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Philippine Normal University
National Center for Teacher Education

**TOWARDS EVOLVING A MODEL FOR MATHEMATICS PROGRAM
OF SPECIAL SCIENCE ELEMENTARY SCHOOLS**

A Dissertation
Presented to the Faculty of the College of
Graduate Studies and Teacher Education Research
Philippine Normal University
Manila, Philippines

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy in Mathematics Education

RENELYN R. CORDIAL

April 2014



APPROVAL SHEET

This dissertation entitled "**TOWARDS EVOLVING A MODEL FOR MATHEMATICS PROGRAM OF SPECIAL SCIENCE ELEMENTARY SCHOOLS**" prepared and submitted by **RENELYN R. CORDIAL** in partial fulfillment of the requirements for the degree, Doctor of Philosophy (Ph.D.) in Mathematics Education, has been examined and recommended for Oral Examination.

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LYNN C.



DEDICATION

HUMBLY DEDICATED TO
ALMIGHTY GOD,
MY BELOVED FAMILY,
AND
TO ALL SSES ADMINISTRATORS, TEACHERS,
AND STAKEHOLDERS



ABSTRACT

Researcher: **Renelyn Rodil Cordial**

Title: **TOWARDS EVOLVING A MODEL FOR MATHEMATICS
PROGRAM OF SPECIAL SCIENCE ELEMENTARY SCHOOLS**

Key Concepts: **Mathematics Program, Special Science Elementary Schools**

Degree: **Doctor of Philosophy**

Specialization: **Mathematics Education**

Advisers: **Rene R. Belecina, Ph.D.**

Gladys C. Nivera, Ph.D.

This study aimed to evaluate the status, strengths and weaknesses of the Mathematics Program of selected Special Science Elementary Schools in the province of Cavite during the school year 2012-2013, as input for the development of a model for Mathematics program of Special Science Elementary Schools.

Using a descriptive-evaluative research design and employing the purposive sampling, this study involved the participation of six (6) principals, six (6) Grade 6 Mathematics teachers, and 143 sample-pupils whose grades were evaluated. This study made use of questionnaires developed by the researcher and validated by experts. The questionnaires were the main instrument in gathering the needed data which were analyzed and interpreted using the statistical tools such as frequency, weighted mean, percentage, and ranking. To test the significance, One Way ANOVA was employed.



To determine the strengths and weaknesses of the implemented program, the current practices of the schools included in the study were evaluated against the standards set by the Department of Education for Special Science Elementary Schools.

Based on the findings of the study, it could be concluded that all the schools in this study showed a balanced and clear Vision and Mission statement; however, other stakeholders like the parents seemed to have little information and orientation about it. In terms of all the inputs, public science elementary schools in this study implemented the policies and standards set by the DepEd for science elementary schools; on the other hand, other private schools did not observe some set of standards and policies like academic program, time allotment, and placement. In terms of the pupils' academic achievement, results from both groups had satisfactory level only. Both groups of respondents perceived that there were problems encountered in the implementation of the Mathematics program; however, these were described as not serious. In addition, no significant difference was found on the evaluation of the school principals and the Mathematics teachers on the following: Vision and Mission, Goals and Objectives, problems encountered in the implementation of mathematics program, adequacy of seminars and trainings, curriculum standards, and adequacy of facilities. The proposed program, which evolved out of the results of this study, is subject for evaluation, but this could be adopted to help them enhance their current Mathematics Program.



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Chapter I

THE PROBLEM AND ITS BACKGROUND

Introduction

Change is an interesting fact which happens in every fiber of the society, and it is difficult if not impossible to escape from it. Change is constant. People might like to think that at some time there is a period of stability; however, change still occurs. Just by living, people experience change which ranges from being simple, low key, or manageable; on the contrary, it can be substantial, very significant, and extremely difficult to cope with.

The truism that change is naturally occurring in all organizations, including individuals comprising them, is without a doubt, universally accepted. The internal and external environments of these organizations and individuals significantly influence, either positively or negatively, these changes (Sarmiento, 2012).

Today, there is so much emphasis on science and technology. Curricular refinement and reforms pave the way to cater to the ever-changing world which is now propelled by great advancements in science and technology. Science and technology play the dynamic role for socio-economic development, setting up the scientific background for decisions and policies for the government, contributing



to set up the competition capacity for the economy to successfully implement the industrialization and modernization career for any nation.

Furthermore, advances in science and technology enable mankind to achieve more in-depth understanding of the different phenomena, which were considered before as beyond one's imagination. These advances provide man a clearer perspective of the rapid development of the present society, and perhaps, even future societal advances.

In the Philippines, the role of science and technology in national progress and development, including its sustainability, is highly recognized. This is emphasized in the 1987 Philippine Constitution, Article IV of Section 10. It is stated that

“Science and technology are essential for national development and progress. The state shall give priority to research and development, invention, innovation and their utilization to science and technology education, training and services. It shall support indigenous, appropriate and self-reliant, scientific and technological capabilities, and their application to the country’s productive systems and national life.”

Science and technology is not possible without Science and Mathematics. “Science and Mathematics are critical tools of industrialization which we surely need to improve our global competitiveness,” said Education Secretary Br. Armin A. Luistro FSC (D.O. No. 79, s. 2012).



The enhancement of Science and Mathematics proficiency of the Filipino learners is included in the Basic Education Ten Point Agenda of President Aquino who said:

“I will rebuild the science and math infrastructure in schools so that we can produce more scientists, engineers, technicians, technologists, and teachers in our universities so that this country can be more globally competitive in industry and manufacturing. To build a culture for science and math, I will promote science and math clubs and fairs.”

As a response to the trends and challenges brought about by educational change, the Department of Education has introduced reforms and innovations in connection with science and technology, one of which is the implementation of Special Science Elementary School (SSES) Project pursuant to DepEd Order No. 73, s. 2008, DepEd Order No. 51, s.2010 and the latest DepEd Letter Unnumbered from the Director III, OIC, Office of the Director IV dated August 2, 2011.

In support to the mandate of DepEd Order No. 51, s. 2012, strengthening Science Education at the Elementary Level, the Regional Elementary Science and Mathematics Educators Association (RESMEA) in cooperation with the Elementary Education Division (EED) conducted the Regional Training on Enhancement of Teachers on Communicative Science and Mathematics Instruction for the SSES and Gifted/Fast Learners on August 2010. One of the objectives of the activity is to enhance teachers' competencies on content,



pedagogy and assessment for learning with focus on identified least mastered competencies in Science and Mathematics based on Regional Achievement Test (REAT) and address misconceptions in Science and Mathematics.

Science schools, both elementary and secondary, are special schools for more intellectually promising students with the objective of fostering the problem-solving approach of critical thinking. They are separate, not merely special classes in regular schools. As such, they have certain characteristics not found in regular school, although any private or public school can aspire to meet these special minimum standards and be considered as science schools.

A science school has an enriched Science, Mathematics, and English curriculum in addition to the minimum standard requirements of the Basic Education Curriculum. The contact time for the three subjects may be increased by the individual science schools, either in terms of contact time per subject or in additional subjects. Other characteristics of Science Schools are: (1) Strict selection for admission and retention; (2) Teacher must be recommended by the subject area supervisors or newly hired teachers must be superior graduates of education institutions; (3) Science schools must not have more than 40 students in a class, particularly in a laboratory science and language subjects; (4) There must be superior facilities; and (5) Strict selection of school administrator/head.

Science schools are under special schools. They offer a curricula specially designed to address peculiar needs of special groups of students (DECS Service



Manual 2000). The Regional Division Science High School (R/DSHS) provides a secondary education program with additional elective in Science, Mathematics, and English subjects for students who are inclined toward the sciences. There shall be one R/DSHS for each region/division (D.O. No. 69, s.1993).

As part of the expansion program of the Department of Education's Engineering and Science Education Program, the Special Science Elementary School was established to serve as a feeder school for science high schools. This program envisions developing Filipino children who are equipped with scientific and technological knowledge, skills and attitudes; creative and have positive values; and lifelong learning skills to become productive partners in the development of the community and society. It aims to determine the qualities that science inclined learners possess; describe the characteristics of a good special elementary school; and determine the factors inputted into the SSES that significantly contribute to the improved performance of the learners involved in the study.

The Project started in SY 2007-2008 and currently 7 of the 103 expanded SSESs are located in Ilocos, 5 in Cagayan Valley, 10 in Central Luzon, 9 in Southern Tagalog-A (Calabarzon), 5 in Southern Tagalog-B (Mimaropa), 9 in Bicol, 8 in Western Visayas, 5 in Central Visayas, 6 in Eastern Visayas, 2 in Western Mindanao or Zamboanga Peninsula, 5 in Northern Mindanao, 10 in Caraga, 7 in Southern Mindanao, 6 in Cordillera Administrative Region and 9 in National Capital Region. (Philippine Star, 2011)



To enhance the operation of the project, financial subsidy is provided to the implementing schools to be utilized for the enhancement of teachers and school heads capability and participation to conferences, trainings, seminars and immersion training in science oriented schools, development of pupil activities such as investigatory projects, leadership training, workshops, payment of internet subscription, procurement of instructional devices/facilities like science models, apparatuses, video materials, and software in Science, Mathematics and English including maintenance and repair of said facilities.

Moreover, principals and teachers in the implementing schools have the major responsibility of tracking pupils' academic progress, guiding pupils toward activities that foster scientific thinking and culture and ensuring the increase of the yearly mean performance level by at least 5%. Parent's support and other stakeholders in the community are likewise needed for this program to be successful.

What could be the possible factors that affect the academic performance of the Filipino learners? Studies have proven that the academic performance of learners can be attributed to many factors like the learners themselves, their teachers, their learning environment, lack or inadequacy of physical resources, inappropriate teaching strategies, and a lot more. Therefore, it is very important to look into and evaluate each of these factors to ensure positive learning outcome since evaluation is a vital part of a curriculum.



Ifamuyiwa (2006) defines evaluation as a process of gathering valuable information on attainment of educational objectives, analyzing and fashioning information to aid judgment on the effectiveness of teaching or an educational program. Evaluation is the process whose duty is the systematic and objective determination of merit, worth, or value. Without such a process there is no way to distinguish the worthwhile from worthless, and to accomplish this, gathering data and using the data for judgment and decision-making with respect to agreed standards are two required process dimensions.

Furthermore, evaluation is a participating process that involves the stakeholders in the various tasks of evaluation so that results are fully comprehensive to project participants. The question of who is invited to participate in the process and the nature of their participation determine the extent to which participating evaluators exemplify the principles of transformative paradigm (Thackary, as cited in Rafael, 2007).

Premised on the above statements and information, there is a need to evaluate the Mathematics program of the special science elementary schools in the province of Cavite and determine their status focusing on the following: (1) vision and mission; (2) goals and objectives; (3) problems encountered in the implementation of the mathematics program; (4) qualification of the school principal, mathematics teacher, and the profile of grade six pupils; (5) academic program and policies; (6) facilities and instructional materials; and (7) academic



performance of the learners. The findings of the study served as the bases of recommendations to further improve the Mathematics program of the special science elementary schools.

Conceptual Framework

This study was anchored on Stufflebeam's CIPP Model of evaluation. Corresponding to the letters in the acronym CIPP, this model's core parts are Context, Input, Process, and Product evaluation. In general, these four parts of an evaluation respectively ask: What needs to be done? How should it be done? Is it being done? Did it succeed? These components can be viewed as separate forms of evaluation, but they can also be viewed as steps or stages in a comprehensive evaluation.

The CIPP Model for evaluation is a comprehensive framework for guiding formative and summative evaluations of programs, projects, personnel, products, institutions, and systems. This model was introduced by Daniel Stufflebeam in 1966 to guide mandated evaluations of U.S. federally funded projects because these emergent projects could not meet requirements for controlled, variable-manipulating experiments, which then were considered the gold standard for program evaluations. Since then, the model has been widely applied and further developed. Those applying or contracting others to apply the model have



included government officials, foundation officers, program and project staff, international assistance personnel, school administrators, physicians, military leaders, and evaluators. The model is configured for use in internal evaluations conducted by an organization's evaluators, in self-evaluations conducted by project teams or individual service providers, and in contracted external evaluations.

Good, as cited in Calmorin (2004), defined evaluation as the consideration of evidence in the light of value standard and in terms of the particular situations and the goals which the groups and individuals are striving to attain. For instance, teachers and professors evaluate students' achievements simply because of their concern whether or not they are able to reach the purpose or goal of their teaching efforts. In evaluation, statistical treatment is involved to determine the exact meaning of the value whether within the standard or substandard. In other words, if students' achievements are within the standard, they pass; and if substandard, they fail.

Calmorin (2004) explained evaluation in terms of its different scopes and the characteristics of each. The first scope is concerned with the assessment of curriculum offerings. This means that the courses offered should be evaluated to determine if they are still relevant, realistic, and responsive to the changing needs and problems of the society. Next in scope is the assessment of school programs. School programs must be appraised to determine if teachers are not



over-loaded or under loaded. Third is the assessment of instructional materials. Instructional materials like books, references, visual aids, devices, and many others should be assessed to ascertain if they are adequate and updated. Fourth in scope is the assessment of instructional facilities like computers, projectors, audio-visual equipment, laboratory equipment, physical plant, library holdings, and many others should be evaluated if they are adequate, Fifth scope is the assessment of teachers and professors. The teachers and professors should be evaluated if they possess the qualities of the acronym MODERN TEACHER (Model, Obedient, Dedicated, Economical, Resourceful, Noble- Talented, Efficient, Active, Creative, Honest, Effective, and Research-oriented); to determine also if they can deliver the goods and services to the students effectively, efficiently, and economically; and to evaluate if they are qualified and competent to teach the subjects they are handling. Another scope is the assessment of pupils/students. The pupils or students should be evaluated to determine whether they reached the goals of the learning tasks. Still under scope is the assessment of graduates. Graduates should be evaluated to determine if they passed the board examination; and if they are employed, underemployed or unemployed. Finally, the scope of evaluation includes the assessment of school managers. School managers should be evaluated to determine if they are democratic in dealing with their subordinates; facilitator to the needs of teachers and students; understanding to the problems of their subordinates; and honest and not corrupt.



One of the most commonly used methods of evaluation in education is the Context Input Process and Product (CIPP) Model. According to Stufflebeam and Shinkfield (1985), context evaluation includes examining and describing the program context, target population, needs, opportunities for addressing needs, problems underlying the needs, and whether program goals are sufficiently responsive to the assessed needs. It specifies goals and objectives on the basis of context evaluation.

In this study, context evaluation pertains to the schools' vision and mission, goals and objectives of the Mathematics program, and the problems encountered by the school principal and the mathematics teachers in the implementation of the mathematics program.

Input evaluation includes some of the following: demographic profile of the students, course content and objectives, resources/materials available, teaching skills, classroom environment, academic program and workload, and number of teachers (Stufflebeam, 1983).

In this study, input evaluation pertains to the different resources such as the qualification of the school principal and mathematics teacher, profile of the grade six pupils, the implementation of the requirements for admission and retention to the program, and the adequacy of facilities and instructional materials.



Process evaluation includes examining how a program is being implemented, monitoring how the program is performing, auditing the program to make sure that it is following the required legal and ethical guidelines, and identifying defects in the design or in the implementation of program (Payne,1994).

In this study, the process is focused on organization of the academic program for mathematics such as the curriculum standards in mathematics, time allotment for math subjects, teaching methodologies, workload of teachers, assessment for learning, and the extent of administrative support.

Product evaluation includes determining and examining the general and specific outcomes of the program (i.e., which requires using impact or outcome assessment techniques); measuring anticipated outcomes; assessing the merit of the program; and conducting a retrospective benefit/cost assessment (to establish the actual worth or value of the program). This component evaluates the outcome of the program in deciding to accept, improve, or terminate the program using the criteria related to the goals and objectives (Payne, 1994).

In this study, the product refers to the academic performance of the pupils in Mathematics.

The framework illustrates how the study was anchored on CIPP Model where the VMGO and the needs were established under the Context evaluation,



followed by specifying the available human and physical resources to meet the VMGO and the needs under the Input evaluation. Then the implementation of the academic program for mathematics was assessed using the Process evaluation followed by assessing the outcome of the program under the Product evaluation. Based on the evaluation results, a model was evolved in the attempt to improve the Mathematics program of special science elementary schools of the country.

It is on these concepts and theories that the study rests heavily for the formulation of the paradigm of the study as illustrated in Figure 1.

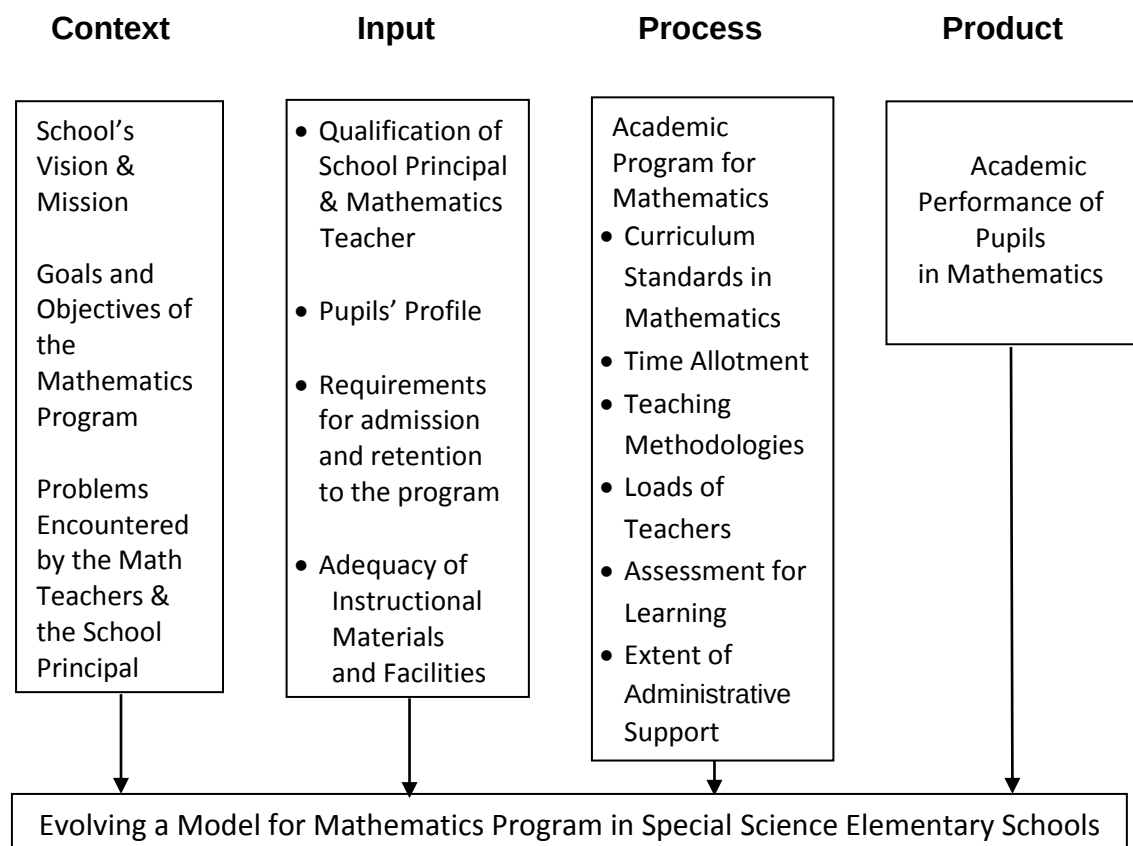


Figure 1. Conceptual Paradigm



Statement of the Problem

The main purpose of the study was to evaluate the status of Mathematics Program of selected Special Science Elementary Schools in the Division of Cavite. The results served as input in evolving a model for the mathematics program of special science elementary schools.

Specifically, this study sought to answer the following questions:

1. What is the present status of SSES in the following components:
 - 1.1 Vision and Mission;
 - 1.2 Goals and Objectives;
 - 1.3 Problems encountered in the implementation of the Mathematics program;
 - 1.4 Qualification of the school principal;
 - 1.5 Qualification of the mathematics teachers;
 - 1.6 Pupils' profile;
 - 1.7 Pupil admission, retention, and promotion to the program;
 - 1.8 Instructional materials;
 - 1.9 Physical facilities;
 - 1.10 Implementation of mathematics program in terms of:
 - 1.10.1 Curriculum standards in mathematics;
 - 1.10.2 Time allotment of mathematics class;
 - 1.10.3 Teaching methodologies;



- 1.10.4 Workload of teachers;
- 1.10.5 Assessment for learning; and
- 1.10.6 Extent of administrative support?
- 1.11 Academic performance of the grade six pupils in mathematics?
- 2. Are there significant differences in the evaluation of the school principals and the mathematics teachers on the following variables:
 - 2.1 Vision and Mission;
 - 2.2 Goals and Objectives;
 - 2.3 Problems encountered in the implementation of Mathematics program;
 - 2.4 Physical facilities; and
 - 2.5 Curriculum standards in mathematics?
- 3. What are the perceived strengths and weaknesses of the program in terms of the different areas evaluated?
- 4. Based on the findings of the study, what model in mathematics program of the special science curriculum could be evolved?

Significance of the Study

The results of this study would be beneficial to the following:



Pupils. The study would be geared toward suggesting ways and means to improve all the predictors of academic performance for the benefit of the pupils.

Parents. This study would inform the parents about the status of Mathematics program of the school where their children are enrolled. Being one of the stakeholders, they would be informed about the academic performance of their children in mathematics which will become their basis in discussing ways and means to help the schools enhance the academic performance of their children.

Teachers. The study will help the Mathematics teachers determine their weaknesses and strengths; thus, enhance what is good and develop those that need improvement so that they can become competent, better, and effective teacher. Through this study, they will determine the different teaching strategies that will make teaching of Mathematics easier and more effective.

School Principals. This study will help the school administration to determine and improve the current status of the Mathematics program of their schools which will become the basis in decision-making and planning of better implementation and management of Mathematics program, particularly on academic program, educational qualifications of Math



teachers, teaching and assessment , math teachers' training, supervision and administration, and schools' resources.

Department of Education. Through this study, the Department of Education can further assess and review policies on the implementation and management of Mathematics program in the different science elementary schools particularly on academic program, educational qualifications of Math teachers, teaching and assessment, math teachers' training, supervision and administration, and schools' resources.

Future Researchers. The results of this study may guide them in pursuing similar topic and objectives under different locale, population, and other variables.

Scope and Delimitation of the Study

This study was undertaken to evaluate the Mathematics program of special science elementary schools in the province of Cavite during the school year 2012-2013. It covered areas such as the schools' goals and objectives in Mathematics program, school's vision and mission, the pupils' profile and academic performance in Mathematics, the mathematics teachers and school principal's qualifications, academic program in Mathematics, assessment in



Mathematics, physical facilities, and the problems encountered in teaching Mathematics.

This study was limited to the evaluation of Mathematics program of the special science elementary school in the province of Cavite, and it did not cover the other subject areas and the secondary level. In terms of the respondents, only the faculty members who handled Mathematics in Grade 6 were included. The Grade 6 pupils and their academic performance based on their GPA in Mathematics from First Grading to Fourth Grading period of the school year 2012-2013 were used. The trainings and seminars in Mathematics, teaching strategies of the teachers, facilities, and instructional materials which the Math teachers needed in teaching Mathematics were also included. In terms of school administration, the study included only the school principal.

To gather the needed data, survey questionnaires were utilized and administered to the pupils, parents, mathematics teachers, and school principal-participants.

Definition of Terms

For better and clearer understanding, the following terms are operationally and conceptually defined.



Academic Performance. This refers to the learners' academic progress. In this study, it refers to the pupils' grade point average (GPA) in Mathematics at the end of school year 2012-2013.

Administrative Support. As used in this study, this refers to the tangible and non-tangible support provided by the school principals in accordance with the philosophy, goals, and objectives of the school.

Assessment for Learning. This refers to a comprehensive process that involves measuring, describing, evaluating, and communicating the quality of learning and learners' performance as well as teachers (Zulueta, 2008). In this study, this refers to the different output or performance or pen-paper test administered by the Mathematics teachers.

CIPP Model. It is a comprehensive framework for guiding formative and summative evaluations of programs, projects, personnel, products, institutions, and systems (Santos, 2007). This model was introduced by Daniel Stufflebeam. In this study, this refers to the evaluation model which was utilized in determining the status of the Mathematics program of special science elementary schools of Cavite.

Context Evaluation. This refers to the part of the CIPP Model which provides rational for determination of objectives. It defines relevant environment and describes the desired and actual conditions of environment as it also identifies unmet needs and unused opportunities. In this study, this



includes the school's vision and mission statement, goals and objectives for Mathematics Program, and problems encountered both by the Mathematics teachers and school principal in implementing the Mathematics program.

Evaluation. It is a systematic determination of a subject's merit, worth, and significance, using criteria governed by a set of standard (Calmorin, 2004). It can assist an organization to assess any aim, realizable concept or proposal, or any alternative, to help in decision-making; or to ascertain the degree of achievement or value in regard to the aim and objectives and results of any such action that has been completed (Calmorin 2004). In this study, this refers to the systematic determination of the current status of the Mathematics programs of special science elementary schools of Cavite. This covers the human resources, academic program, physical resources, financial resources, academic performance of the pupils, and the common problems encountered both by the teachers and the school principals in relation to the school's Mathematics program. Operationally, this refers to the process used to determine the current status of the Mathematics Program of selected special science elementary schools in Cavite.

Goals and Objectives. Goals refer to the broad, general statement of what the program, course, or activity intends to accomplish. They describe broad



learning outcomes and concepts stating with what the learners will learn. Objectives on the other hand, are specific statements that describe the expected results of teaching activities and establish foundation of assessment. They reflect different levels of learning.

Input Evaluation. This is the part of the CIPP Model which determines how to use resources. It assesses capabilities of responsible agencies. It also assesses strategies for achieving objectives, and design for implementing a selected strategy. In this study, this refers to the pupils' profile, mathematics teachers, and school principal's qualifications; implementation of admission, promotion, and retention policies; and adequacy of facilities and instructional materials.

Instructional materials. These refer to the educational resources which are used to aid instruction and help improve the learners' knowledge, abilities, and skills. In this study, these are the different materials that the teachers use in teaching Mathematics. Some of these are blocks, cubes, pictures/illustrations, and technology-based materials.

Mathematics Program. This is the implementation and management of Mathematics as a subject area in school. In this study, this refers to the implementation and management of Mathematics which includes academic program, goals in teaching mathematics, time allotment, learning competencies, strategies in teaching and assessment for



learning, teachers and school principals' qualifications, schools' resources, and problems encountered in the implementation and management of Mathematics program.

Process Evaluation. This refers to the part of the CIPP Model which detects or predicts defects in procedure, design, or its implementation. Moreover, it provides information for programming decisions. In this study, this refers to the academic program for Mathematics, curriculum standards, time allotment, teaching approaches, loads of teachers, assessment for learning, and extent of administrative support.

Product Evaluation. This refers to the part of the CIPP Model which measures and interprets attainment. In this study, this refers to the academic performance of the pupils in Mathematics as shown in their GPA during the school year 2012-2013 and the evolved model for Mathematics program.

Profile of the grade six pupils: As used in this study, this refers to the age, gender, and favorite subject of the participants of the study.

Pupil admission. As used in this study, this refers to the school's policies and guidelines in the placement in special science class of pupils who enroll in an elementary program.

Qualification of the elementary mathematics teachers: As used in this study, this includes number of years in teaching mathematics, educational



attainment, eligibility, seminars and trainings attended in mathematics, academic preparation, and teaching performance.

Qualification of the school principal/administrator: As used in this study, this includes the number of years as school principal/administrator, educational attainment, eligibility, and seminars and trainings attended.

Retention to the program and promotion. As used in this study, this refers to the school's policies and guidelines in retaining in the same grade level or promoting every pupil to the next grade level.

School's Mission Statement. In this study, this refers to a general statement outlining the purpose which guides the practices of a school.

School's Vision Statement. In this study, this refers to the school's intended direction, a statement declaring the school's ideals and core organizational values. It is the school's statement to describe its goals for the future.

Special Science Elementary Schools (SSES). These are the schools that implement special science in the elementary (D.O. No. 51, s.2010). In this study, this refers to the private and public elementary schools in Cavite that offer specialized program in Science.

Teaching Loads. As used in this study, these refer to the specified daily teaching assignment of teachers in reference to time, subject, and class.



Teaching methodologies. These refer to the different systematic plans employed by teachers to achieve learning objectives. They are series of related and progressive acts performed by the teachers and students to achieve the objectives of the lesson (Salandanan, 2009). In this study, these include the following: Discovery/inquiry method, Investigatory, Learning by Doing, Problem-solving, Guided Practice, Drills and Charts, Small/Whole Group Instruction, Cooperative/Independent Learning, and Concept Formation.

Time allotment. This refers to the number of minutes allocated in every subject area indicated in the academic program. In this study, this refers to the number of minutes allocated for teaching Mathematics, daily or within the week.



Chapter II

REVIEW OF RELATED LITERATURE

This chapter presents the related literature and studies that provide valuable insights relevant to the present study.

On Evaluation and Program Evaluation

Evaluation is the process of delineating, obtaining, providing, and applying descriptive and judgemental information about the merit and worth of some object's goals, design, implementation, and outcomes to guide improvement decisions, provide accountability reports, inform institutionalization/dissemination decisions, and improve understanding of the involved phenomena (Stufflebeam, 1985)

Furthermore, according to Rossi, Lipsey, and Freeman (2004), evaluation is the structured interpretation and giving of meaning to predict actual impacts of proposals or results. It looks at original objectives, and at what is either predicted or what was accomplished, and how it was accomplished. So evaluation can be formative, which is taking place during the development of a concept or proposal, project or organization, with the intention of improving the value or effectiveness of the same. It can also be summative, drawing lessons from a



completed action or project or an organization at a later point in time or circumstance.

According to Santos (2007), when evaluation is viewed from the micro or classroom level, it may be defined as a systematic, continuous, and comprehensive process determining the growth and progress of the pupils towards objectives or values of the curriculum. However, when viewed more generally, evaluation may be characterized as the systematic determination of merit, worth, and significance of something or someone. Evaluation often is used to characterize and appraise subjects of interest in a wide range of human enterprises, including the Arts, business, computer science, criminal justice, engineering, government, health care, and other human services.

Calmorin (2004) cited seven functions of evaluation in education. Accordingly, measurement and evaluation help determine student's achievement by giving tests and evaluating the test results. Students' achievements can be determined whether they have reached the goals of the learning tasks or not. Another function is to evaluate instruction. The effectiveness and ineffectiveness of instruction is ascertained through measurement and evaluation. For instance, take the case of a teacher or professor who gives an achievement test to the students. If the result of the test is high, it means instruction is effective; if students get low for instance, instruction is perhaps ineffective. Another function of evaluation is to motivate learning. Upon knowing the results of the



achievement test, the student's enthusiasm is aroused especially if s/he gets a high score; otherwise, if the score is low, s/he might be reminded to strive and work hard to get higher score in the next examination. Evaluation also can predict success or failure. For example, students who always get high scores in all subjects are sure to pass, which could be interpreted as success in academic courses. Likewise, evaluation functions to diagnose the nature of learners' difficulties. For instance, a teacher or professor gives diagnostic test to his/her students. Through the results of this test the teacher or professor can determine the difficulties or weaknesses of the students; consequently, remedial instruction can be planned and implemented. Still it functions to evaluate teachers' performance. For instance, the National Achievement test (NAT) is given for the Grade VI pupils and first year high school students. If the results of this test are within the mean, the teachers' performance can be inferred as satisfactory; if they are above the mean, very satisfactory; and if below the mean, unsatisfactory. Take the case of the NAT Regional mean, for examples. which is 79 and the NAT mean score of Grade VI pupils in certain school is 79, this could be interpreted as satisfactory teaching performance; if the mean is 85, it could be considered very satisfactory; 90 or above could mean outstanding teaching performance; and below 79 could be seen as unsatisfactory performance. Another function is the evaluation of school's facilities. Adequacy and inadequacy of school's facilities are determined through measurement and evaluation. For



instance, a marine engineering program of a school applying for accreditation could be approved or disapproved based on the results of evaluation.

The results of any evaluation help policy-makers make decisions, which according to Cronbach (1991) could be categorized into three types of decisions requiring evaluation. The first decision has to do with course improvement, deciding what instructional materials and methods are satisfactory and where change is needed. The second decision is about individuals,- identifying the needs of the pupil for the sake of planning his/her instruction, judging pupil merit for the purposes of selection and grouping, and acquainting the pupil with his/her own progress and deficiencies. The third is on administrative regulation, - judging how good the school system is, and how good individual teachers are, among others.

Santos (2006) stated that evaluation designates a more comprehensive concept of measurement than is implied in conventional tests or examinations because the emphasis in the evaluation is based upon broad personality change and the major objectives in the educational program. This includes not only subject matter achievement but also values, attitudes, interest, ideas, ways of thinking, work habits, personal, spiritual, and social adaptability.

The American Evaluation Association (as cited in Santos, 2007) has created a set of guiding principles for evaluators which are also applicable in Philippine setting. These guiding principles are systematic inquiry, competence,



integrity/honesty, respect for people, and responsibilities for general and public welfare.

Evaluation has a long history, which ultimately leads to the use of various evaluation models by curriculum specialists. Evaluation models differ greatly with regard to curriculum evaluation approaches. The underlying reasons behind this variety of classifications are generally related to evaluators' diverse philosophical ideologies, cognitive styles, methodological preferences, values, and practical perspectives. Due to this diversity in curriculum evaluation, it is not possible to come up with only one single model. As Erden (1995) stated, researchers can choose the most appropriate model in terms of their purposes and conditions during their curriculum evaluation models or they can develop a new one by making use of the existing ones.

Further, several evaluation approaches can be used depending on the areas to be evaluated, such as objectives-oriented evaluation approach, management-oriented evaluation approach, consumer-oriented evaluation approach, expertise-oriented evaluation approach, adversary-oriented evaluation approach, and participant-oriented evaluation approach (Fitzpatrick, Sanders, and Worthen, 1997).

The distinguishing feature of an objectives-oriented evaluation approach is that the purposes of some activity are specified and then evaluated based on the extent to which those purposes are achieved. Meanwhile, an evaluation



approach which is focused on management is anchored on the rationale that evaluative information is an essential part of good decision making and that the evaluator can be most effective by serving administrators, policy makers, boards, practitioners, and others who need good evaluative information. On the other hand, an evaluation approach that is consumer-oriented is done by independent agencies or individuals who take responsibility to gather information on educational or other human services products, or assist others in doing so. These products generally include curriculum packages, workshops, instructional media, in-service training opportunities, staff evaluation forms or procedures, new technology, software and equipment, educational materials and supplies, and even services to agencies, while expertise-oriented evaluation approach depends primarily upon professional expertise to judge an institution, program, product or activity. Additionally, an adversary-oriented evaluation approach in its broad sense refers to all evaluations in which there is a planned opposition in the points of view of different evaluators or evaluation teams. Finally, the participant-oriented evaluation approach aims at observing and identifying all of the concerns, issues, and consequences integral to human services enterprise.

Fitzpatrick, Sanders, and Worthen, (2004) highlighted the aspect of each approach under eight headings such as proponents, purpose of evaluation, distinguishing characteristics, past uses, contributions to the conceptualization of an evaluation, criteria for judging evaluations, benefits, and limitations.



Rafael (2007) described several models of evaluation and the details entailed in applying them. For instance, the Tyler model includes the process required in determining the extent to which the objectives of a program are actually being attended. Tyler's approach begins with the establishment of broad goals or objectives, and then progresses on to classifying the goals or objectives, defining objectives in behavioral terms, finding situations in which achievement of objectives can be shown, development of selected measurement technique/s, collecting performance data, and comparing performance data with behaviorally stated objectives. Meanwhile, the Metfessel and Michael's model enumerates the following as important consideration in evaluation: (a) involvement of stakeholders as facilitators of program evaluation; (b) formulation of a cohesive model of goals and specific objectives; (c) translation of specific objectives into a communicative form; (d) selection or construction of instruments to furnish measures allowing inferences about program effectiveness; (e) carrying out periodic observation using content-valid tests, scales, and other behavioral measures; (f) analyzing data using appropriate methods; (g) interpreting the data using standards of desired levels of performance over all measures; and (h) developing recommendations for the further implementation, modification, and revision of broad goals and specific objectives (Fitzpatrick, 1997).

The Provus' Discrepancy Model (1973), on the other hand, views evaluation as a process of agreeing on standards, determining whether a discrepancy exists between the performance of some aspects of a program and



the standard set for performance, and using information about discrepancies to decide whether to improve, maintain, or terminate the program or some aspects of it (Levine, Brown, *Fitzgerald*, Goplerud, Gordon, Jayne-Lararus, Rosenberg, & Slater, 2005).

Provus (1973) further explained that, as a program is being developed, it goes through four developmental stages, with a fifth added as an optional stage. These are (a) definition/design, (b) installation, (c) process, (d) product, and (e) cost-benefit analysis (optional).

During the definition or design stage, the focus of work is on defining goals, processes, or activities; and delineating necessary resources and participants to carry out the activities and accomplish the goals. The evaluator's job at the design stage is to see that a complete set of design specifications is produced and that they meet certain criteria, which are theoretical and structural soundness.

At the installation stage, the program design or definition is used as the standard against which to judge program operation. The evaluator performs a series of congruency tests to identify any discrepancies between expected and actual implementation of the program or activity. The degree to which program specifications are followed is best determined through firsthand observation. If discrepancies are found at this stage, Provus proposed either changing the program definition, making adjustments in the installation (such as preparing a



special in-service workshop), or terminating the activity if it appears that further development would be futile.

During the process stage, evaluation focuses on gathering data on the progress of participants to determine whether their behaviors changed as expected. He used the term enabling *objective* to refer to those gains that participants should be making if longer-term program goals are to be reached. If certain enabling objectives are not achieved, the activities leading to those objectives are revised or redefined.

At the product stage, evaluation is used to determine whether the terminal objectives for the program have been achieved. He distinguished between immediate outcomes, or terminal objectives, and long-term outcomes, or ultimate objectives. He encouraged the evaluator to go beyond the traditional emphasis on end-of-performance and to make follow-up studies based on ultimate objectives a part of all program evaluations.

Provus (1973) also suggested an optional fifth stage that called for cost-benefit analysis and comparison of results with similar cost analyses of comparable programs. In recent times, with funds for human services becoming scarcer, cost-benefit analyses have become an essential part of almost all program evaluations.



Another is the Stake's mode which is an initial step in evaluation of an educational program. Stake's emphasis is on two basic acts of evaluation- description and judgment- also referred to as the two "countenance of evaluation". Certain reminders or points have to be observed by the evaluator in order to help him/her organize data collection and interpretation. S/He must provide background, justification, and description of the program rationale including the need. Then s/he lists the intended antecedents (inputs, resources, and existing conditions); transactions (activities, process); and outcomes. S/He records observed antecedents, transaction and outcomes (including observations of unintended features of each). After doing the preceding activities, the evaluator explicitly states the standards (criteria, expectations, performance of comparable programs) for judging program antecedents, transactions and outcomes. The last activity is to record judgments made about the antecedent conditions, transaction, and outcomes. The evaluator analyzes information in the description matrix at the congruence between intents and observations and by looking at dependencies (contingencies) of outcomes on transactions and antecedents. Judgment is made by applying standards to the descriptive data.

Evaluating a program performance is an essential part of any institution or organization to manage results. The program cycle (design, implementation, monitoring, and evaluation) fits into the broader cycle of an institution's management system. Plans set out objective and criteria for success, while performance reports assess what has been achieved. Measuring performance is



an essential link in this cycle. Evaluation should produce timely, relevant, credible, and objective findings and conclusion of program performance based on valid and reliable data collection and analysis (Public Affairs Branch, Treasury Board of Canada Secretariat).

Program evaluation is a systematic method for collecting, analyzing, and using information to answer questions about projects, policies and programs, particularly about their effectiveness and efficiency. In both the public and private sectors, stakeholders will want to know if the programs they are funding, implementing, voting for, receiving, or objecting to are actually having the intended effect and to what cost. This definition focuses on the question of whether the program, policy, or project has, as indicated, the intended effect. However, equally important are questions such as how the program could be improved,- whether the program is worthwhile; whether there are better alternatives; if there are *unintended* outcomes; and whether the program goals are appropriate and useful. Evaluators help to answer these questions, but the best way to answer the questions is for the evaluation to be a joint project between evaluators and stakeholders (Wikipedia.org).

According to Shackman (1998), program evaluation is the systematic assessment of the operation and/or outcomes of a program or policy, compared to a set of explicit or implicit standards as a means of contributing to the improvement of the program or policy.



Program evaluation is the systematic assessment of the processes and/or outcomes of a program with the intent of furthering its development and improvement. As such, it is a collaborative process in which evaluators work closely with program staff to craft and implement an evaluation design that is responsive to the needs of the program. For example, during program implementation, evaluators can provide formative evaluation findings so that program staff can make immediate, data-based decisions about program implementation and delivery. In addition, evaluators can, toward the end of a program or upon its completion, provide cumulative and *summative* evaluation findings, often required by funding agencies and used to make decisions about program continuation or expansion (University of Washington, 2005).

Program evaluation is a valuable tool for program managers who are seeking to strengthen the quality of their programs and improve outcomes for the children and youth they serve. Program evaluation answers basic questions about a program's effectiveness, and evaluation data can be used to improve program services.

While there are many different types of program evaluations, and many terms are used to describe them, evaluations are typically divided into two major categories: process evaluations and outcome evaluations (U.S. Department of Health and Human Services, 2003). Process evaluations assess whether an intervention or program model was implemented as planned, whether the



intended target population was reached, and whether the major challenges and successful strategies associated with program implementation were accounted for. However, outcome evaluations determine whether, and to what extent, the expected changes in child or youth outcomes occur and whether these changes can be attributed to the program or program activities.

Metz (2007) cited several reasons to conduct program evaluation. Accordingly, program evaluation can find out “what works” and “what does not work.” A process or outcome evaluation enables program managers to answer basic questions about a program’s effectiveness. Knowing “what works” helps program managers to focus resources on the essential components of the program model that benefit participants and volunteers; knowing “what does not work” allows program managers to improve and strengthen their service delivery models. Not knowing what is working may waste valuable time and resources. Also, a program evaluation can showcase the effectiveness of a program to the community and funders because the findings can demonstrate to a community and to funders that a program is worthwhile. Sharing findings within the community can serve as a good outreach tool for attracting collaborative partners, recruiting participants and volunteers, and building trust with families and community members. Also, funders often require that a program evaluation be conducted when they agree to fund a program, and some funders will not fund, or re-fund, a program until an evaluation has been conducted and outcomes have been demonstrated. Additionally, a program evaluation can



improve staff's frontline practice with participants. Improving how frontline staff members deliver services to children and youth will increase the likelihood that a program will achieve positive outcomes with program participants. In the same manner, conducting program evaluation can allow a program manager to systematically assess staff's performance, and figure out where staff members are succeeding and where they may need more support or training. An evaluation can also provide staff with opportunities to discuss the challenges they face and offer potential solutions. Moreover, a program evaluation can increase a program's capacity to conduct a critical self- assessment and plan for the future. Conducting an evaluation either internally or with an outside evaluator will build an organization's capacity to conduct critical self-assessments, including conducting staff and program needs assessments, measuring staff performance, and assessing whether program objectives have been met. This will strengthen program operations and, consequently, improve outcomes for those served. Knowing how and for whom the program is effective, and which ways services can be strengthened are essential building blocks for an organization's strategic plan. Having the goal and the capacity for self-assessment allows for ongoing reflection and planning and helps create a continuous learning organization.

Further, program evaluation can build knowledge for the out-of-school time field. Contributing to the evidence, based on what works in out-of-school time programming, it benefits everyone trying to make a difference in the lives of the children and youth who participate in these programs. Sharing knowledge



with peers on what has been learned about programs can ensure that other program managers and staff avoid mistakes and that successful and effective strategies are replicated.

On CIPP Model

The CIPP model by Daniel Stufflebeam is one of the most frequently used models in program evaluation whose evaluation phases are (1) Context, (2) Input, (3) Process, and (4) Product. Stufflebeam (2003) viewed evaluation as the process of delineating, obtaining, and providing useful information for judging decision alternatives. These processes are executed for four types of administrative divisions each of which represents a type of evaluation which may be conducted independently or in an integrated sequence. They can be listed as follows: (a) Planning decisions - Context Evaluation; (b) Structuring decisions - Input Evaluation; (c) Implementing decisions - Process Evaluation; and (d) Recycling decisions to judge and react to program attainments - Product Evaluation.

Context evaluation involves studying the environment of the program. Its purpose is to define the relevant environment, portray the desired and actual conditions pertaining to that environment, focus on unmet needs and missed opportunities, and diagnose the reason for unmet needs (Ornstein and Hunkins, 1998). Determining what needs is to be addressed by a program helps in defining objectives for the program (Fitzpatrick, Sanders and, Worthern, 1997).



The results of a context evaluation are intended to provide a sound basis for either adjusting or establishing goals and priorities and identifying needed changes (Stufflebeam, 2003). One suggested use of context evaluation is a means for a school district to communicate with the public to achieve a shared understanding of the district's strengths, weaknesses, needs, opportunities, and pressing problems. Other uses are to convince a funding agency of the worth of a project, to develop objectives for staff development, to select schools for priority assistance, and to help parents or advisers focus on developmental areas requiring attention (Gredler, 1996). Context evaluation is really a situational analysis – a reading of the reality in which the individuals find themselves and an assessment of that reality in light of what they want to do. This diagnosis stage of evaluation is not a one-time activity. It continues to furnish baseline information regarding the operations and accomplishments of the total system (Ornstein and Hunkins, 1998).

The second stage of the model, input evaluation is designed to provide information and determine how to utilize resources to meet program goals. Input evaluators assess the school's capabilities to carry out the task of evaluation; they consider the strategies suggested for achieving program goals, and they identify the means by which a selected strategy will be implemented. Input evaluates specific aspects or components of the curriculum plan.



An important component of this analysis is to identify any barriers or constraints in the client's environment that may influence or impede the operation of the program. In other words, the purpose of input evaluation is to help clients consider alternatives in terms of their particular needs and circumstances and to help develop a workable plan for them (Stufflebeam and Shinkfeld, 1985).

The focus of process evaluation is the implementation of a program or a strategy to provide feedback about needed modification if the implementation is inadequate. That is, are program activities on schedule? Are they being implemented as planned? Are available resources being used efficiently? And do program participants accept and carry out their roles? In addition, "process evaluation should provide a comparison of the actual implementation with the intended program, the costs of the implementation, and participants' judgments of the quality of the effort" (Stufflebeam and Shinkfeld, 1985. p. 175). Process evaluation includes three strategies. "The first is to detect or predict defects in the procedural design or its implementation stage, the second is to provide information for decisions, and the third is to maintain a record of procedures as they occur." This stage, which includes the three strategies, occurs during the implementation stage of the curriculum development. It is a piloting process conducted to debug the program before district-wide implementation. From such evaluation, project decision makers obtain information they need to anticipate and overcome procedural difficulties, and to make decisions.



Although the main purpose is to provide feedback on the extent of implementation, process evaluation can fulfil two other functions: to provide information to external audiences who wish to learn about the program, and to assist program staff, evaluators, and administrators in interpreting program outcomes (Gredler, 1996).

The primary function of product evaluation is “to measure, interpret, and judge the attainments of a program” (Stufflebeam and Shinkfeld, 1985, p. 176). Product evaluation, therefore, should determine the extent to which identified needs were met, as well as identify the broad effects of the program. The evaluation should document both intended and unintended effects and negative as well as positive outcomes (Gredler, 1996). The primary use of product evaluation is to determine whether a program should be continued, repeated, and/or extended to other settings (Stufflebeam and Shinkfeld, 1985). However, it should also provide direction for modifying the program to better serve the needs of participants and to become more cost effective. Finally, product evaluation is an essential component of an “accountability report” (Stufflebeam and Shinkfeld, 1985, p. 178). At this stage, product evaluation helps evaluators to connect activities of the model to other stages of the whole change process (Ornstein and Hunkins, 1988).

As a logical structure for designing each type of evaluation, Stufflebeam (2003) proposed that evaluators follow the steps of focusing the evaluation,



collecting information, organizing the information, analyzing the information, reporting it, and administering the evaluation.

For focusing the evaluation, evaluators need to Identify the major level(s) of decision making to be served,- for example, local, state, or national; For each level of decision making, they have to project the decision situations to be served and describe each one in terms of its locus, focus, critical timing, and composition of alternatives. Also, they need to define criteria for each decision situation by specifying variables for measurement and standards for use in the judgment of alternatives; and define policies within which the evaluator must operate.

In collecting information, evaluators have to specify: the source of the information to be collected; the instruments and methods for collecting the needed information; the sampling procedure to be employed; and the conditions and schedule for information collection.

As regards organizing the information, they have to provide a format for the information that is to be collected and designate a means for performing the analysis. Meanwhile, in analyzing information, evaluators need to select the analytical procedures to be employed and how this is to be done. Further, reporting of information requires evaluators to define the audiences for the evaluation reports; specify means for providing information to the audiences; specify the format for evaluation reports and/or reporting sessions; and schedule



the reporting of information. Finally, the administration of the evaluation requires evaluators to summarize the evaluation schedule; define staff and resource requirements and plans for meeting these requirements; specify means for meeting policy requirements for conduct of the evaluation; evaluate the potential of the evaluation design for providing information that is valid, reliable, credible, timely, and pervasive (i.e. will reach all relevant stakeholders); specify and schedule means for periodic updating of the evaluation design; and lastly, provide a budget for the total evaluation program.

According to Santos (2007), the model developed by Stufflebeam is a very useful approach in educational evaluation as it essentially systemizes the way the different dimensions and aspects of curriculum and the sum or total of students' experiences in the educative process are evaluated, requiring that stakeholders be involved in the process.

In this model, the user is asked to go through a series of questions in the context, inputs, process, and product stages.

One study on program evaluation that utilized the CIPP model is by Rezaee and Shokrpour (2011) which was a descriptive evaluation research focusing on the performance assessment productivity and quality of academic departments in Shiraz Medical School, Iran. There was an attempt to identify departmental performance regarding input, process, and output areas. In this study, program evaluation theory and management-oriented systems model were



used as the evaluation approach. In this approach, the CIPP model which emphasized comprehensiveness in evaluation within a larger framework of organizational activities was applied. This model as a conceptual framework directed the research strategy (what to look for) and helped the researcher to identify the performance dimensions of academic departments and select appropriate performance indicators. Findings revealed that: (1) the curriculum content of basic sciences departments and their objectives were clear and useful. However, the students' views about the department of biochemistry varied. The most problematic areas in the basic sciences courses (programs) were related to the time organization of the course, type of examinations, and available educational resources. High pass percentage in these four departments showed that the programs have had a comprehensive impact on the students. The consistently high percentage of students who successfully completed the basic sciences courses during 2005 to 2007 indicated that the process and inputs were stable and institutionalized.

Another study which utilized the CIPP model was by Tunc (2010). This study aimed to evaluate the effectiveness of Ankara University Preparatory School program through the perspectives of instructors and students. 406 students attending the preparatory school in the 2008-2009 academic year and 12 instructors teaching in the program participated in the study. The data were gathered through a self-reported student questionnaire and an interview schedule which was designed for the instructors. Results of the study indicated



that the program at Ankara University Preparatory School partially served its purpose. The findings revealed that some improvements in the physical conditions, content, materials, and assessment dimensions of the program were required to make the program more effective.

Still another study using CIPP model was by Divina (2004). It was a descriptive study aimed at evaluating the Mathematics program in the Division of Cavite. Findings revealed that the mathematics teachers possessed the needed requirements to teach in the elementary level; the key administrators were qualified for the position; the pupils gained moderate competence as evidenced by the results of their achievement tests and their academic performance; and the problems encountered by the mathematics teachers were very serious while that of the school administrators were serious.

Nguyen (1992) conducted a study on the evaluation of the SEDP mass training program for Mathematics teachers in selected regions of Luzon. Findings revealed that the trainee had positive attitude toward the new curriculum, but its implementation had not reached even half of the program goals. Summarily, it was found that the implementation of the said curriculum was significantly related to the teaching skills and knowledge of the subject matter.

Larcia (1994), in a study focused on the evaluation of Elementary Mathematics Curriculum of Canossa Academy, found that generally the curriculum was implemented in accordance with the guidelines of the NESC-



Mathematics program and that the curriculum under review was fairly satisfactory; however, there were some problems like lack of visual aids, topics not covered during the school year; slow learners; classroom management; test construction; and pupil's lack of mastery of basic mathematical skills. The study also found that the teachers responded to these problems with the support of the administrator.

Prado (1995) also conducted a study on the evaluation of Mathematics program of fourth year secondary school whose findings revealed that the intended curriculum for both types of high school was the same inasmuch as it was a national curriculum; however, the state universities and colleges' (SUC) high schools were better in the implementation than the public national high school in terms of coverage. Also, findings implied that curricular modifications had served the enhancement of learning for all students especially in mathematics.

In 1987, Lim evaluated the Mathematics program for the gifted/talented at the International School, Manila. Some of the findings were: (1) the GATE (Gifted and Talented Education) students attending special class in Mathematics demonstrated significant gains in the standardized and teacher-made achievement; had higher cognitive processes, and creativity test; (2) Parents of the GATE students had a positive attitude toward the program; and (3) Teachers were supportive of the program.



Another program evaluation was conducted by Abanes (2008) whose aim was to evaluate the music program in selected private elementary schools of Cavite using the descriptive-evaluative and product development method of research employing the Input, Process, and Output Model. The study focused on the objectives of the music education program, teachers' and administrators' profile, school resources, and pupils' academic performance in music. Study concluded that: (1) the music teachers had employed various techniques and materials; (2) majority had participated only in- service trainings in music; (2) there were several problems such as lack of attendance in music seminars; lack of training handling music groups, insufficient knowledge on the teaching methods in music; and lack of music guides and manuals and music instructional materials. Also majority of the teachers had problems on pupils who could not read notes and were not exposed to musical programs and activities.

Adonis (2012) conducted a study on strategic plans to enhance the special program in sports (SPS) aimed at determining its strengths and weaknesses. Finding and results revealed that all supervisory sub-components of the SPS of the schools had not attained Total Quality Assurance (TQA). Similarly, all the components related to administrative management did not also attain TQA. Therefore, it was concluded that there was a need to enhance the SPS program in order to attain TQA.



Chavez (2003) in his master's thesis conducted a study on the status and concerns of Risen Christ Catholic School as bases for a medium term development plan. He used descriptive analytical method of research to gather data using questionnaires as the instrument. It found out that the administrators of the school were committed yet deficient in expertise to run the school, yet they were aware of the status and the problems of the school. The teachers of the school are Professional Board Examination for Teachers/Licensure Examination for Teachers passers, yet they needed to improve their academic qualifications and their teaching competencies. Likewise, the school was poor in facilities and equipment, fair in research and development, infrastructure development and community services, and good on management, faculty and faculty development, records and report management, physical plant, and student services. The evaluation of the four groups of respondents on the status of Risen Christ Catholic School was generally not the same. On the other hand, the evaluation of its problems was found to be generally urgent in relation to administration/management, student services, and facilities and equipment. The community services also had problems but were not so serious. It also found that the evaluation of the four groups of respondents on the problems of the school related with the different key areas were generally not the same.

Servida (2001) conducted a study on the analysis of institutional profile and environmental factors of selected Montessori schools in Cavite. She concluded that in all aspects of the institution (human resources and institutional



elements), the Montessori schools had well provided conditions/provisions that could come up with the standard of quality education. However, the library services needed more attention, and therefore it was concluded that improvement in all the areas evaluated were in order.

The CIPP Model is commonly used in evaluating educational program or curriculum. Hernandez cited in Rafael (2007) conducted a study using the CIPP Model to evaluate the language instructional program in Filipino of the college students in Tarlac State University.

For the context evaluation, Hernandez assessed the needs of the program using Richard's instrument for evaluating language program. She found out that the instructional program in Filipino of Tarlac State University (TSU) had been satisfactorily developed in general. The teachers and administrators had already attained the educational qualifications needed to discharge their functions effectively. Likewise, the general goals of the instructional program were geared towards the philosophy and mission of the university. She suggested that specific objectives of the program aimed to develop the communicative competencies of the students for oral and written forms should be considered.

For the input variables, she analyzed the adequacy and effectiveness of resources both human and materials and found out that the syllabi used possessed good qualities, but the library resources were found to be insufficient in relation to the needs of the growing student population. The teachers and



administrators were doing well in discharging their roles and functions for the attainment of the goals and objectives of the program. However, it was found out that there was a need to develop good learning strategies that would be appropriate to the needs and skills of the students.

To carry out the process of evaluation, she conducted an actual classroom observation to find out the actualities of the teachers' teaching strategies, classroom management, art of questioning, and receiving feedback and correcting the students' errors. She also found out that lessons and activities inside the classroom were well organized; that teachers used varied and current approaches in enhancing the reading skills and comprehension of the students; and that large percentage of students were involved in classroom discussion. Furthermore, she also observed that teaching and learning were effective and productive because the learners were involved in the process of planning and managing classroom activities.

Lastly, for product evaluation, the results of the final grade and results of the related activities of the students were used to determine the actual end of the program implementation. She found out that the program was rated to be high, implying that the objectives of the program were satisfactorily achieved.

Based on the results of her study, she generally recommended that there should be a continuous support to the needs of the program to improve more its context, input, process, and product.



The other cited study which utilized the CIPP Model was conducted by Rafael (2007) whose aim was to evaluate the in-service trainings attended by Physical Education faculty from selected colleges and universities in CALABARZON. This study was similar with the present one in terms of its general scope considered in CIPP model.

Further, Honrada (1996) conducted an ethnographic evaluation of the Pre-Cana Program of Selected Parishes in Manila using the CIPP Model. It was found that the Pre-Cana objectives as perceived by the program directors and program facilitators were to assist engaged couples and make them aware of the essential teaching of the Church on the nature, purpose, and responsibilities. It was concluded that facilitators needed continuing formation to be more effective in the ministry.

On School's Vision and Mission Statement

Developing the school's vision and mission is the most important step toward creating a successful program. Done well, the vision and mission give clarity and direction for a school. A muddy vision or mission can result to continuing conflicts and can have difficulty identifying priorities.

The creation of effective schools ultimately depends on the ability of educators to visualize how schools look. Vision converts ideas, knowledge, experience, and futurist thinking into a reality that is clearly understood and



achievable by practitioners. Vision provides the bridge between innovative ideas and purposeful, coordinated action. Therefore, it is critically important that educators are aware of the latest thinking, and of what holds the greatest promise of improving education. The vision of ideal schools help them to rework and reshape existing curriculum content, instructional methods, and delivery system (Cunningham & Cordeiro, 2009).

On the other hand, a mission statement explains the schools' purpose for existence. It describes what it does and its overall intention. The mission statement supports the vision and serves to communicate the purpose to all the stakeholders. The mission can change to reflect a school's priorities and methods to accomplish its vision. This means that a mission statement should include: ages and other characteristics of students the school intends serve; curriculum philosophy and instructional approaches the school intends to use; an overall goal or two of the school; and one or two special features of the school.

The purpose of the school or its mission is projected into the future as a Vision of the finished product of the process of schooling. The vision gives a clear concept of the kind of person the school hopes the learners will become. The school should specify the kind of knowledge, skills, and competencies, and attitudes and values that the graduates will possess in keeping with the vision (Palma, 2009).



It is not enough for a small group of people to create a vision and mission. Students, faculty, and families need to understand a school's vision and mission. Also, the school's faculty and board of directors should periodically review both the vision and mission statements. It may be that the school wants to alter one or both (Center for School Change, 2014).

On Program Goals and Objectives

Educational goals are general statements of what the program intends to do or its purpose. These are broad statements of the kinds of learning the school hope learners will achieve- they describe learning outcomes and concepts – and what the students will learn expressed in general statement like clear communication and problem solving skills. They describe the knowledge, skills, and values expected of graduates, and should be consistent with the mission of the institution.

According to Palma (2009), goals are the building block of the educational planning. The reflection of individual and societal needs and expectations in goal setting results is written in statements describing different categories or areas of human development or behavior. Thus, goal statements may encompass the aspects of the total development of a human person such as spiritual, moral, intellectual, aesthetic, emotional, social, occupational, and physical.



Goals flow from the mission and provide framework for determining the more specific educational learning objectives and outcomes of a program. Goals describe overarching expectations such as “Students will develop effective written communication skills (University of Central Florida [UCF] Academic Program Assessment Handbook, 2005).

The main function of the program goals statement is to form a bridge between the lofty language of the Mission Statement and the concrete-specific nuts and bolts of program objectives. The Program Goals statement becomes a blueprint for implementing the mission by answering the following questions:

How do program goals relate to the mission statement?; How does this program fit into a student’s overall development?; What general categories of knowledge and abilities will distinguish the graduates?; For each principle of the mission, what are the key competency categories graduates of the program should know or be able to do?

On Mathematics Program

A set of new goals for mathematics education has been discussed, with an emphasis on the importance of thinking, understanding, reasoning, problem solving, connections, applications, and communication (e.g., National Council of Teachers of Mathematics, 1989). These goals stand in contrast to a more conventional view of mathematics education, which involves memorizing and



reciting de-contextualized facts, rules, and procedures, with an emphasis on the application of well-rehearsed procedures to solve routine problems. For example, in the United States, the National Council of Teachers of Mathematics, as cited in Cai (2005) proposed five new goals for students to learn in school mathematics.

First goal is that students learn to value mathematics. Next is that they become confident in their ability to do mathematics. Then another is that they become mathematical problem solvers. Fourth is that they learn to communicate mathematically. Finally, the goal is that they learn to reason mathematically.

In other countries, there are also similar goals for school mathematics (e.g., Basic Education Curriculum Material Development Center, National Ministry of Education, 2002). The new goals of mathematics education represent a major shift in mathematics instruction from the traditional practice (NCTM, 1989), including shifts toward classrooms as mathematical communities--away from classrooms as simply a collection of individuals; toward logic and mathematical evidence as verification--away from the teacher as the sole authority for right answers; toward mathematical reasoning--away from merely memorizing procedures; and toward conjecturing, inventing, and problem solving--away from an emphasis on mechanistic answer-finding.



In the Philippines, the Department of Education has set the aims, goals, and specific objectives of the Mathematics program (Corpuz, Salandanan, and Rigor, 2006).

Aims of Mathematics as a Discipline

A mathematician is a disciplined person. She/he attempts to state precise definition, test inferences to make sure they are necessary implications of definitions, axioms, or theorems, and continually asks, "Why?" and "How do we know?"

Some of the general aims of mathematics as a discipline are to teach students the concepts basic in quantitative thinking-measurement ratio and proportion, rational numbers, and functions as these ratios are used consistently; Development of students' ability to think logically- to analyze a complex situation, recognize the logical relations among interdependent factors, and be able to discover and state a generalization that describes the relationship among objects under study; inculcation of such mental habits and attitudes as seeking to understand relations, intellectual curiosity, persistence, a love of precision, accuracy thoroughness, clarity and orderly and logical organization; and training students in functional thinking, and meaning thinking in terms of relationship.

Additionally, it aims for students to develop appreciation of beauty in the geometrical forms found in nature art and industry intellectual, and ethical,



respectively; to develop appreciation of logical structure, precision of statement and thought, and logical reasoning; and to develop appreciation of the power of mathematics, the part it has played in the development of civilization, and in particular, that of science.

Anchored on the concept of the nature of mathematics, the mathematics students should: 1.) have an understanding of the deductive nature of mathematics; 2.) understand the basic properties of operations on numbers and be able to determine whether a given system possesses any of these operations; 3.) be able to perceive patterns; 4.) be aware that mathematics is used not only in those natural sciences but also in the behavioral and social sciences and arts; 5.) recognize that some professions require knowledge of sophisticated and complex mathematical techniques; 6.) know the ways in which computers are used in science, technology, business and government; and 7.) be aware of the extent to which mathematical skills are used by individuals in their daily lives.

Goals and objectives are similar in that they describe the intended purposes and expected results of teaching activities, and establish foundation for assessment. Goals are statements about general purposes while objectives are brief, clear statements that describe the learning outcomes of instruction. These objectives belong to three types such as cognitive, affective, and behavioral or psychomotor. Objectives describe in detail the behaviors that the learners will be



able to perform at the end of a unit of instruction or program. (University of Central Florida [UCF] Academic Program Assessment Handbook, 2005)

On School Administrator

The success of an organization/school system depends on how the leader manages the organization effectively, efficiently, and competently. An administrator is in the vanguard in carrying out the functions of the school. S/He leads the educational workers in the field, and makes direct interpretation and application of the policies and directives of the system, and provides conditions favorable for effective teaching and efficient learning. S/He must be perceived by her/his teachers as a good example of a leader and a facilitator, technically competent and with well-developed analytical skills (Bautista, 2012).

Aside from possessing the needed personality of a school leader, s/he must be academically qualified. The school head must (1) be a Filipino citizen; (2) possess at least a master's degree or a professional license requiring at least a bachelor's degree; (3) have adequate teaching experience, managerial competence and technical expertise in school management, or have a background of demonstrated service and competence in his/her field of endeavor; and (4) be of good moral character (Sarmiento, 2012).

Similarly, the school principal in the elementary and secondary levels shall hold a master's degree and should have at least five years of relevant teaching



or administrative experience. The principal shall assist the school head in the attainment of the objectives of the elementary or secondary education, and her/his functions and responsibilities are explicitly stated by the school, which according to Sarmiento (2003) are to carry out school objectives and the policies of the governing body within the purview of existing laws, rules, and regulations; to exercise educational leadership among faculty members and to cooperate in activities for the upliftment of the community and attainment of national goals; and to carry out a definite program of progressive development in all significant aspects of school operations.

While the school boards or heads are authorized to determine the principal's specific functions and responsibilities, such duties are based on standard practice and usually include the following: 1. To determine the authenticity of the admission credentials of pupils and students seeking enrollment; 2. To draw up the school and class programs, classify students, and assign teachers; 3. To recommend the appointment, promotion, or dismissal of teachers to the governing body; 4. To supervise the teachers in classroom and administrative work and in co-curricular activities; 5. To maintain reasonable order and discipline in the school, school campus, and in outside school-related activities; 6. To administer adequate guidance and personnel services; 7. To carry out well-planned in-service education for faculty; 8. To conduct regular evaluation of students' work in the light of the objectives of the school; and 9. To



maintain wholesome public relations in the school, with other schools, and in the community.

The ultimate function of the school administrator is to provide optimum educational opportunities for wholesome experience for all children in school. Also, s/he must possess technical, human, and conceptual skills (Zulueta, 2008).

On Teachers

The teacher in the teaching arena assumes a critical role. Educators express a strong adherence to the dictum “as the teacher, so is the pupil.” Truer than at any other time due to the fast-changing force in the learning factors that impinge on the intellectual, social, and emotional development of the growing child, it is upon the teacher education sector to adequately prepare and transform the youth to corresponding ideal mold. The responsibility for such a noble mission rests upon the shoulder of the mentors who should just as well keep up with the rapid studies in society and be willing to adopt new ways of nurturing their “minds and hearts” (Salandanan, 2000).

The school is very much alive when the teachers are dynamic, alert, and zealous of their teaching, research, and service function. In order to articulate the philosophy, vision, and mission of the school in relation to the changing needs of the immediate society, in general, of which integral part, the teacher has a tremendous task. The teacher is not just a cog in the wheel, s/he is the wheel in



the total complex of the educational system. S/He is the central figure in the school system, notwithstanding the pupils/students. S/He can give flesh to the noble aspirations of the learners, translate into commodity, and transform values and attitudes into functional attributes (Zulueta, 2008).

In the Philippines, teachers have undergone rigorous pre-service training before they are hired to a teaching position, either in public or private institutions. Recruitment policy with respect to the selection and appointment of teachers shall be clearly defined by the Department of Education. Provided however, that effective upon the approval of this Act (Republic Act No. 4670: Magna Carta for Public School Teachers), the following shall constitute the minimum educational qualifications for teachers-applicants: for teachers in the kindergarten and elementary grades, Bachelor's degree in Elementary Education (B.S.E.E.D.); for teachers of the secondary schools, Bachelor's degree in Education or its equivalent with a major or a minor; or a Bachelor's degree in Arts or Science with at least eighteen professional units in Education; for teachers of secondary vocational and two years technical courses, Bachelor's in the field of specialization with at least eighteen professional units in education; and for teachers of courses on the collegiate level, other than vocational, master's degree with a specific area of specialization.

Private schools observe similar recruitment policy. Both public and private school teachers must be familiar with the laws, rules, and regulations that govern



the teaching profession. Any teacher applicant must meet the requirements of the Approved Qualifications Standards of the DECS in terms of educational attainment, experience, and eligibility.

No teaching experience is required of new entrants. However, like other professions, a teacher-graduate is expected to have undergone considerable pre-service education preparatory to the work.

Arnn and Mangieri (1988) presented the five competencies most important for principals in ranking teacher competencies, such as task orientation (the extent to which the classroom is businesslike, the students spend their time on academic subjects, and the teacher presents clear goals to the students); enthusiasm and interest (the amount of the teacher's vigor, power, and involvement interest); direct instruction (the extent to which the teacher sets and articulates the learning goals, actively assesses student progress, and frequently makes class presentations illustrating how to do assigned work); pacing (the extent to which the level of difficulty and the pace of the lesson is appropriate for the student's ability and interest); feedback (the extent to which the teacher provides the students with positive and negative feedback; management (the extent to which the teacher is able to conduct the class without instruction being interrupted); questioning (the extent to which the teacher asks questions at different levels and adjusts them appropriately in the classroom); instructional time (the allocation of a period of time for a lesson adequate to cover the material



yet flexible enough to allow for the unexpected); variability (the amount of flexibility or adaptability of teaching methods; and the amount of extra material in the classroom; structuring (the extent to which the teacher directs instruction); and finally the opportunity to learn criterion material (the extent to which criterion material is covered in class).

In relation to this, Ryan and Cooper (2000) believe that the teachers must have the four essential areas of competency, which are attitudes that foster learning and genuine human relationships; knowledge of the subject matter; theoretical knowledge about learning and human behavior; and skills of teaching that promote learning.

On Instructional Materials

Palma (2009) defines instructional materials as resources available to the teacher and the learners, which serve as stimuli in the teaching-learning process. The whole purpose of materials is to initiate the students to the “real world” they live in. They represent elements found in that world and are meant to help students understand and explain reality.

According to Ornstein (1992), real-life experiences provide the most direct type of learning, but they are difficult to supply in the traditional classroom. Most experiences in the classroom occur through verbal symbolism – written and spoken words. These classroom experiences may be easier for teachers to



supply, but they may be more difficult for many students to understand. Verbal symbolism depends on the ability to conceptualize and think in the abstract, while the impact of firsthand experience is immediate and concrete. Various multisensory **instructional aids** – texts, pictures, games, simulations – can substitute for firsthand experiences and enhance understanding, so they are an integral part of the learning activity.

Schools must consider the selection of instructional material as a very vital part of the institutional planning. These must be allocated in alignment with the school's mission and goals and used in ways that further productive student learning. They are utilized to maximize student achievement of essential goals for their learning (Glatthorn, A.A. 1993a).

Similarly, Salandanan and Corpuz (2011) emphasize that there is no drab lesson if appropriate and sufficient media is used in its presentation. Properly selected and used, its impact on the attention, sustained interest, and participation of students has long been recognized to a point that this wide collection of teaching tools earned the title “sub-strategies.” It is not surprising to see these materials, devices, and instruments accumulated in every teacher's storehouse. Of late, more teaching technologies such as recordings, projectors, and computers, CD-ROMS are visibly becoming part of the teachers' repertoire. Videos have been available in some schools. Other instructional materials



include mock-ups, realia, models, books, pictures, charts, bulletin boards, and electronic media.

Salandanan and Corpuz (2011) enumerated the principles in the use of instructional materials for optimum learning. According to them, all instructional materials are aids to instruction, and they do not replace the teacher. Teachers only have to choose the instructional materials that best suit the instructional objectives, and if possible, they are to use a variety of tools. Likewise, teachers need to check out the instructional materials before the class starts to be sure that it is working properly.

The accepted standard educational media or materials refer to those devices which have become a normal part of the classroom setting such as pictures, charts or graphs, maps, globes, and other illustrative materials and models used to transmit messages between the teacher and the learners (Zulueta, 2008).

On School Facilities and Equipment

School equipment, furniture, and facilities should be planned in relation to the instructional program, and the plan shall be flexible to anticipate educational as well as social and technological changes and innovations. These include school equipment, school furniture, regular classroom facilities, audio-visual, Home Economics facilities, industrial arts facilities, library facilities, playground



facilities, athletic equipment, school health clinic, guidance and counseling room, and school lunch center (DECS Service Manual, 2000).

Facilities, equipment, and supplies for the Philippine classroom vary according to the unit of the school system. The requirements for the different units, however, are uniform throughout the country. Schools shall provide sufficient suitable seats to accommodate all students; appropriate seats in the kindergarten, elementary grades, secondary, and collegiate classes; sufficient teachers' cabinets, tables and chairs; sufficient number of blackboards; Sufficient library equipment and supplied; sufficient and appropriate laboratory furniture and fixtures; sufficient and appropriate office equipment; adequate modern instructional and teaching aids; sufficient athletic equipment and supplies; sufficient equipment and supplies for effective student personnel services; and adequate forms and office supplies.

The Department of Education (DepEd) has recently allocated P27,636,000 fund subsidy to the country's Special Science Elementary Schools (SSEs) project whose coverage is widened starting this school year from 31 to 103 qualified grade schools in 15 regions.

Education Secretary Armin Luistro explained through DepEd Order No. 88, s. 2011 that the coverage expansion of the project is designed to strengthen the teaching of science education in the elementary level and ultimately help



hasten the advancement of science and technology in the country in the face of growing global competition.

To enhance the operation of the expanded SSES project which began in 2006, the DepEd, through the Bureau of Elementary Education, also increased its annual financial subsidy for such learning centers from an initial P2,537,073 to P27,636,000 to augment their resources and pursue necessary innovations as reflected in the SSES' respective approved School Improvement Plans (SIPs).

Luistro said the yearly fund support for each SSES ranges from P131,600 to P362,439.

The DepEd chief's directive mandated that each SSES shall utilize a) 40 percent of the allotment for the enhancement of the capability of teachers and school heads through their participation in conferences, trainings, seminars and immersion training in science-oriented schools; b) 25 percent for the development of pupil activities such as investigatory projects, leadership training, workshop, educational visits, and participation in Science-related activities; c) 25 percent for procurement of reference books, textbooks, psychological tests, video materials and software in Science, Mathematics and English, instructional materials, gadgets and devices including maintenance and repair of said devices and apparatuses; d) five percent for payment of internet subscription, and e) five percent for organization of classes.



Seven of the 103 expanded SSESs are located in Ilocos, five in Cagayan Valley, 10 in Central Luzon, nine in Southern Tagalog-A (Calabarzon), five in Southern Tagalog-B (Mimaropa), nine in Bicol, eight in Western Visayas, five in Central Visayas, six in Eastern Visayas, two in Western Mindanao or Zamboanga Peninsula, five in Northern Mindanao, 10 in Caraga, seven in Southern Mindanao, six in Cordillera Administrative Region and nine in National Capital Region (Philippine Star, 2011).

On Teaching Methodologies

Method as a concept is perhaps as old as the beginning of education. The Socratic Method, for instance, is a dialectical method employed by Socrates to develop a latent idea. This is also true with all other methods utilized in teaching (Zulueta, 2008).

Method, as used in connection with the act of teaching, assumes a clearly defined way of pursuing an educational objective. Such objective could be stated in terms of knowledge that should be gained or skills and values that should be developed. In undertaking classroom instruction, a particular method may take a form of strategy or technique resorted to in introducing a subject. In daily lessons, it is a systematic plan of presenting a topic. Educators view method as a “procedural context that requires close adherence in order to insure the attainment of a learning outcome.” It can be said therefore that method is an integral part of teaching (Salandanan, 2000).



Methods can be classified as to the following: (1) where suitably taken; (2) focused participants; (3) action-based; (4) technology-based; (5) goals-based; and (6) time available-based. Further, the different methods can be grouped as (1) individualized; (2) for small group; and (3) the class. Individualized methodologies include (a) Independent Study, (b) Writing Journal, (c) Narratives, (d) Individualized Instruction, (e) Discovery, (f) Experiential Learning, (g) Problem-solving, and (h) Using Multiple Intelligences.

On the other hand, the methodologies for small groups include (a) Cooperative Learning, (b) Role playing, (c) Sociodrama, (d) Peer Tutoring, (e) Microteaching, (f) Direct Instruction, (g) Inquiry Approach, (h) Integrative Approach, and (i) Experimenting; while the methodologies for a class include (a) Discussion, (b) Reflective Teaching, (c) Concept Teaching, (d) Team Teaching, (e) Demonstration, (f) Field Studies, (g) Lecture, (h) Simulation, and (i) Field trips (Salandanan, 2000).

On Academic Performance

Academic performance has become an index of child's future in this highly competitive world. Academic performance has been one of the most important goals of the educational process. It is also a major goal, which every individual is expected to perform in all cultures. It is a key mechanism through which adolescents learn about their talents, abilities, and competencies which are an important part of developing career aspirations (Lent et al. , 2005).



Nathanap (2007) defines academic performance as the extent to which learners are profiting from instructions in a given area of learning i.e., performance is reflected by the extent to which skill and knowledge have been imparted to them. It also denotes the knowledge attained and skill developed in the school subject, usually designated by test scores. This is influenced by personality, motivation, opportunities, education, and training. There are several other factors which also influence the academic performance of students like study habit, self-concept, socio economic status, and intelligence, among others.

Palma (2009) enumerated the different factors that can be predictors of the learners' academic performance and learning. These key elements are: (1) the milieu or environment of learning; (2) matter, referring to subject matter or content; (3) method or the strategies for delivering content; (4) materials, referring to human and non-human resources; (5) media, covering audio-visual, verbal, and non-verbal modes; (6) motivation or arousing and sustaining interest of learners in the learning process; (7) mastery or habituation of new behavior through guided and independent practice and application; and (8) measurement, referring to the assessment of learning gains.

Several studies have proven that there are many factors that can affect the academic performance of learners. Teachers who do not have both the academic and the professional teaching qualifications would undoubtedly have a negative influence on the teaching and learning of their subject. Apart from



qualification, other teacher variables still exist which can either positively or negatively predict pupils' mathematics performance. However, research particularly in the Nigeria context is being silent about them. The choice of primary school culminated from the fact that it is the bedrock/foundation of any advancement in educational system (Agyeman (1993) cited in Tella, 2008).

There are currently two major concepts of academic achievement and performance. The first, called basic skills, grew out of the 1950s and 1960s when behavioral psychology dominated the way educators viewed learning. The second conception of achievement involves the notion of higher order thinking skills, problem-solving, and advanced knowledge. These skills could be regarded as a progression described in Bloom's taxonomy. (Cole, cited in Cunningham & Cordeiro, 2009)

Conceptions of educational achievement and performance change with the times, are influenced by many factors, and take different forms for different people. Cole finds the two conceptions inadequate to think about learning, concluding that educators need to formulate an alternative conception that integrates divergent views of academic achievement and performance, carries clear instructional implications, and focuses on long-term educational goals. Choices are related to what is valued, what is teachable, how it is organized, how much time should be devoted, who should be involved, what best communicates



intentions, and what goals are served, to name but a few of the elements of the alternatives.

Synthesis

The different related literature and studies presented in this chapter provide bases which are directly significant to what was pursued by the study.

The studies of Cai (2005), Baggett and Ehrenfeucht (2006), Divina (2004), Nguyen (1992), Larcia (1994), Prado (1995), and Lim (1987) which were all focused on evaluating Mathematics Program or Curriculum share similarities with the present study. In the process of their evaluation, they looked into and described the current status of the following variables: implementation of the program, teachers' practices, facilities, instructional materials, academic program, and learners' competencies. The main goal was to improve and maximize learners' learning. Most of the variables were also evaluated and described in this study. Most of the findings revealed that there are problems in the implementation of the Mathematics program, be it in the elementary or high school level.

This study utilized the CIPP Model for program evaluation. Similarly, the studies of Rezaee and Shokrpour (2011), Tunc (2010), Hernandez, cited in Rafael (2007), Rafael (2007), and Honrada (1996), utilized the same model.



Except for Honrada, all the cited studies evaluated academic programs and instruction.

The studies of Abanes (2008) and Adonis (2012) which were focused on program evaluation share commonality in terms of aim and variables such as academic program, problems encountered, facilities, administrative support, and teachers' and students' training. Some of these variables were evaluated also in this present study. Both findings revealed that there is a gap between the standards and the actual implementation of the program. Similarly, the studies of Chavez (2003) and Servida (2001) evaluated these variables also; however, theirs were more comprehensive because both external factors and internal profiles were included.

In its totality, the review of the related literature and related studies will be beneficial in this research in terms of the following: (1) what is evaluation, (2) program evaluation, (3) Mathematics program, (4) the different aspects of academic program such as Vision and Mission Statement, goals and objectives, teachers, administrators, the learners, teaching methodologies and strategies, (5) physical resources, and (6) the learner's academic performance.



Chapter III

RESEARCH METHODOLOGY

This chapter presents and describes the research design, participants of the study, research instruments, data gathering procedure, and data analysis as well as the statistical tools that were applied in answering the specific questions.

Research Design

The descriptive-evaluative method of research was used in this study. This design is to appraise carefully the worthiness of the current study (Calmorin, 2004, p. 49).

The purpose of a descriptive study is to provide an in-depth description of a phenomenon or the relationships between two or more phenomena. This gives more attention in securing a representative sample and the study may involve comparison groups. Data-gathering techniques also tend to be more precise in a descriptive study and there is a clearer and more specific focus on what is being studied.

Based on the nature of the research study, the descriptive-evaluative research design was utilized to evaluate the Mathematics Program of Special Science Elementary Schools in the province of Cavite. Furthermore, this is a descriptive study because it aims to provide an accurate description of a situation



or of an association between variables from which one can then make some statements about a certain group or population (Tejero, 2004). The current state of the Mathematics program of the science schools was determined through evaluation using the CIPP Model. Areas such as vision, mission, goals, objectives, pupils, faculty, administration, profile, physical resources and problems encountered were looked into.

Participants of the Study

A permission to get the list of elementary schools in Cavite who are offering the special science curriculum was requested to the Schools Division Superintendent of Cavite (see appendix C). Based on the list, there are three public schools offering special science curriculum located in District VI and District VII of Cavite; hence, all 3 public schools were included. Likewise, all private elementary schools offering special science curriculum in the same districts were chosen as the participants. It was found out that the list of schools with grade six were composed of six (6) science elementary schools in the province of Cavite. Three (3) schools are private and the remaining three (3) are public. The private schools were (1) Gateway International School of Science and Technology, Mangahan, General Trias, (2) Governor's Hills Science School, Biclatan, General Trias, and (3), St. Genevieve School of Science International School, Mendez, Cavite. The public schools were (1) Naic Elementary School,



Naic, Cavite, (2) Amadeo Elementary School, Amadeo, Cavite, and (3) Trece Martires City Elementary School, Trece Martires City.

The school principal, Mathematics teachers, and the Grade 6 pupils of the science elementary schools during the school year 2012-2013 were the participants. An interview to some parents of Grade 6 pupils was also conducted. Purposive sampling was utilized in selecting the participants of the study based on their position as school principal and their subject, line of expertise, and specialization as Mathematics teachers. All grade 6 students were also considered as participants since their grades served as basis for determining the academic performance.

The first batch of SSES pupils to complete science education from Grade 1 to 6 graduated in school year 2012-2013; hence, all Grade 6 pupils were chosen as participants. Table 1 shows the distribution of the participating schools.

Table 1
Distribution of the SSES Participating Schools

SSES Participating Schools	Principal	Mathematics Teacher	Grade Six Pupils	Total
Public				
AES	1	1	26	28
NES	1	1	35	37
TMCES	1	1	33	35
Private				
GIST	1	1	22	24
GHSS	1	1	18	20
SGSSIS	1	1	9	11
Total	6	6	143	155



Research Instruments

Four research instruments were used in gathering data needed in this study. The instruments as developed by the researcher included items from books, school directives, published and unpublished research papers, theses, and dissertations. Some items were modified to fit in the field of mathematics and the target participants.

The first drafts of the instruments were submitted to the dissertation advisers for comments and suggestions. After careful study of the original instrument, several revisions were made. Some items were restated and aligned to meet the objectives of the study, while other items were discarded. The refined instruments went through the process of content validation by experts- (3) from the field of education, and (1) mathematics and statistics educator. The experts helped in improving every item found weak and inappropriate in measuring the components in the scale. The criteria used in validation were adopted in the study of Maranan (2012).

For reliability, the instruments were administered to a group of respondents which was not included in the population. The values obtained were all higher than 0.70 (see Appendix Q) which denotes high relationship as interpreted by Calmorin (2004, p 83).



A. Questionnaire for School Principal

The instrument was developed to evaluate the vision, mission, goals and objectives of SSES, to know how serious the problems encountered in the implementation of the mathematics program, to determine the qualification of the school principal, to determine the requirements for admission and retention to the program, the available physical facilities, the curriculum standards in mathematics, schedule time for mathematics class, and the principal's evaluation of the mathematics teachers' teaching performance (See Appendix J).

B. Questionnaire for Mathematics Teacher

This instrument was used to evaluate the vision, mission, goals and objectives of SSES, to know how serious the problems encountered in the implementation of the mathematics program, to determine the qualification of the mathematics teacher, to determine the adequacy of the instructional materials used, the available physical facilities, the curriculum standards in mathematics, the effectiveness of teaching methodologies, workload of teacher, assessment for learning, the extent of administrative support, and the academic performance of grade 6 pupils in mathematics (See Appendix K).

C. Questionnaire for Pupils

The instrument for the Grade Six pupil contains the profile of the pupil, pupils' feedback on teacher's performance, and the open-ended questions that



were intended to determine the characteristics of the mathematics program under the special science curriculum (See Appendix L).

D. Questionnaire for Parents

The questionnaire for the parents contains open-ended questions that were intended to determine the characteristics of the mathematics program under the special science curriculum. (See Appendix M).

Scaling Techniques

The different scaling techniques used in the study were described as follows:

For Evaluation of the Vision, Mission, Goals, and Objectives, the curriculum standards in Mathematics VI by the School Principal and the Mathematics Teacher

Scale	Range of Means	Verbal Interpretation
5	4.51 – 5.00	Strongly Agree
4	3.51 – 4.50	Moderately Agree
3	2.51 – 3.50	Agree
2	1.51 – 2.50	Moderately Disagree
1	1.00 – 1.50	Strongly Disagree



For Evaluation of the problems encountered in the implementation of Mathematics program in SSES by the School Principal and the Mathematics Teacher

Scale	Range of Means	Extent of Seriousness
5	4.51 – 5.00	Very Serious
4	3.51 – 4.50	Serious
3	2.51 – 3.50	Moderately Serious
2	1.51 – 2.50	Not Serious
1	1.00 – 1.50	Not a Problem

For the Adequacy of the in-service training attended by the school principal and mathematics teacher, and the adequacy of the physical facilities

Scale	Statistical Limit	Verbal Interpretations
5	4.51-5.00	Very Adequate
4	3.51-4.50	Adequate
3	2.51-3.50	Moderately Adequate
2	1.51-2.50	Inadequate
1	1.00-1.50	Very Inadequate



For Evaluation of the Teachers on their preparedness in teaching
Mathematics

Scale	Range of Means	Level of Preparedness
4	3.51 – 4.00	Very Well Prepared
3	2.51 – 3.50	Somewhat Prepared
2	1.51 – 2.50	Not Well Prepared
1	1.00 – 1.50	I do not Teach these Topics

For Evaluation of the pupils on the teaching performance of their
Mathematics teacher

Scale	Range of Means	Verbal Interpretation
4	3.51 – 4.00	Always
3	2.51 – 3.50	Often
2	1.51 – 2.50	Rarely
1	1.00 – 1.50	Never



For the adequacy and frequency of the instructional materials used by the mathematics teacher

Scale	Statistical Limit	Verbal Interpretations	
5	4.51-5.00	Very Adequate	Very Often
4	3.51-4.50	Adequate	Often
3	2.51-3.50	Moderately Adequate	Sometimes
2	1.51-2.50	Inadequate	Rarely
1	1.00-1.50	Very Inadequate	Never

For the effectiveness and frequency of teaching methodologies used in Mathematics

Scale	Statistical Limit	Verbal Interpretations	
5	4.51-5.00	Very Effective	Very Often
4	3.51-4.50	Effective	Often
3	2.51-3.50	Moderately Effective	Sometimes
2	1.51-2.50	Ineffective	Rarely
1	1.00-1.50	Very Ineffective	Never



For the weight given in different types of assessment

Scale	Statistical Limit	Verbal Interpretation
5	4.51 – 5.00	Very Often
4	3.51 – 4.00	Often
3	2.51 – 3.50	Sometimes
2	1.51 - 2.50	Rarely
1	1.00 - 1.50	Never

For Evaluation on teachers' performance by the school principal

Scale	Statistical Limit	Verbal Interpretations
5	4.51-5.00	Commendable
4	3.51-4.50	Proficient
3	2.51-3.50	Developing
2	1.51-2.50	Unsatisfactory
1	1.00-1.50	N/A



For the support given by the school principal

Scale	Statistical Limit	Verbal Interpretations
5	4.51-5.00	Strongly Agree
4	3.51-4.50	Agree
3	2.51-3.50	Moderately Agree
2	1.51-2.50	Disagree
1	1.00-1.50	Strongly Disagree

For the academic performance of the pupils in Mathematics

<u>Numerical Scale</u>	<u>Descriptive Level</u>
95 – 100	Outstanding
89 – 94	Very Satisfactory
83 – 88	Satisfactory
77 – 82	Fair
Below 77	Needs Improvement



Data Gathering Procedure

Prior to the conceptualization of the study, a careful planning was facilitated through brainstorming; intensive reading of dissertation, DepEd memoranda, books, journals, internet resources; and visiting different elementary schools in Cavite offering special science curriculum to gather concepts and theories useful for the study.

Upon obtaining a considerable host of information and data, formulation of instrument and important request protocol were done taking note of the following:

1. Developing the instruments

Four questionnaires were developed for school principal, mathematics teacher, grade six pupils, and the parents.

2. Validating the instruments

The instruments were presented to the advisers for their comments and suggestions. Experts were also consulted for face and content validity. All comments, suggestions, and recommendations were incorporated to revise the instruments.

3. Setting the reliability

For reliability, the instruments were administered to a group of respondents not included in the population. The values obtained were all



higher than 0.70 using Cronbach's Alpha (see Appendix M) which denotes a high relationship as interpreted by Calmorin (2004, p 83).

4. Seeking the Approval of the Schools Division Superintendent

A letter of permission to conduct the study was sought from the Schools Division Superintendent noted by the researcher's dissertation advisers (see Appendix C).

5. Distributing the Endorsement Letter to the School Principal of Participating Schools

The endorsement letter was personally handed to the school principal of different participating schools and the schedules for administering the questionnaires were also coordinated.

6. Administering the questionnaires

The validated questionnaires were administered to the participants of six participating schools and were retrieved after two to three weeks. A consistent follow-ups and reminders were done to retrieve all accomplished questionnaires. Several visits to all participating schools were made to have an informal interview with the grade 6 parents who were in the vicinity of the school.



7. Organizing, Interpreting, and Analyzing the data

After the retrieval of the questionnaires, the data were organized, interpreted and analyzed.

Data Analysis Procedure

The data gathered in the study were organized in tabular form, analyzed, and interpreted through the use of statistical tools such as Frequency, Percentage, Ranking, Weighted Mean, and One way ANOVA.

Weighted Mean. This was used to determine the level of implementation of mathematics program in the participating special science elementary schools.

Ranking. This was used to determine the order of seriousness of the problems encountered in the implementation of the mathematics program.

One way ANOVA. This was used to determine the significant differences in the evaluation of the school administrators and the mathematics teachers in VMGO, problems encountered in the implementation of mathematics program, and the curriculum standards in mathematics.



The scale below was adopted from Adonis' (2012) study and was used to interpret the strengths and weaknesses of the mathematics program in SSES.

Scale	Interpretation	Remarks
4.51-5.00	TQA attained	Maintain
3.00-4.50	Strength	Enhance
2.99- below	Weakness	Improve

Scale	Interpretation	Remarks
3.51-4.00	TQA attained	Maintain
2.00-3.50	Strength	Enhance
1.99- below	Weakness	Improve

Scale	Interpretation	Remarks
95-100	TQA attained	Maintain
85-94	Strength	Enhance
85- below	Weakness	Improve



Chapter IV

PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

This chapter presents the analysis of data and their interpretation. The presentations in this section follow the sequence of the research questions posed in Chapter 1.

Problem 1. What is the present status of SSES in the following components?

The Vision, Mission, Goals and Objectives statement reflects the future, aspirations, direction, purpose, and aim of the school through its program, activities, and practices. For any school to operate and function according to its vision and mission, it must be clear to all stakeholders so that everybody can work harmoniously towards the same aspirations and direction.

1.1 Vision and Mission

Table 2 shows the vision and mission of SSES as evaluated by the principals and the mathematics teachers. The criteria were provided for the balanced program of development to the students based on the following areas; intellectual, emotional, moral, social, spiritual and physical; defined preferred future through its vision and mission; attainable vision and mission; focused on meeting the interest and abilities of elementary pupils; are regularly reviewed, evaluated, updated, monitored, and reflected awareness; stakeholders'



orientation; and the harmonization of the vision and mission of the school with that of the Department of Education.

The grand mean is 4.38 which has a description of **Agree**. This implies that the Vision and Mission of the different schools provide clear direction for the school in consonance with the goals of the State through the Department of Education and describes what the school is all about. Likewise, the Vision and Mission of the school provides the right direction of the school and it serves its purpose. However, the Vision-Mission Statement of the schools must be revisited to determine its relevance to changing times. In doing so, the stakeholders must be involved. Both the school and the stakeholders must come up with a shared Vision-Mission.

The Vision and Mission of a school is a key point in curriculum planning and development. The purpose of the school or its mission is projected into the futures as a Vision of the finished product of the process of schooling. The vision gives a clear concept of the kind of person the school hopes the learners will become. The school should specify the kind of knowledge, skills, and competencies, attitudes, and values that the graduates will possess in keeping with the vision (Palma, 2009).



Table 2
Status of Vision and Mission of SSES

VISION AND MISSION	Principals		Math Teachers		Overall Mean	
	Mean	VI	Mean	VI	AM	VI
1. Provides for balanced program of development to students in:						
1.1 intellectual	5.00	SA	5.00	SA	5.00	SA
1.2 emotional	4.83	SA	4.83	SA	4.83	SA
1.3 moral	5.00	SA	5.00	SA	5.00	SA
1.4 social	5.00	SA	5.00	SA	5.00	SA
1.5 spiritual	4.83	SA	4.83	SA	4.83	SA
1.6 physical	4.83	SA	4.83	SA	4.83	SA
2. The school defines its referred future through its vision and Mission	5.00	SA	5.00	SA	5.00	SA
3. The school's vision and mission						
3.1 are attainable	5.00	SA	5.00	SA	5.00	SA
3.2 are focused on meeting the interests and abilities of elementary pupils	4.50	A	4.33	A	4.42	A
3.3 are regularly						
3.3.1 reviewed	4.00	A	4.00	A	4.00	A
3.3.2 evaluated	4.00	A	4.00	A	4.00	A
3.3.3 updated	3.00	MA	3.00	MA	3.00	MA
3.3.4 monitored	3.33	MA	3.50	MA	3.42	MA
3.4 reflect awareness of national goals	4.83	SA	4.67	SA	4.75	SA
4. The following stakeholders are being oriented about the school's vision and mission:						
4.1 pupils	4.00	A	3.83	A	3.92	A
4.2 teachers	4.00	A	4.17	A	4.09	A
4.3 personnel	4.00	A	4.00	A	4.00	A
4.4 parents	4.00	A	3.50	MA	3.75	A
5. The Vision and Mission of the school harmonizes with that of the Department of Education	4.50	A	4.33	A	4.42	A
GRAND MEAN	4.40	A	4.36	A	4.38	A

Legend: Verbal Interpretation (VI)
Strongly Agree (SA)
Agree (A)
Moderately Agree (MA)
Disagree (D)
Strongly Disagree (SD)

Weighted Mean Interval
4.51- 5.00
3.51- 4.50
2.51- 3.50
1.51- 2.50
1.00- 1.50



It is not enough for a small group of people to create the school vision and mission. Students, faculty, and families need to understand a school's vision and mission. The school's faculty and board of directors should periodically review both the vision and mission statements. It may be that the school wants to alter one or both (Center for School Change, 2013).

1.2 Goals and Objectives

Tables 3 presents the results of the SSES Goals and Objectives Statement evaluation administered to the principals and mathematics teachers. The ratings done by the principals were similar to that of the ratings done by the mathematics teachers in terms of the SSES goals and objectives.

From the data presented, the over-all weighted mean score is 4.70 with a verbal interpretation of **Strongly Agree**. The school principals and the mathematics teachers strongly agree on all the statements or indicators pertaining to the goals and objectives of the school. According to Palma (2009), goals are the building block of the educational planning. The reflection of individual and societal needs and expectations in goal setting results to statements describing different categories or areas of human development or behavior. Thus, goal statements may encompass the following aspects of the



total development of a human person: spiritual, moral, intellectual, aesthetic, emotional, social, occupational, and physical.

These results implied that the principals and the mathematics teachers believed that the sense of nationalism was being integrated into their mathematics program; that teachers had been making ways to encourage and provide learning opportunities for community involvement; and that the mathematics teachers incorporated general skills and attitudes to values formation of their pupils so as to prepare them for life and work in the society.

According to Palma (2009), goals are the building block of educational planning. The reflection of individual and societal needs and expectations in goal setting results statements describing different categories or areas of human development or behavior. Thus, goal statements may encompass the following aspects of the total development of a human person: spiritual, moral, intellectual, aesthetic, emotional, social, occupational, and physical.



Table 3
Status of Goals and Objectives of SSES

GOALS AND OBJECTIVES	Principals		Math Teachers		Overall Mean	
	Mean	VI	Mean	VI	AM	VI
1. Include a sense of nationalism through deepened appreciation in mathematics	4.33	A	4.33	A	4.33	A
2. Provide for students to positively apply and contribute their skills in the community	5.00	SA	4.83	SA	4.92	SA
3. Incorporate the general skills and attitudes, values in the mind of the pupils in preparation for life and work in the society	5.00	SA	5.00	SA	5.00	SA
4. The goals and objectives of the school harmonizes that of the Department of Education Special Science Program	4.67	SA	4.67	SA	4.67	SA
5. Align instructional objectives and curricular goals with the shared vision	4.67	SA	4.50	SA	4.59	SA
GRAND MEAN	4.73	SA	4.67	SA	4.70	SA

Legend:

Verbal Interpretation (VI)
Strongly Agree (SA)
Agree (A)
Moderately Agree (MA)
Disagree (D)
Strongly Disagree (SD)

Weighted Mean Interval

4.51- 5.00
3.51- 4.50
2.51- 3.50
1.51- 2.50
1.00- 1.50



Problems Encountered in the Implementation of the Mathematics Program

Table 4 shows the results of the evaluation of problems encountered in the implementation of the mathematics program as rated by the principals and the mathematics teachers. Among the 15 listed possible problems encountered during the implementation of the mathematics program, the principals identified one moderately serious problems and 14 not serious problems, while the mathematics teachers identified 15 not serious problems.

Results revealed that the principals had considered the lack of comprehension of students as moderately serious problem. On the other hand, they believed that the following are not serious problems: inadequate supervisory assistance; inadequate facilities; inadequate instructional media; inadequate teaching aids; inadequate textbooks; inadequate reference materials; lack of interest of pupils in mathematics; absenteeism among pupils; lack of interest of mathematics teachers; lack of mastery of the subject matter by teachers; lack of support from the parents; inadequate faculty development program for teachers; insufficient funds for mathematics activities and trainings for both pupils and teachers; and fast turnover of mathematics teachers. The overall evaluation of the principals regarding the problems encountered in the implementation of mathematics program with an over-all mean of 1.89 implies that the problems encountered were not serious.



Results showed that the mathematics teachers considered the following as not serious problems: inadequate supervisory assistance; inadequate facilities; inadequate instructional media; inadequate teaching aids; inadequate textbooks; inadequate reference materials; lack of interest of pupils in mathematics; absenteeism among pupils; lack of comprehension of pupils; lack of interest of mathematics teachers; lack of mastery of the subject matter by teachers; lack of support from the parents; inadequate faculty development program for teachers; insufficient funds for mathematics activities and trainings for both pupils and teachers; and fast turnover of mathematics teachers.

The overall evaluation of mathematics teachers regarding the problems encountered in the implementation of mathematics program with an over-all mean of 1.72 implies that the problems encountered were not serious.

In Table 4, the participants believed that there were no serious problems encountered in the implementation of Mathematics program. Although there are still existing problems, they considered them not serious.

Yet these problems in implementing the Mathematics program must be eliminated or minimized because they impede the success of the implementation of the program. In implementing any program, the following factors are very important: drive and motivation of the learners, positive transfer of learning, usefulness and adequacy of materials, administrative support; the academic,



professional and attitude of teachers, and support of the parents and other stakeholders (Zulueta, 2008; Palma, 2009).

Table 4
Problems Encountered in the Implementation
of the Mathematics Program of SSES

PROBLEMS	Principals		Math Teachers		Overall Mean	
	Mean	VI	Mean	VI	AM	VI
1. Inadequate supervisory assistance	1.50	NS	1.53	NS	1.52	NS
2. Inadequate facilities	1.67	NS	1.27	NP	1.47	NP
3. Inadequate instructional media	2.50	NS	2.20	NS	2.35	NS
4. Inadequate teaching aids	2.33	NS	2.20	NS	2.27	NS
5. Inadequate textbooks	1.50	NS	1.53	NS	1.52	NS
6. Inadequate reference materials	1.83	NS	1.80	NS	1.82	NS
7. Lack of interest of pupils in mathematics	2.00	NS	2.00	NS	2.00	NS
8. Absenteeism among pupils	2.17	NS	2.13	NS	2.15	NS
9. Lack of comprehension of pupils	2.50	MS	2.47	NS	2.49	NS
10. Lack of interest of mathematics teachers	1.50	NS	1.47	NP	1.49	NP
11. Lack of mastery of the subject matter by teachers	1.83	NS	1.93	NS	1.88	NS
12. Lack of support from the parents	1.50	NS	1.47	NP	1.49	NP
13. Inadequate faculty development program for teachers	2.33	NS	2.33	NS	2.33	NS
14. Insufficient funds for mathematics activities and training for both pupils and teachers	1.67	NS	1.47	NP	1.57	NS
15. Fast turnover of mathematics teachers	1.50	NS	1.33	NP	1.42	NP
GRAND MEAN	1.89	NS	1.72	NS	1.81	NS

Legend:

Verbal Interpretation (VI)
Very Serious (VS)
Serious (S)
Moderately Serious (MS)
Not Serious (NS)
Not a Problem (NP)

Weighted Mean Interval

4.51- 5.00
3.51- 4.50
2.51- 3.50
1.51- 2.50
1.00- 1.50



1.4 Qualification of the School Principal;

Number of years as school principal

Table 5 shows the profile of the principal in terms of number of years as school principal. Out of 6 participating principals, 1 of them or 16.67% fall at a range of 1-5 years in terms of length of service as principal, 3 of them or 50% fall at a range of 6-10 years in terms of length of service as principal, 1 of them or 16.67% also lies at a range of 11-15 years in terms of length of service as principal; 1 of them or 16.67% lies at a range of 16-20 years in terms of length of service as principal and no principal had served for 21 years and above. This implies that years in service varied across schools.

Table 5
Number of Years as School Principal

Number of Years	Frequency	Percent
1-5 years	1	16.67
6-10 years	3	50.00
11-15 years	1	16.67
16-20 years	1	16.67
21 and above years	0	0.00
Total	6	100

Highest Educational Attainment

Table 6 shows the highest educational attainment of the school principals. Of the 6 respondents, 2 or 33.3 % have a doctoral degree; 3 or 50.00% have master's degree; and 1 or 16.7 % has bachelor's degree. This implies that most



of the respondents are qualified as school principal based on their educational background (Regional Memo on SSES Implementation, 2010).

Table 6
Educational attainment of the school principals

Highest Educational Attainment	Frequency	Percent
Doctoral Degree	2	33.3
Master's Degree	3	50.0
Bachelor's Degree	1	16.7
Total	6	100

Eligibility

All of the school principal participants are LET passers. Three (3) of them are CSE or civil service passers. This is supported by Sarmiento (2003) which states that: the school head must (1) be a Filipino citizen; (2) possess at least a master's degree or a professional license requiring at least a bachelor's degree; (3) have adequate teaching experience, managerial competence and technical expertise in school management, or have a background of demonstrated service and competence in his field of endeavor; and (4) be of good moral character.

Seminars and trainings attended

Table 7 shows the seminars and training attended by the school principals. As revealed by the data, the over-all weighted mean 4.25 with a description of Adequate means that the seminars and trainings attended by the



school principals are adequate, which help the principal develop his skills and competence in managing the school. On the other hand, the school principals are required to attend development programs, seminars or trainings to equip them with the needed skills and competency as principal (see Appendix I). The success of an organization/school system depends on how the leader manages the organization effectively, efficiently, and competently. An administrator is in the vanguard in carrying out the functions of the school. S/He leads the educational workers in the field, and makes direct interpretation and application of the policies and directives of the system, provides conditions favorable for effective teaching and efficient learning. He must be perceived by his teachers as a good example of a leader and a facilitator, technically competent and with well-developed analytical skills (Bautista, 2012).

Table 7
Seminars and Training Attended by the School Principals

In-service Trainings	Mean	VI
Conference	4.17	A
Forum	4.17	A
Seminar	4.67	VA
Workshop	4.33	A
Symposium	4.17	A
Panel Discussion	4.00	A
Grand Mean	4.25	A

Legend:	Verbal Interpretation (VI)	Weighted Mean Interval
	Very Adequate (VA)	4.51- 5.00
	Adequate (A)	3.51- 4.50
	Moderately Adequate (MA)	2.51- 3.50
	Inadequate (I)	1.51- 2.50
	Very Inadequate (VI)	1.00- 1.50



1.5 Qualification of the mathematics teacher

Number of years in teaching mathematics

Table 8 shows the frequency and percentage distribution of “Teachers number of years in teaching Mathematics”. With these results, it can be implied that the teacher-respondents have acquired some years of experience and have gained involvement in educating the students and delivering the needed instructions for them to learn.

Table 8
Number of Years in Teaching Mathematics

Number of Years	Frequency	Percent
1-5 years	2	33.33
6-10 years	2	33.33
11-15 years	0	0.00
16-20 years	1	16.67
21 and above years	1	16.67
Total	6	100

Highest Educational Attainment

Table 9 shows the highest educational attainment of the mathematics teachers. Out of 6 teachers, 1 or 16.67% of them has a Doctoral Degree, 4 or 66.67% have Master’s Degree, and 1 or 16.67% has a Bachelor’s Degree. Based on the data below, there is an implication that the respondents have the required



educational background and are equipped with skills necessary to deliver quality academic instructions.

Table 9
Educational Attainment of the Mathematics Teachers

Highest Educational Attainment	Frequency	Percent
Doctoral Degree	1	16.67
Master's Degree	4	66.67
Bachelor's Degree	1	16.67
TOTAL	6	100

Eligibility

As revealed by the data, all the Mathematics teacher are licensed; hence, they meet one of the requirements set by the law and the Department of education. According to Sunga (2011), recruitment policy on teachers does not specify the preference on gender or age for as long as they are educationally qualified. The school teaching personnel in pre-school, elementary, and secondary level of basic education in all public schools shall possess appropriate educational qualifications and must pass the Licensure Examination for Teachers.

Seminars and trainings attended in mathematics

Table 10 presents the adequacy of in-service training attended by the Mathematics teachers. The over-all weighted mean score of 3.27 with a



description moderately adequate means that the trainings attended by the mathematics teachers were moderately adequate to improve teaching strategies and approaches to meet the demand of time and mandate of the Department of Education. In-service training is very important to help the teachers improve their teaching skills and competency. Teachers must seek professional growth continuously and they must possess relevant training and experience. These are some of the indicators for teacher standards for SSES Program (DepEd Order No. 51, s. 2010).

Table 10
Adequacy of In-service Training Attended in Mathematics

In-service Trainings	Mean	VI
Conference	3.40	MA
Forum	3.53	A
Panel Discussion	3.07	MA
Seminar	3.07	MA
Symposium	3.20	MA
Workshop	3.33	MA
Grand Mean	3.27	MA

Legend:	Verbal Interpretation (VI)	Weighted Mean Interval
	Very Adequate (VA)	4.51- 5.00
	Adequate (A)	3.51- 4.50
	Moderately Adequate (MA)	2.51- 3.50
	Inadequate (I)	1.51- 2.50
	Very Inadequate (VI)	1.00- 1.50

In summary, the Mathematics teachers were academically qualified to teach in a regular academic program in terms of number of years, educational qualifications, eligibility, and training; however, one can be qualified to teach in Science School as long as he or she possess the following qualifications and



criteria set by the DepEd for SSES: preferably has MA degree/units or its equivalent; preferably with specialization in science or a seasoned science teacher with outstanding performance for the last three consecutive years; preferably has relevant training or experience; preferably has experience in conducting, teaching, or supervising research; possesses good moral character and positive work ethics; and seeks professional growth continuously (DepEd Order No. 51, s. 2010).

Academic preparation

Table 11 shows the academic preparation of Mathematics teachers in teaching different subject matters. As shown, the level of preparedness of mathematics teachers was described as very well prepared in the following subject matter: fractions, decimals, and percentages, geometric figures – definitions and properties, and representation and interpretation of data in graphs, charts and tables. On the other hand, the level of preparedness of the teachers was described as somewhat prepared in ratios and proportions; measurements – units, instruments, and properties; geometric figures – symmetry, motions and transformations, congruency and similarity; coordinate geometry; algebraic representation; evaluate and perform operations on algebraic expressions; solving linear equations and inequalities; and simple probabilities – understanding and calculations.



Table 11
Academic Preparation of Mathematics Teachers in
Teaching Different Subject Matters

SUBJECT MATTER	Mean	VI
1. Fractions, decimals and percentages	3.67	VP
2. Ratios and proportions	3.50	SP
3. Measurements-units, instruments, properties	3.33	SP
4. Perimeter, area, and volume	3.50	SP
5. Geometric figures – definitions and properties	3.33	VP
6. Geometric figures – symmetry, motions and transformations, congruency and similarity	3.17	SP
7. Coordinate geometry	3.33	SP
8. Algebraic representation	3.00	SP
9. Evaluate and perform operations on algebraic expressions	3.33	SP
10. Solving linear equations and inequalities	3.50	SP
11. Representation and interpretation of data in graphs, charts and tables	3.67	VP
12. Simple probabilities – understanding and calculations	3.50	SP
Grand Mean	3.40	SP

Legend:	Verbal Interpretation (VI)	Weighted Mean Interval
	Very well Prepared (VP)	3.51- 4.00
	Somewhat Prepared (SP)	2.51- 3.50
	Not well Prepared (NP)	1.51- 2.50
	I do not teach these Topics (IT)	1.00- 1.50

The overall mean score of the academic preparation of the teachers is 3.26, suggesting that the overall level of preparedness of the teachers can be described as **somewhat prepared**. This implies that the Mathematics teachers need more training and time allotment to improve their skills and ability, resourcefulness, and creativity in the preparation of teaching important mathematical concepts and competencies for SSES. The DepEd had set the following criteria for a SSES Teacher: demonstrates mastery of the subject;



provides varied learning and instructional strategies suited to the level of maturity, learning styles, and needs of learners; demonstrates skills that develop higher order thinking skills in learners; and models the skills of scientific inquiry, curiosity, creativity, openness to ideas and skepticism (DepEd Order No. 51, s. 2010).

Teaching Performance

Table 12 shows the performance evaluation of mathematics teachers by the principals. The performance level of the teachers was evaluated in terms of productive teaching techniques, student achievement, organized and structured classroom management, positive interpersonal relations, and teachers' responsibilities. As per computation, organized and structured classroom management is described as commendable in terms of establishes and maintains discipline and organizes students for effective instruction. On the other hand, the result shows that the teacher's performance is proficient in terms of the following criteria: productive teaching techniques; student's achievement; positive interpersonal relations; and teacher's responsibilities. The performance level of the teachers had an overall weighted mean of 4.45 which was described as **Proficient**.

In general, what makes a competent teacher? According to Ryan and Cooper (2000), the teacher must have the four essential areas of competence: (1) Attitudes that foster learning and genuine human relationships; (2) Knowledge



of the subject matter; (3) Theoretical knowledge about learning and human behavior; and (4) Skills of teaching that promote learning.

One should not look on one aspect only, like knowledge, because there are different elements that make a competent teacher.

Table 12
Performance Evaluation of Mathematics Teachers by the Principal

CRITERIA	Mean	VI
Productive Teaching Techniques	4.47	Proficient
Student Achievement	4.50	Proficient
Organized, Structured Classroom Management	4.54	Commendable
Positive Interpersonal Relations	4.17	Proficient
Teacher Responsibilities	4.33	Proficient
Grand Mean	4.45	Proficient

Legend:	Verbal Interpretation (VI)	Weighted Mean Interval
	Commendable (C)	4.51- 5.00
	Proficient (P)	3.51- 4.50
	Developing (D)	2.51- 3.50
	Unsatisfactory (U)	1.51- 2.50
	Not Applicable (N/A)	1.00- 1.50

Table 13 shows the performance evaluation of mathematics teacher by the students. The teachers were evaluated by the pupils using the different criteria. In most of the criteria, the students described the performance of the Mathematics Teachers as always in terms of strategies, approaches, classroom management, evaluation, and implementation of instruction. On the other hand, the students' evaluation of the use of instructional materials and its implementation is verbally described as often.



Table 13
Performance Evaluation of Mathematics Teachers by the Pupils

CRITERIA	Mean	VI
1. My math teacher makes the class work interesting.	3.77	Always
2. My math teacher is fair to all students.	3.82	Always
3. My math teacher maintains discipline in the classroom.	3.84	Always
4. My math teacher is well prepared for classroom discussion.	3.82	Always
5. My math teacher gives assignment related to the topics that we are studying.	3.83	Always
6. My math teacher discusses and summarizes the lesson with the class.	3.83	Always
7. My math teacher ensures that our discussion focuses on the topic of the lesson.	3.86	Always
8. My math teacher likes it when students ask questions.	3.72	Always
9. My math teacher allows sufficient time to complete our work.	3.69	Always
10. My math teacher asks questions in class to check if we understand what has been taught.	3.90	Always
11. My math teacher explains new ideas in a way that is easy to understand.	3.88	Always
12. My math teacher monitors my work, to see if I understand the lesson.	3.74	Always
13. My math teacher is very knowledgeable about the subject he/she teaches.	3.87	Always
14. My math teacher has extra activities prepared for me to do, if I completed the task before the class is over.	3.40	Often
15. My math teacher often uses teacher-made materials and worksheets for me to use.	3.41	Often
16. My math teacher gives tests and quizzes.	3.72	Always
17. My math teacher returns tests and assignments quickly.	3.59	Always
18. My math teacher uses a variety of classroom activities and resources.	3.62	Always
Grand Mean	3.74	Always

Legend:

Verbal Interpretation (VI)

Always (A)

Often (O)

Rarely (R)

Never (N)

Weighted Mean Interval

3.51- 4.00

2.51- 3.50

1.51- 2.50

1.00- 1.50

In general, the over-all weighted mean 3.74, which falls under a description **always**. This implies that the teachers, as evaluated by their pupils, showed that they do their part and perform their tasks accordingly, in relation to



implementation of new techniques, approaches and strategies of teaching. As curriculum changes from time to time due to the need or demand of the community and with the abrupt advent of technology, the quality of learning imparted to the students should be considered. There are times that the school or the individuals concerned cannot possibly acquire necessary tools in mathematical instructions to improve mathematical performance of the students perhaps because of ineptness with technology.

1.6 Profile of the grade six pupils

Age

Table 14 presents the age of the pupils. Out of 143 pupils, 29 or 20.28% of them were 11 years of age, 101 or 70.63% of them were 12 years of age, and 13 or 9.09% of them were 13 years of age. Hence, the ages of the pupils lie on the range 11-13 years of age only. This implies that these are within the normal school age for the particular grade level.

Table 14
Profile of the Pupils According to Age

Age	Frequency	Percent
11	29	20.28
12	101	70.63
13	13	9.09
Total	143	100



Gender

Table 15 shows the profile of the pupils according to their gender. Out of 143 pupils, 75 or 52.45% were females and 68 or 47.55% were males. This implies that there are more female pupils in the class.

Table 15
Profile of the Pupils According to Gender

Gender	Frequency	Percent
Female	75	52.45
Male	68	47.55
Total	143	100

Favorite subject

Table 16 shows the profile of pupils according to favorite subject. In general, the students' most favorite subject is Science, English is the second, Mathematics is the third; no favorite subject is the fourth; Filipino and HEKASI are the fifth; and HELE and MAPEH are their least favorite subjects. This implies that many of the pupils do not consider Mathematics as the number one subject among the major subjects. This could be one of the possible reasons why many pupils do not perform well in Mathematics. The results of the National Achievement Test (NAT) administered both in the elementary and secondary level revealed that pupils and students obtained low mean percentage in Science



and Mathematics. This reflects the poor performance of the Filipino learners in the area of Science and Mathematics, according to Director Nelia Benito of the National Educational Testing and Research Center (NETRC).

Table 16
Profile of the Pupils According to Favorite Subject

Subject	Frequency	Percent	Rank
1. Science	52	36.36	1
2. English	28	19.58	2
3. Mathematics	27	18.88	3
4. Filipino	10	6.99	5.5
5. HEKASI	10	6.99	5.5
6. HELE	1	0.7	7.5
7. MAPEH	1	0.7	7.5
8. No Favorite	14	9.79	4
Total	143	100	

1.7 Pupils' Admission, Retention, and Promotion to the Program

Table 17 shows the assessment done by the principals in their selective admission process and other measures. They had expressed the presence or absence of the five indicators set by the Department of Education for SSES. Results revealed that all the schools practiced four out of five indicators on the selective admission process and other measures set by the Department of



Education for SSES. However, two private schools did not require their Grade I entrants to pass the Mental Ability Test. These schools were GIST and SGSSIS.

Table 17
Pupils' Admission Requirements for SSES

INDICATORS	Private		Public	
	Frequency	Percent	Frequency	Percent
The SESS pupils undergo a selective admission process and other measures				
1. Manifest inclination in Science and Mathematics through personal interview and non-test material	3	100	3	100
2. Undergoes the School Readiness Assessment (SRA)	3	100	3	100
3. Passes the Mental Ability Test or Grade 1 entrants	1	33.33	3	100
4. Passes the qualifying test of the grade level	3	100	3	100
5. Submit certification of good moral Character	3	100	3	100

To ensure that only the qualified pupils are enrolled in the Science School, the guidelines for admission and placement set by the Department of Education must be implemented. Public science schools adhere to the policies set by the DepEd; however, some private schools deviate from these set of standards because they need more enrollees as compared to public schools. In addition, private schools have the freedom not to follow *in toto* the policies set by the DepEd.



Retention to the program and promotion

Table 18 reveals the assessment done by the principals in their retention and promotion policies. They had expressed the presence or absence of the eight indicators set by the Department of Education for SSES. Results revealed that all the schools practiced all the eight indicators on the retention and promotion guidelines set by the Department of Education for SSES.

Table 18
Retention to the Program and Promotion in SSES

INDICATORS	Private		Public	
	Frequency	Percent	Frequency	Percent
The SSES learner applies acquired scientific and technological knowledge, attitudes, values and life-long skills in coping in everyday living				
1. Maintains a general average of not lower than 83 % with a grade not lower than 85 % in Science, Mathematics and English and not lower than 83 % in other learning areas at all grade levels	3	100	3	100
2. Observes the school code of conduct.	3	100	3	100
3. Excels in Science and Mathematics international, national, regional/division achievement tests with at least 80 % Mean Percentage Score (MPS)	3	100	3	100
4. Excels in Science and Mathematics local, national, and international competitions	3	100	3	100
5. Applies concepts and skilled learned in daily life	3	100	3	100
6. Uses higher order thinking skills and creative thinking processes in solving problems	3	100	3	100
7. Undertakes investigatory project/researches for Grade III-VI	3	100	3	100
8. Keeps abreast with the current scientific findings/phenomena	3	100	3	100



These implied that the school, whether private or public, were strictly following the guidelines of the Department of Education in terms of the SSES retention and promotion policies. Schools are very particular in this area maybe because this could have legal implications, particularly in the private schools, when there is misjudgment on the part of the teachers in the retaining or promoting pupils.

1.8 Instructional Materials

Table 19 reveals the adequacy and frequency of use of instructional materials in teaching mathematics. The overall mean 3.77 shows that all the 20 listed instructional materials were adequately used. The frequency of using the said instructional materials has a mean of 3.4 which means that teachers sometimes used those instructional materials. This implies that instructional materials were adequate but they were not always utilized by the teachers.

Salandanan and Corpuz (2011) emphasize that there is no drab lesson if appropriate and sufficient media is used in its presentation. Properly selected and used, its impact on the attention, sustained interest, and participation of students has long been recognized to a point that this wide collection of teaching tools earned the title “sub-strategies.” It is not surprising to see these materials, devices, and instruments accumulated in every teacher’s storehouse. Of late, more teaching technologies such as recordings, projectors, and computers, CD-



ROMS were becoming conspicuous. Videos have been available in some schools. Other instructional materials include mock-ups, realia, models, books, pictures, charts, bulletin boards, and electronic media.

Table 19
Adequacy and Frequency of Use of Instructional Materials by
Mathematics Teachers in SSES

Instructional Materials	Adequacy		Frequency	
	Mean	VI	Mean	VI
1. Blocks and cubes (MABs)	3.6	A	3.13	Sometimes
2. Pictures and Illustrations	4.33	A	4.13	Often
3. Different shapes	4.07	A	3.93	Often
4. Charts and Tables	4.53	VA	4.27	Often
5. Chips	3.60	A	3.20	Sometimes
6. Abacus	3.07	MA	2.80	Sometimes
7. Board Games	4.07	A	3.67	Often
8. Geometric Models	4.20	A	3.73	Often
9. Measuring Instruments	4.07	A	3.93	Often
10. Play money and Coins	4.00	A	3.80	Often
11. Dice	3.93	A	3.47	Sometimes
12. Calendar	4.13	A	3.67	Often
13. Clock	4.40	A	4.00	Often
14. Computer Assisted Materials	3.40	MA	3.00	Sometimes
15. Pattern blocks	3.60	A	3.13	Sometimes
16. Laptop and Projector	3.20	MA	2.73	Sometimes
17. Transparency	3.20	MA	2.93	Sometimes
18. Film	3.20	MA	2.8	Sometimes
19. Cassette Player / DVD Player	3.47	MA	2.93	Sometimes
20. TV and DVD Player	3.33	MA	2.8	Sometimes
GRAND MEAN	3.77	Adequate	3.40	Sometimes

Legend:

Verbal Interpretation (VI)

Weighted Mean Interval

Very Adequate (VA)

Very Often (VO)

4.51- 5.00

Adequate (A)

Often (O)

3.51- 4.50

Moderately Adequate (MA)

Sometimes (O)

2.51- 3.50

Inadequate (I)

Rarely (R)

1.51- 2.50

Very Inadequate (VI)

Never (N)

1.00- 1.50



1.9 Physical Facilities

Table 20 shows the evaluation of principals on the adequacy of facilities in their school. The overall mean 3.40 implies that in terms of adequacy of facilities, it is moderately adequate. This implies that the facilities are just enough or may even meet the needs of the pupils and the demands of the program.

The table also reveals the evaluation of mathematics teachers on the adequacy of facilities in their school. The facilities include guidance and counseling office, canteen, computer laboratory, mathematics laboratory, music room with musical instruments, library, medical or dental clinic, speech laboratory, gymnasium with sports facilities, and science laboratory with basic apparatus and equipment. As regards sports facilities in gymnasium, they are found very inadequate, and this is also true for the music room also. The overall weighted mean is 3.15 or approximately 3.00 with a verbal interpretation of **Moderately Adequate**.

This implies that the facilities are not adequate enough to meet the standards in the implementation of the program, the needs of the population, and the requirements of an academic program. School equipment, furniture, and facilities should be planned in relation to the instructional program. The plan shall be flexible to anticipate educational as well as social and technological changes and innovations. These include school equipment, school furniture, regular classroom facilities, audio-visual, Home Economics facilities, industrial arts



facilities, library facilities, playground facilities, athletic equipment, school health clinic, guidance and counseling room, and school lunch center (DECS Service Manual, 2000).

Table 20
Adequacy of Physical Facilities in SSES

Facilities	Principal		Mathematics Teacher	
	Mean	VI	Mean	VI
1. Guidance and counseling office	4.83	VA	4.67	VA
2. Canteen	4.33	A	4.83	VA
3. Computer laboratory	4.33	A	3.67	A
4. Mathematics laboratory	1.33	VI	2.67	MA
5. Music room with musical instruments	1.67	I	1	VI
6. Library	4.33	A	3	MA
7. Medical/Dental clinic	3.83	A	3.33	MA
8. Speech laboratory	4.17	A	3	MA
9. Gymnasium with sports facilities	1.67	I	1	VI
10. Science laboratory with basic apparatus and equipment	3.5	MA	3.33	MA
GRAND MEAN	3.4	MA	3.15	MA

Legend:
Verbal Interpretation (VI)
Very Adequate (VA)
Adequate (A)
Moderately Adequate (MA)
Inadequate (I)
Very Inadequate (VI)

Weighted Mean Interval
4.51- 5.00
3.51- 4.50
2.51- 3.50
1.51- 2.50
1.00- 1.50

1.10 Implementation of mathematics program in terms of:

1.10.1 Curriculum Standards in mathematics

Table 21 shows the curriculum standards in Mathematics VI for SSES as evaluated by the administrator. As per computed value of weighted mean of 4.71



which is described as **Strongly Agree**, it implies that the administrators believed the curriculum standards for Mathematics VI of SSES set by the Department of Education is being implemented. The capability of the students to comprehend and perform in all the topics in mathematics are based on many factors such as teachers' effectiveness in implementing the instruction, availability of instructional materials or aids, consistency of the implementation of the curriculum headed by the administrators, and other factors that might affect students' performance.

Table 21 also reveals the curriculum standards in Mathematics VI for SSES as evaluated by the mathematics teachers.

The overall weighted mean of 4.71 which is described as **Strongly Agree** implies that the mathematics teachers strongly agreed that the eight standards mentioned in the table can be demonstrated by the students with mastery. However, the teachers must find ways on how the concepts about shapes and data presented through graphs will be mastered by the pupils. Also, students should have an understanding of the deductive nature of mathematics; understand the basic properties of operations on numbers and be able to determine whether a given system possesses any of these operations; be able to perceive patterns; be aware that mathematics is used not only in those natural sciences but also in the behavioral and social sciences and arts; recognize that some professions require knowledge of sophisticated and complex mathematical techniques; know the ways in which computers are used in science, technology,



business and government; and finally, be aware of the extent to which mathematical skills are used by individuals in their daily lives (Corpuz, Salandanan, and Rigor 2006).

Table 21
Curriculum Standards in Mathematics VI of SSES

Curriculum Standards	Principal		Mathematics Teacher	
	Mean	VI	Mean	VI
1. Demonstrate mastery of number sense and performs standard numerical operations and estimations in a variety of ways.	5.00	SA	5.00	SA
2. Understands rational numbers, ways of representing rational numbers, relationships among rational numbers, and rational number systems; and understands meaning and operations and how they relate to one another.	5.00	SA	5.00	SA
3. Analyzes characteristics of two-to-three dimensional shapes and develops mathematical arguments about geometric relationships.	4.33	A	4.33	A
4. Understands measurable attributes of object and units, systems, and processes of measurement; applies appropriate techniques, tools, and formulas to determine measurements.	5.00	SA	5.00	SA
5. Understands the concepts of circle graphs, maps and scales and techniques of interpreting data and will use them to model situations, solve problems, and interprets and draws appropriate inferences from data.	4.33	A	4.17	A
6. Selects and uses appropriate statistical methods to analyze data; develops and evaluates inferences and predictions that are based on data; and understands and applies basic concepts on probability.	4.67	SA	4.67	SA
7. Understands real numbers, ways of representing real numbers, relationships among real numbers, and real number systems; and understands meanings of operations and how they relate to one another.	5.00	SA	5.00	SA
8. Represents and analyzes relationships among variables, quantities and solve problems involving patterns, and algebraic concepts and processes.	4.33	A	4.50	SA
GRAND MEAN	4.71	SA	4.71	SA

Legend:

Verbal Interpretation (VI)
Strongly Agree (SA)
Agree (A)
Moderately Agree (MA)
Disagree (D)
Strongly Disagree (SD)

Weighted Mean Interval

4.51- 5.00
3.51- 4.50
2.51- 3.50
1.51- 2.50
1.00- 1.50



1.10.2 Time Allotment of Mathematics Class

Table 22 shows the number of minutes allotted by the six special science elementary schools for their mathematics subject per grade level. It is clearly shown that for nursery and kindergarten of AES, 60 minutes in mathematics is allotted; while GIST, GHSS, SGSSIS nursery, kindergarten, and preparatory classes spent 30 minutes in mathematics each day, and 60 minutes for grades 1 to 6. AES, NES, and TMSES spent 90 minutes in teaching mathematics for grades 1 to 3, and 60 minutes for grades 4 to 6. NES and TMSES had no nursery, kindergarten, and preparatory classes, while AES did not have preparatory classes also. This implies that the public science elementary schools have more contact hours in Mathematics in compliance with the standards for Science schools requiring more number of minutes for Science and Mathematics.

Some private schools have less number of minutes for Mathematics because primary levels are only on a half-day schedule. In addition, some private schools, though offering science program, do not follow the policy on time allotment. Under the BEC, there should be 80 minutes daily, allotted for Mathematics 1, 2, and 3, and 60 minutes in the intermediate level since more minutes are required in the SSES program.



Table 22
Time Allotment for Mathematics Class of SSES

LEVEL	AES	NES	TMCES	GIST	GHSS	SGSSIS
Nursery	60			30	30	30
Kindergarten	60			30	30	30
Preparatory				30	30	30
Grade I	90	90	90	60	60	60
Grade II	90	90	90	60	60	60
Grade III	90	90	90	60	60	60
Grade IV	60	60	60	60	60	60
Grade V	60	60	60	60	60	60
Grade VI	60	60	60	60	60	60

1.10.3 Teaching Methodologies

Table 23 shows the effectiveness and frequency of application of the various teaching methodologies of mathematics teachers in science elementary schools. The computed mean is 3.57, which is interpreted as effective; and 3.44, which is interpreted as sometimes used or applied. This implies that the teachers apply the appropriate teaching methodologies in enhancing the performance of the pupils. Method, as used in connection with the act of teaching, assumes a clearly defined way of pursuing an educational objective. Such objective could be stated in terms of knowledge that should be gained or skills and values that should be developed. In undertaking classroom instruction, a particular method may take a form of strategy or technique resorted to in introducing a subject. In daily lessons, it is a systematic plan of presenting a topic. Educators view method as a “procedural context that requires close



adherence in order to insure the attainment of a learning outcome”, because of which it is considered an integral part of teaching (Salandanan, 2009).

Table 23
Effectiveness and Frequency of Teaching Methodologies of
Mathematics Teachers in SSES

Teaching Methodologies	Mean	Effectiveness	Mean	Frequency
1. Discovery /Inquiry	3.50	ME	3.17	S
2. Investigatory Project	3.33	ME	2.33	R
3. Learning by Doing	4.17	E	4.33	O
4. Problem-Solving	4.33	E	4.67	VO
5. Guided Practice	4.33	E	4.5	O
6. Drills and Charts	3.83	E	3.83	O
7. Small Group Instruction	3.50	ME	3.00	S
8. Whole Group Instruction	3.33	ME	3.17	S
9. Cooperative Learning	3.50	ME	3.50	S
10. Independent Learning	3.50	ME	3.17	S
11. Practical Work Approach	3.17	ME	3.00	S
12. Outdoor Work	2.83	ME	2.83	S
13. Concept formation	3.33	ME	3.33	S
14. Reflective teaching and learning	3.33	ME	3.33	S
Grand Mean	3.57	E	3.44	S

Legend:

Verbal Interpretation (VI)

Weighted Mean Interval

Very Effective (VE)

Very Often (VO)

4.51- 5.00

Effective (E)

Often (O)

3.51- 4.50

Moderately Effective (ME)

Sometimes (S)

2.51- 3.50

Ineffective (I)

Rarely (R)

1.51- 2.50

Very Ineffective (VI)

Never (N)

1.00- 1.50



1.10.4 Workload of Teachers

Table 24 shows the workload of Mathematics Teachers in Special Science Elementary Schools. The table reveals the total number of classes in each school with a mean score of 5.0. This shows that each school averages 5 classes in a week. It was shown also that the total number of pupils has a mean score of 115.83. However, it was observed that there were Special Science Elementary Schools with only few pupils and there were some schools with a lot of pupils.

In addition, the teachers' workloads are also shown in the table. The number of teaching hours that the mathematics teachers in a special science elementary school render in a week has a mean score of 12.5 which implies that there were teachers who spent more hours in teaching mathematics and there were teachers who spent only a few hours for it. The number of hours that those teachers render in teaching mathematics varies due to the specialization of the teachers handling the subject. Some teachers are also teaching other learning areas as shown below with a mean score of 14.67.

In addition to the teaching loads, they also have administrative duties. It was also observed that the number of pupils vary from one school to another. More so, there are more pupils in the public elementary schools than in the private elementary schools. Likewise, the workload differs in terms of specialization and total population. Most of the schools observe the DepEd's policy on teachers'



workload which is 6 hours daily or 360 minutes for teaching and 2 hours for nonteaching duties.

Table 24
Workload of Mathematics Teachers in SSES

VARIABLES	MEAN
Total number of classes in a week	5.00
Total number of pupils	115.83
Number of teaching hours /week in mathematics	12.50
Number of teaching hours /week in other learning areas	14.67
Number of hours/week for student supervision	3.33
Number of hours/week for student counseling/appraisal	2.58
Number of hours/week for administrative duties	1.75
Number of hours/week for individual curriculum planning	1.50
Number of hours/week for cooperative curriculum planning	0.97

1.10.5 Assessment for learning

Table 25 shows the different weights given for various types of assessment. The result shows that the teachers use the different types of assessment listed. The computed overall mean is 3.60 and interpreted as often. From this result, it can be implied that the types of assessment given by the teachers vary in terms of types; however, most of these are teacher-made tests which are limited to multiple choice, true or false and matching type, and giving of homework/assignments.



Table 25
Weights Given for Use of the
Different Assessment Types

TYPES OF ASSESSMENT	MEAN	VERBAL INTERPRETATION
1. standardized test produced outside the school	2.83	Sometimes
2. teacher-made short answer or essay tests that require pupils to describe or explain their reasoning	3.33	Sometimes
3. teacher-made multiple choice, true or false and matching type	4.0	Often
4. homework / assignments	4.33	Often
5. projects or practical/ laboratory exercises	3.50	Sometimes
Grand Mean	3.60	Often

Legend:

Verbal Interpretation (VI)

Very Often (VO)

Often (O)

Sometimes (O)

Rarely (R)

Never (N)

Weighted Mean Interval

4.51- 5.00

3.51- 4.50

2.51- 3.50

1.51- 2.50

1.00- 1.50

1.10.6 Extent of administrative support

The performance of the principals as evaluated by the teachers is presented in table 26. Their performance was evaluated by the teachers in terms of administrative management, instructional leadership, and public relations. Based on the table, the performances of the principals in the three criteria mentioned above as rated by the teachers were verbally interpreted as agree. However, there were some criteria where the principals were rated as strongly agree by the teachers. The overall mean of the performance of the principals as evaluated by the teachers was 4.28 verbally interpreted as **agree**.



Table 26
Performance Evaluation of Principals by the Teachers

Criteria	Mean	Verbal Interpretation
Administrative Management	4.30	Agree
1. The principal communicates school's vision and mission effectively.	4.17	Agree
2. The principal translates VMGO to programs and project.	4.0	Agree
3. The principal plans, implements, and evaluates school program and projects with stakeholders.	4.33	Agree
4. The principal ensures the utilization of resources efficiently and effectively, to achieve planned programs and projects.	4.50	Agree
5. The principal establishes linkages to generate support for the school.	4.50	Agree
Instructional Leadership	4.21	Agree
1. The principal highly respected by teachers, learners, and the community for his/her leadership in the profession.	4.17	Agree
2. The principal possesses strong supervisory and administrative skills.	4.00	Agree
3. The principal initiates innovations/interventions to raise the quality of mathematics instructions.	4.33	Agree
4. The principal provides opportunities for the professional growth of teachers and staff.	4.67	Strongly Agree
5. The principal empowers teachers to undertake innovative researches/ projects related to mathematics program.	3.67	Agree
6. The principal plans and implements a fair incentive system for teachers.	4.47	Agree
7. The principal documents and shares best practice of the school.	4.17	Agree
Public Relations	4.50	Agree
1. The principal maintains good public relations with students, teachers, and the community to ensure their support.	4.67	Strongly Agree
2. The principal involves stakeholders in planning and implementing school plans.	4.33	Agree
Grand Mean	4.28	Agree

Legend:

Verbal Interpretation (VI)
Strongly Agree (SA)
Agree (A)
Moderately Agree (MA)
Disagree (D)
Strongly Disagree (SD)

Weighted Mean Interval
4.51- 5.00
3.51- 4.50
2.51- 3.50
1.51- 2.50
1.00- 1.50



This implies that the administrators were able to perform their duties and responsibilities successfully; however, there were some areas that the school principals must look into or strive to perform. Some of these were translating the VMGO into programs and projects; planning, implementing, and evaluating school programs and projects with stakeholders; establishing linkages for support and benchmarking; improving supervisory skill or ability; and sharing leadership by empowering the teachers to undertake innovative researches related to mathematics program. The principal is likewise supposed to assist the school head in the attainment of the objectives of the elementary and secondary education, and his/her functions and responsibilities were explicitly stated by the school (Sarmiento, 2003).

1.11 Academic performance of the grade six pupils in mathematics

Table 27 below shows the academic performance of the pupils in from the first to the fourth grading periods. Based on the results obtained, the level of performance of the students was consistently described as satisfactory during the four grading periods. The overall mean was 86.28, interpreted as satisfactory. This implies that the grades of the pupils in Mathematics vary from one grading period to another; however, not much improvement was observed because the grades were consistently satisfactory. This is not a very positive indicator of good



academic performance, considering that they belong to a science school where there is higher and stricter admission and promotion grade requirements.

Table 27
Academic Performance of Grade Six Pupils in Mathematics

Grading Period	Mean	Verbal Interpretation
First	85.55	Satisfactory
Second	86.35	Satisfactory
Third	86.84	Satisfactory
Fourth	86.37	Satisfactory
Final	86.28	Satisfactory

Problem 2. Are there significant differences in the evaluation of the school principals and the mathematics teachers on the following variables?

2.1 Vision and Mission

Table 28 presents the Analysis of Variance between the responses of the principals and the teachers in terms of the Vision and Mission of SSES. Based on the results, the computed value is 0.13 which is less than the tabulated value 5.32 at 0.05 level of significance. This implies that there is no significant difference between the evaluation of principals and the evaluation of mathematics teachers on vision and mission of the school. Hence, there is not enough evidence to reject the null hypothesis to support the claim of significant difference.



2.2 Goals and Objectives

Table 28 presents the Analysis of Variance between the responses of principals and teachers in terms of the Goals and Objectives of SSES. Based on the data, the computed value 0.017 is less than the tabulated value 5.32 at 0.05 level of significance. This implies that there is no significant difference between the evaluation of mathematics teachers and the principals on the schools goals and objectives.

2.3 Problems encountered in the implementation of mathematics program

Table 28 shows the significant difference on the evaluation of the school principals and Mathematics teachers on the problems encountered in the implementation of mathematics program. In the previous table above, it was shown that both the principals and the teachers described the different problems in general as not serious. The different problems possibly encountered could be the inadequate supervisory assistance, inadequate facilities, inadequate instructional media, inadequate teaching aids, inadequate textbooks, inadequate reference materials, lack of interests of pupils in mathematics, absenteeism among pupils, lack of comprehension of pupils, lack of interests of mathematics teachers, lack of mastery of subject matters by the teacher, lack of support from the parents, inadequate faculty development of teachers, insufficient fund for



activities and training for both teachers and pupils, and fast turnovers of mathematics teachers.

Table 28 shows the Analysis of Variance between the responses of principals and teachers in terms of their evaluation on the problems encountered in the implementation of the mathematics program. The computed value 0.331 is less than the tabulated value 4.20 at 0.05 level of significance. From this result could be inferred that the null hypothesis is to be accepted because there is not enough evidence to support the claim that there is a difference in the responses of the two groups.

2.4 Adequacy of the school facilities

Table 28 presents the Analysis of Variance between the evaluation of mathematics teachers and the principals on the adequacy of school facilities. Based on the data, the computed value 0.257 is less than the tabulated value 5.32 at 0.05 level of significance. This implies that there is no significant difference between their evaluations. Hence, there is not enough evidence to reject the null hypothesis supporting the claim of significant difference on the paired variables. This implies that both the school principals and the Mathematics teachers are aware of the status of the facilities in their school.



2.5 Curriculum standards in mathematics

Table 28 shows the Analysis of Variance between the responses of principals and teachers on curriculum standards in Mathematics VI. The computed value is 0.347 which is less than the tabulated value at 0.05 level of significance. This shows that there is no significant difference between the two paired variables; likewise, this result indicates that the null hypothesis is to be accepted. This implies that both the school principals and the Mathematics teachers have similar perception about the curriculum standards of the school.

Table 28
Comparison of the School Principals' and Mathematics Teachers' Perceptions on the Components of SSES Program

Component		Sum of Squares	Df	Mean Square	F-ratio	P-value	Interpretation
Vision and mission	Between Groups	0.04	1	0.04	0.13	5.32	Not Significant
	Within Group	2.44	8	0.31			
Goals and objectives	Between Groups	0.001	1	0.001	0.017	5.32	Not Significant
	Within Group	0.48	8	0.06			
Problems encountered in the implementation of mathematics program	Between Groups	0.048	1	0.048	0.331	4.20	Not Significant
	Within Group	4.06	28	0.145			
Adequacy of school facilities	Between Groups	0.313	1	0.313	0.257	4.41	Not Significant
	Within Group	21.92	18	1.217			
Curriculum standards in mathematics	Between Groups	0.026	1	0.026	0.347	4.60	Not Significant
	Within Group	1.05	14	0.075			

Problem 3. What are the perceived strengths and weaknesses of the program in terms of the different areas evaluated?

In determining the strengths and weaknesses of the Mathematics Program in selected special science elementary schools, the following areas were



evaluated: Vision, Mission, Goals, and Objective statement; qualification of the school principals, Mathematics teachers, and profile of pupils; physical facilities, instructional materials; academic program which includes schedule, teaching methodologies, workload of teachers, assessment for learning; and policies on admission, retention, and promotion.

Table 29 shows the summary of mean scores of evaluated components to determine the status of the implementation of the Mathematics Program of selected science elementary schools in the province of Cavite.

Based on the computed means and their verbal interpretations, the following are considered as strengths: Vision and Mission, Goals and Objectives, Trainings and Seminars, Teachers' Performance, Adequacy of Instructional Materials, Teaching Methodologies, Curriculum Standards, Assessment of Learning, and Performance of School Principals. Nevertheless, there are still measures to be done to enhance each area for the achievement of the SSES mandate.

On the other hand, the problems encountered in the implementation of the program were considered as weaknesses, though the data revealed that problems were not serious. In sum, they are still considered as problems and they may affect the implementation of the program.



Table 29
Evaluation Results of the Implementation of Mathematics Program in SSES

Components	Mean	Verbal Interpretation	Evaluator	Strength / Weakness	Remark
Vision and Mission	4.40 4.36	Agree Agree	Principals Teachers	Strength	Enhance
Goals and Objectives	4.73 4.67	Strongly Agree Strongly Agree	Principals Teachers	Strength	Maintain
Problems Encountered	1.89 1.72	Not Serious Not Serious	Principals Teachers	Weakness	Improve
Trainings and Seminars	4.25 3.27	Adequate Moderately Adequate	Principals Teachers	Strength	Enhance
Teachers' Preparation	3.26	Somewhat Prepared	Teacher	Strength	Enhance
Teachers' Performance	4.33 3.74	Proficient Always	Principal Pupils	Strength	Enhance
Adequacy of Instructional Materials	3.77 3.40	Adequate Sometimes	Teachers	Strength	Enhance
Curriculum Standards	4.71 4.71	Strongly Agree Strongly Agree	Principals Teachers	Strength	Maintain
Adequacy of Facilities	3.40 3.15	Moderately Adequate Moderately Adequate	Principal Teachers	Strength	Enhance
Teaching Methodologies	3.57 3.44	Effective Sometimes	Teachers	Strength	Enhance
Assessment for Learning	3.6	Often	Teachers	Strength	Enhance
Performance of the School Principal	4.28	Agree	Teachers	Strength	Enhance
Academic Performance	86.28	Satisfactory	Teachers	Strength	Enhance



There are also measures to be done on components like the training and seminars of teachers, the teachers' preparation, improvement on physical facilities, and most importantly, the academic performance of the pupils.

Moreover, measures have to be taken to attain better academic performance since the schools are classified as science schools where standards and competencies are expected to be higher than that of a regular curriculum.

Based on the responses to the checklist and ranking, some component areas need to adhere to the policies and standards set for science schools, especially among the selected private schools. These are admission policy, time allotment for Mathematics, and workload of teachers.

Interview with some parents and pupils supported these findings (see Appendix N). In general, they gave the following comments and suggestions in order to improve the Mathematics program in the school of their children: 1) continuously improve the quality of teaching; 2) more advanced textbook; 3) more activities/games/puzzles/interesting problems/exercises; 4) computer assisted instruction (CAI) in math; 5) more improvement for easy comprehension; 6) summer class; 7) longer discussion; 8) more teachers; 9) more math time; 10) more rooms; 11) best and well-known teachers; 12) time to catch up; 13) paying attention to pupils' weaknesses; 14) longer time for MTAP; 15) more fun; 16) more problem solving; 17) more seminars/trainings for



teachers; 18) advanced algebra in grade VI; 19) prioritize teaching techniques; 20) more references; 21) more combined science and math exercises; 22) more encouragement from teachers; 23) more learning materials; 24) math taught in Filipino language; 25) math competitions within the school; 26) math electives/advance math /statistics; 27) more facilities/laboratories; 28) practical work approach; and 29) use of multimedia.

Problem 4. Based on the findings of the study, what model in mathematics program of the special science curriculum can be evolved?

The proposed Mathematics Model was developed as a result of the study conducted to determine the current status of selected Science Elementary Schools in the province of Cavite. The data presented in Table 29 reveal that there are some areas that have to be enhanced for the selected schools to meet the standards in implementing Mathematics Program of the said schools.

The proposed Mathematics Program is presented on the next page.



Chapter V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter presents the summary, conclusions, and recommendations based on the findings of the study.

Summary

This study employed the descriptive-evaluative research design to determine the status, strengths and weaknesses of the Mathematics Program of selected Special Science Elementary Schools (SSES) in the Province of Cavite using the CIPP Model of Program Evaluation. Areas such as Vision, Mission, Goals, and Objectives; problems encountered in the implementation of the program; qualification of the school principals and mathematics teachers, and the pupils' profile; policies on admission, retention, and promotion; instructional materials; physical facilities; curriculum standards; time allotment; teaching methodologies; workload of teachers, assessment for learning, extent of administrative support, and the academic performance of pupils in Mathematics were considered in the evaluation process.

Four research instruments were used in this study. Some portions of the instruments were adopted from other researches but were modified and revalidated to fit in the field of mathematics. The respondents were six (6) school principals, six (6) Mathematics teachers, and 143 pupils, during the school year



2012-2013. To evaluate the pupils' academic performance, their GPA was utilized. They were selected using the purposive sampling technique. Some parents were interviewed to gather more data or information. Data gathered were analyzed and interpreted using the statistical tools such as frequency, weighted mean, percentage, and ranking. To determine significance, One Way ANOVA was employed. To determine the strengths and weaknesses of the Mathematics program, the summarized mean and verbal description or interpretations of some variables were presented, analyzed, and interpreted. These were supported by the feedback from the parents and pupils during the informal interview. The results of the evaluation served as the basis in evolving a Mathematics program for Special Science Elementary Schools.

Findings

Results of the study reveal the following findings:

1. The status of SSES as perceived by the principals and mathematics teachers
 - 1.1 In Vision and Mission of SSES, the school principals and the mathematics teachers agree that the Vision and Mission of the school provides for balanced program for holistic development of the pupils and it defines the future and direction of the school; however, they moderately agree that the Vision and Mission of the schools is updated



and monitored. Furthermore, the mathematics teachers moderately agree that the stakeholders particularly the parents are oriented.

1.2 In terms of Goals and Objectives, the respondents strongly agree that the indicators like includes a sense of nationalism; incorporates general skills, attitudes, and values; harmonizes with the goals and objectives of the DepEd; and aligns with the shared Vision and Mission of the school.

1.3 In terms of the problems encountered in the implementation of the Mathematics Program, both the school principals and Mathematics teachers perceived the different problems as not serious.

1.4 For the qualifications of the school principal

- The school principals differ in the number of years served in the post. Five of the school principals are educationally qualified because they are either Masters or Doctorate degree holder while one of them has a bachelor's degree only.
- All the school principals are eligible teachers. They all passed the Licensure Examination for teachers.
- The school principals have adequate seminars and trainings.

1.5 For the qualification of the elementary mathematics teachers

- In terms of number of years as Mathematics teachers, the teachers' years in the service as Mathematics teachers vary; however, most of them have been teaching for more than five years.



- Of the 6 respondents, only one has the minimum educational requirement which is bachelor's degree, while the rest possess higher educational attainment.
- All the Mathematics teachers are eligible for they passed the Licensure Examination for teachers.
- In terms of seminars and training, the respondents perceived these to be moderately adequate.
- In terms of academic preparation, the Mathematics teachers described their preparation to be somewhat prepared only.
- The school principals evaluated the Mathematics teachers' performance as proficient while the pupils perceived that their Mathematics teacher always follow or perform the given indicators.

1.6 For the profile of the grade six pupils

- The pupils belong to the ages 11-13 years old.
- In terms of gender, there are more female than male pupils.
- In terms of favorite subjects, among the major subjects, Science ranked as 1, followed by English, and Mathematics ranked as 3.

1.7 For the requirements being implemented in SSES

- In terms of pupil admission, the public science elementary schools follow all the indicators of standards while two private schools do not follow all the five indicators of standards for admission.



- In retention to the program and promotion, both the public and private schools practice all the eight indicators based on retention and promotion of pupils.

1.8 In terms of instructional materials, the respondents perceived these to be adequate but teachers use them only sometimes.

1.9 In terms of facilities, both the school administrators and the Mathematics teachers perceived these to be moderately adequate.

1.10 For the implementation of the Mathematics Program

1.10.1 Both the school principals and the teachers strongly agree that the curriculum standards are observed or practiced.

1.10.2 The public science elementary schools implement or observe the standard time allotment in all grade levels; on the other hand, the private science elementary schools have shorter time allotted for Mathematics in the primary level for grades 1-3.

1.10.3 In terms of teaching methodologies, the respondents rated these to be effective and they sometimes apply them.

1.10.4 In terms of workload, some teachers have more workloads while others have less workloads.

1.10.5 In terms of assessment for learning, the Mathematics teachers administer the different types often.

1.10.6 In terms of extent of administrative support through the performance of the school principals, the teachers agree that



their school principals perform all the indicators, except on the following indicators: the principal provides opportunities for the professional growth of teachers and staff and the principal maintains good public relations with students, teachers, and the community to ensure that their support will reach the strongly agree level of evaluation.

- 1.11 In terms of pupils' academic performance, it is rated as satisfactory.
2. There is no significant difference in the evaluation of the school principals and the Mathematics teachers on the following: Vision and Mission, Goals and Objectives, problems encountered, adequacy of facilities, and curriculum standards.
3. The following are considered as strengths: Vision and Mission, Goals and Objectives, Trainings and Seminars, teachers' preparation in teaching Mathematics, Teachers' Performance, Adequacy of Instructional Materials, Curriculum Standards, adequacy of facilities that support the implementation of the Mathematics program, Teaching Methodologies, Assessment of Learning, and Performance of School Principals, and pupils' academic performance.

On the other hand, the problems encountered in the implementation of the program are considered a weakness.



Conclusions

Based on the findings of the study, the following conclusions were drawn:

1. The Vision and Mission articulates the education purposes of the schools and describes its desired direction; likewise, the goals and objectives of the schools reflect and embody that of the Mathematics program for Special Science Elementary Schools. However, along the process the stakeholders are not aware about the common sense of purpose and the direction of the school because they are not involved or oriented and the sense of nationalism through deepened appreciation in Mathematics is not given much emphasis. Hence, there is a need for revisit to determine its relevance to changing times.
2. Some areas are perceived to be problems particularly on lack of instructional media, inadequate faculty development program for the teachers, and pupils' comprehension.
3. The Mathematics teachers are not fully prepared to teach Mathematics. They lack the required or needed preparation expected of them.
4. Mathematics is not their favorite subject perhaps due to its perceived difficulty by many pupils and students.
5. Private school have their own admission policy which is quite different from the policy on admission set by the DepEd for science elementary schools.



6. Both public and private science elementary schools follow the policy set by the DepEd because retention and promotion are very critical areas which may cause problem on both the school and the parents when they are not within the prescribed standards.
7. The instructional materials are adequate but these do not help improve the academic performance of the pupils because they are not frequently used by the teachers. Adequacy does not guarantee effectiveness.
8. The schools do not have enough facilities to meet the requirements in implementing Mathematics program and the needs of the population because they are just moderately adequate.
9. Although the curriculum standards in terms of the components of Mathematics curriculum are perceived to be strongly implemented, there are still areas or components that needs emphasis and these are the competencies in analyzing characteristics of two-to-three dimensional shapes and developing mathematical arguments about geometric relationship and understands the concepts of circle graphs, maps and scales and techniques of interpreting data and will use them to model situations, solve problems, and interprets and draws appropriate inferences from data. These are basic competencies that must be acquired or developed by the learners.
10. The selected private schools deviate from the policy on time allotment in the primary levels perhaps due to their limited allotted time for Preparatory



and Grades 1-3, while the public schools adhere to the policy set for Science elementary schools in terms of daily allotted time for Mathematics.

11. The teachers apply effective and different types of teaching methodologies in teaching Mathematics and this could contribute to their proficient teaching performance.
12. The workloads of the teachers are not the same or equal and this is very true in many schools due to different factors such as teaching performance, years in service, and skills.
13. The teachers administer different types of assessment; however, most of these are the types which are easy to construct or check. They do not explicitly indicate whether these would develop critical thinking skills and creativity on the parts of the learners.
14. Although the school principals provide support in the implementation of the Mathematics program by performing their duties and responsibilities indicated in the criteria, there are important areas which must be improved. Some of these were translating the VMGO into programs and projects; planning, implementing, and evaluating school programs and projects with stakeholders; establishing linkages for support and benchmarking; improving supervisory skill or ability; and sharing leadership by empowering the teachers to undertake innovative researches related to mathematics program.



15. The academic performance in Mathematics of the pupils needs to be improved in order to achieve the above minimum requirement for promotion in special science elementary schools. Their performance does not reflect the expected performance of pupils from a science school.
16. The school principals and the Mathematics teachers have similar perception about the various areas or components of a curriculum or program. This could be due to the fact that the policies, standards, and requirements for a science school are higher than that of a regular program and the expectations and demands are also greater.
17. The schools have more strengths than weaknesses; however, those strengths still require enhancement. The perceived weaknesses, when taken for granted will affect the success in implementing the program.

Recommendations

Based on the results and conclusions of the study, the following recommendations were offered:

1. The school must review their Vision and Mission to determine its relevance and involve the stakeholders to be able to come up with shared Vision and Mission statement. The goals and objectives of the Mathematics program should provide holistic development for all the



pupils and does not only focus on knowledge and skills. Values like nationalism must be emphasized or integrated in the different lessons.

2. The schools must work on the improvement or enhancement of all the indicators because they all impede the success of the implementation of the program which the desired product is academic performance. Collaborative efforts must be given importance to offer solutions to the different problems.
3. The schools, especially the private schools, must require considerable amount of years in service as teachers first before assigning them the position of a school principal.
4. Teachers must be given equal opportunities for professional growth and personal welfare regardless of their years in service; however, new entrants must be given support.
5. All teachers must continually educate themselves by pursuing a masters or doctorate degree relevant to Mathematics teaching.
6. The teachers must have very adequate and relevant seminars and trainings because they are considered as the front liners in teaching. Provisions to send teachers to attend seminars and trainings at various levels should be given a priority for the enhancement of their knowledge and skills.
7. Through the supervision and help of the school principals, the teachers must be equipped with teaching skills and competencies to ensure that



they are always very prepared in teaching the subject. In addition, the teachers themselves must find ways to improve this area.

8. Only the qualified teachers in terms of educational background and specialization must be assigned so that their perception of the teaching and learning Mathematics is always positive; otherwise, their performance would be affected.
9. The school administration must provide all the support needed like continuing professional development aimed at enhancing and updating them with innovative teaching strategies and classroom management. Furthermore, the teachers must be aware of their performance, identify their strengths and weaknesses and find ways to improve their weaknesses.
10. Teachers must encourage the pupils to have a more positive attitude toward the Mathematics subject by making them hooked in the discussion through the different teaching strategies and by making the class more learner-centered.
11. The schools, particularly the private science elementary schools must be stricter in terms of admission standards because of the nature of the curriculum or program they offer. Mental ability must be given emphasis also because the pupils must cope with the challenges and demands of Mathematics program of a Special Science Elementary School.



12. The private schools must review their time allotment for Mathematics because Mathematics is one of the fundamental subjects in a Science curriculum.
13. The teachers must be consistent in terms of applying various teaching methodologies and they must apply all those that they have learned from their seminars, whatever are appropriate and relevant.
14. The school principals must see to it that workloads are distributed in conformity with existing legal practices. Policies on workload must be clearly stated and all the teachers are informed or oriented.
15. Teachers must prepare types of test which observe the principles of validity and reliability. They must expose the pupils to different types of test which measures critical thinking skills, output, and performance.
16. School principals must provide all the needed support by providing activities based on the Vision and Mission of the school, strengthening linkages between the school and the community in order to achieve the goals and objectives of the Mathematics program, encouraging and supporting the teachers to be involved in research relevant to Mathematics program, improving his/her administrative and supervisory skills, and by implementing fair incentive system for the teachers.
17. Collaborative efforts must be undertaken to be able to determine and improve the different factors that could improve the academic performance of the pupils.



18. School principals must discuss with the different stakeholders about the needed measures to improve the different areas that are considered their weaknesses. This could be done through consultations, meetings and focus group discussion.
19. The proposed program, which evolved out of the results of this study, is subject for evaluation of the school principals and teachers for implementation, but this could be adopted to help them enhance their current Mathematics Program.
20. This study may be replicated to determine other variables which are predictors of academic performance in Mathematics of pupils enrolled in a Science program.
21. The following variables, not covered in this study, might have influenced the academic performance of the pupils and these must be determined so that their academic performance will improve. This could be done through a study or research to be conducted by either the school principal or the Mathematics teacher.
 - Determine the relevance of their specialization, seminars and trainings to their position and the nature of the curriculum and program they offer, which is a Science curriculum
 - Ensure the strict implementation of the policy on retention and promotion to determine if those who deserve to be retained or promoted were really retained or promoted.



- Include a classroom observation to determine if the school principal ensure that all the learning standards and competencies indicated in the Mathematics Program of a Science Curriculum are being followed and acquired by the pupils; require and guide the teachers to utilize often the appropriate/relevant and varied instructional materials; and if the schools provide the needed instructional materials for a Mathematics program.
- The schools budget allocation for the different facilities that support the academic program and the implementation of the program and make sure that these are adequate to meet the needs of the learners.



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Appendices



Appendix A
LETTER TO EXPERT VALIDATORS

December 4, 2012

Dear _____:

Greetings!

I am a graduate student of Philippine Normal University in Manila and presently working on my dissertation entitled **“TOWARDS EVOLVING A MODEL FOR MATHEMATICS PROGRAM OF SCIENCE ELEMENTARY SCHOOLS OF CAVITE”** in partial fulfillment of the requirements for the degree of Ph.D. in Mathematics Education. This study aims to evaluate the mathematics program of science elementary schools using CIPP Model and to develop a model for the said program.

In view of your renowned proficiency in evaluating instrument and your vast experience as educator, may I respectfully request for your assistance in evaluating the Questionnaires for School Principal, Math Teachers, Grade six pupils and parents which will be used for the said study.

Attached are the copies of the instrument and statement of the problem for your reference.

Your benevolent assistance to this study is highly appreciated.

Thank you very much.

Respectfully yours,

RENELYN R. CORDIAL
Graduate Student

Noted:

GLADYS C. NIVERA, Ph.D.
Adviser

RENE R. BELECINA, Ph.D.
Adviser



Appendix B
CRITERIA FOR VALIDATING THE RESEARCH INSTRUMENT

Evaluator: _____
Highest Educational Attainment: _____
School: _____
Position: _____

Instruction: Listed below are criteria for validating the questionnaires. Please rate each item by ticking (/) the corresponding equivalent on the four-point scale.

Strongly Agree	4	Disagree	2
Agree	3	Strongly Disagree	1

I	Format and Design	4	3	2	1
1	The printing is clear and readable.				
2	The quality of the paper is acceptable.				
3	The layout is attractive and uniform.				
4	The fonts used are comprehensible and appropriate.				
5	The spacing on the pages contributes to the ease of reading and responding.				
II	Language and Style	4	3	2	1
1	The language and style is appropriate.				
2	The language used is consistent.				
3	The questionnaires are free from grammatical errors.				
4	The sentences are properly constructed and punctuated.				
5	The words used are simple and easy to understand.				
III	Content	4	3	2	1
1	The items are factual and objective.				
2	The items are free from ideological, sexual, and racial bias.				
3	The items reflect actual learning/teaching situations.				
4	The choices for each item are independent and do not overlap.				
5	The items are sound, convenient, useful, and proper				

Comments/Suggestions and Modifications:

Validator's Signature



Appendix C
LETTER TO SCHOOLS DIVISION SUPERINTENDENT
FOR THE PERMISSION TO CONDUCT THE STUDY

December 4, 2012

Dr. Yolanda V. Carpina
Schools Division Superintendent
Division Office
Trece Martires City

Dear Dr. Carpina:

Greetings!

I am a graduate student of Philippine Normal University in Manila and presently working on my dissertation entitled **“TOWARDS EVOLVING A MODEL FOR MATHEMATICS PROGRAM OF SCIENCE ELEMENTARY SCHOOLS OF CAVITE”** in partial fulfillment of the requirements for the degree of Ph.D. in Mathematics Education. This study aims to evaluate the mathematics program of science elementary schools using CIPP Model and to develop a model for the said program.

In this connection, the undersigned wishes to request permission from your office to get the list of private and public elementary schools who are offering the science program. Likewise, may I be allowed to gather data needed in my study in selected science elementary schools of Cavite.

Your favorable response to this request will be highly appreciated.

Thank you very much.

Respectfully yours,

RENELYN R. CORDIAL
Graduate Student

Noted:

GLADYS C. NIVERA, Ph.D.
Adviser

RENE R. BELECINA, Ph.D.
Adviser

Approved:

YOLANDA V. CARPINA, Ph.D.
Schools Division Superintendent



Appendix D
COVER LETTER FOR PILOT TESTING

February 8, 2013

Dear _____:

Greetings!

I am a graduate student of Philippine Normal University in Manila and presently working on my dissertation entitled **“TOWARDS EVOLVING A MODEL FOR MATHEMATICS PROGRAM OF SCIENCE ELEMENTARY SCHOOLS OF CAVITE”** in partial fulfillment of the requirements for the degree of Ph.D. in Mathematics Education. This study aims to evaluate the mathematics program of science elementary schools in Cavite using the CIPP Model and to evolve a model for the said program.

In this connection, the undersigned wishes to request permission from your office to administer the research instrument to the Principal/Administrator, the Grade Six Mathematics Teachers, the Grade Six pupils and their parents. The gathered data will be used in pilot testing of the instrument. Rest assured that any information that you supply will be treated with the greatest confidentiality and anonymity.

Your favorable response to this study is highly appreciated.

Thank you very much.

Respectfully yours,

RENELYN R. CORDIAL
Graduate Student

Noted:

GLADYS C. NIVERA, Ph.D.
Adviser

RENE R. BELECINA, Ph.D.
Adviser



Appendix E
COVER LETTER FOR SCHOOL PRINCIPAL

February 14, 2013

Dear _____:

Greetings!

I am a graduate student of Philippine Normal University in Manila and currently working on my dissertation entitled **“TOWARDS EVOLVING A MODEL FOR MATHEMATICS PROGRAM OF SCIENCE ELEMENTARY SCHOOLS OF CAVITE”** for the degree of Ph.D. in Mathematics Education. This study aims to evaluate the status of the mathematics program of science elementary schools in Cavite using the CIPP Model and to evolve a model for the said program.

In this regard, your invaluable participation as school principal is earnestly requested by accomplishing the attached questionnaire as completely as possible. Rest assured that the information gathered will be treated with the greatest confidentiality and anonymity.

Your favorable response will be highly appreciated.

Thank you very much.

Respectfully yours,

RENELYN R. CORDIAL
Graduate Student

Noted:

GLADYS C. NIVERA, Ph.D.
Adviser

RENE R. BELECINA, Ph.D.
Adviser



Appendix F
COVER LETTER FOR MATHEMATICS TEACHER

February 14, 2013

Dear _____:

Greetings!

I am a graduate student of Philippine Normal University in Manila and currently working on my dissertation entitled **“TOWARDS EVOLVING A MODEL FOR MATHEMATICS PROGRAM OF SCIENCE ELEMENTARY SCHOOLS OF CAVITE”** for the degree of Ph.D. in Mathematics Education. This study aims to evaluate the status of the mathematics program of science elementary schools in Cavite using the CIPP Model and to evolve a model for the said program.

In this regard, your invaluable participation as mathematics teacher is earnestly requested by accomplishing the attached questionnaire as completely as possible. Rest assured that the information gathered will be treated with the greatest confidentiality and anonymity.

Your favorable response will be highly appreciated.

Thank you very much.

Respectfully yours,

RENELYN R. CORDIAL
Graduate Student

Noted:

GLADYS C. NIVERA, Ph.D.
Adviser

RENE R. BELECINA, Ph.D.
Adviser



Appendix G
COVER LETTER FOR GRADE SIX PUPILS

February 14, 2013

Dear _____:

Greetings!

I am a graduate student of Philippine Normal University in Manila and currently working on my dissertation entitled **“TOWARDS EVOLVING A MODEL FOR MATHEMATICS PROGRAM OF SCIENCE ELEMENTARY SCHOOLS OF CAVITE”** for the degree of Ph.D. in Mathematics Education. This study aims to evaluate the status of the mathematics program of science elementary schools in Cavite using the CIPP Model and to evolve a model for the said program.

In this regard, your invaluable participation as grade six pupil is earnestly requested by accomplishing the attached questionnaire as completely as possible. Rest assured that the information gathered will be treated with the greatest confidentiality and anonymity.

Your favorable response will be highly appreciated.

Thank you very much.

Respectfully yours,

RENELYN R. CORDIAL
Graduate Student

Noted:

GLADYS C. NIVERA, Ph.D.
Adviser

RENE R. BELECINA, Ph.D.
Adviser



Appendix H
COVER LETTER FOR PARENT

February 14, 2013

Dear _____:

Greetings!

I am a graduate student of Philippine Normal University in Manila and currently working on my dissertation entitled **“TOWARDS EVOLVING A MODEL FOR MATHEMATICS PROGRAM OF SCIENCE ELEMENTARY SCHOOLS OF CAVITE”** for the degree of Ph.D. in Mathematics Education. This study aims to evaluate the status of the mathematics program of science elementary schools in Cavite using the CIPP Model and to evolve a model for the said program.

In this regard, your invaluable participation as Parent is earnestly requested by accomplishing the attached questionnaire as completely as possible. Rest assured that the information gathered will be treated with the greatest confidentiality and anonymity.

Your favorable response will be highly appreciated.

Thank you very much.

Respectfully yours,

RENELYN R. CORDIAL
Graduate Student

Noted:

GLADYS C. NIVERA, Ph.D.
Adviser

RENE R. BELECINA, Ph.D.
Adviser



Appendix I

STANDARDS AND INDICATORS ON THE ESTABLISHMENT OF THE SPECIAL SCIENCE ELEMENTARY SCHOOLS

Standards and Indicators on the Establishment of the Special Science Elementary Schools

I. CURRICULUM AND INSTRUCTION

A. Curriculum

Standard:

The SSES utilizes an enriched Science, Mathematics and English curricula that will provide for the development of life long learning skills and foster the holistic development of the child.

Indicators

- Offers Science and Health from Grades I-VI
- Provides longer instruction time in
 - ♦ Science (Grades I - III – 60 minutes, Grades IV - VI – 80 minutes)
- Provides an enriched/in-depth content of Science and Health curriculum
 - A. Features
 - ❖ Activity-oriented, Learner-oriented (Hands-on, Minds-on, Hearts-on)
 - ❖ Community supported
 - ❖ Multimedia supported
 - ❖ Multi-disciplinary and Integrative
 - B. Competencies
 - ❖ HOTS – based
 - ❖ Info Processing Skill-Centered
 - ❖ Life long skills focused
 - ❖ Scientific attitude and value-laden
 - C. Themes
 - ❖ Diversity
 - ❖ Interaction
 - ❖ Cycles
 - ❖ Systems
 - ❖ Sci-tech culture
- Includes Science content strands in the teaching of other learning areas, e.g.
 - ♦ Science as Inquiry
 - ♦ Science and Technology in Special & Environmental Perspective
 - ♦ History and Nature of Science
- Provides an enriched/in-depth development of the contents of English and Mathematics curricula
- Introduces investigatory project starting Grade III in Science and Mathematics
- Provides opportunities for the acquisition of knowledge, skills and attitudes for effective and responsible participation in a technology-driven society
- Designs special programs (extra and co-curricular activities) to enhance talents and expertise of pupils including those in other learning areas



B. Instruction

Standard:

The SSES instruction focuses on mastery learning utilizing various innovative teaching strategies for the development of higher order thinking skills, creativity, scientific, technological and life-long learning skills.

Indicators

- Adopts a departmentalized scheme/team teaching approach
- Exhibits an integrated approach to learning whenever possible
- Utilizes varied teaching approaches/strategies to address the multiple intelligences, learning styles and needs of the learners
 - ♦ Practical Work Approach
 - ♦ Interactive Teaching-Learning
 - ♦ Cooperative Learning
 - ♦ Computer-Aided Instruction
 - ♦ Independent Learning or Self-Study
- Provides activities that develop higher order thinking skills
- Integrates science career awareness in the teaching of other learning areas
- Enhances creativity, inventiveness and the development of life-long skills
- Develops scientific and technological skills applicable to solve local problems and/or to maximize the use of available community resources

II. LEARNER

A. Pupil Admission

(Pupils admitted should not exceed 35 to a class)

Standard:

The SSES pupils undergo a selective admission process and other measures.

Indicators

- Manifests inclination in Science and Mathematics (personal interview and other non-test materials)
 - e.g. inquisitive, curious, divergent thinker
- Undergoes the School Readiness Assessment (SRA) and passes the Mental Ability Test for Grade I entrants
- Passes the qualifying tests of the grade level (the same for transferees but no transferees after Grade III)
- Must have a good moral character



B. Pupils Performance: Retention to the Program and Promotion

Standard

The SSES learner applies acquired scientific and technological knowledge, attitudes, values and life-long skills in coping with everyday living.

Indicators

- Maintains a general average of not lower than 83 % with a grade of not lower than 85% in Science, Mathematics and English and not lower than 83% in other learning areas at all grade levels.
- Observes the school code of conduct
- Excels in Science and Mathematics international, national, regional/division achievement tests with at least 80% Mean Percentage Score (MPS)
- Excels in Science and Mathematics local, national, and international competitions
- Applies concepts and skills learned in daily life
- Uses higher order thinking skills and creative thinking processes in solving problems
- Undertakes investigatory projects/researches (III – VI)
- Keeps abreast with the current scientific findings/phenomena

C. Determining Honors

Indicator

- Meet the criteria set by DepED Order in determining honors

III. TEACHER QUALIFICATION

STANDARD

The teacher exhibits above average professional competence and is morally upright.

Indicators

A. Professional and Personal Qualifications

- Preferably has MA degree/units or its equivalent ✓
- Preferably with specialization in science or a seasoned science teacher with outstanding performance for the last three consecutive years ✓
- Preferably has relevant training or experience ✓
- Preferably has experience in conducting, teaching, or supervising research
- Possesses good moral character and positive work ethics
- Is physically fit
- Must be ICT/computer literate
- Possesses good communication skills
- Seeks professional growth continuously



- Assists in planning, implementing, and evaluating school programs and projects
- Participates in community development activities

B. Teaching Competence

- Demonstrates mastery of the subject
- Provides varied learning and instructional materials and strategies suited to the level of maturity, learning styles, and needs of learners
- Demonstrates skills that develop higher order thinking skills in learners
- Models the skills of scientific inquiry, curiosity, creativity, openness to ideas and skepticism
- Integrates values and real life situations in the lessons
- Applies classroom learning to the context and needs of the community and the world
- Uses varied and appropriate assessment tools or instruments to evaluate pupils' learning
- Demonstrates effective classroom management
- Maintains an organized system of record-keeping of student performance and behavior

IV. THE SCHOOL

Standard

The SSES is a dynamic community that nurtures excellence in teaching and learning.

Indicators

A. School Plant

- Is centrally, strategically located and is accessible to most schools in the Division/Region
- Has enough space for infrastructure improvement & other projects, e.g science /botanical garden

B. Classroom Facilities & Equipment

- Has state of the art technology
- Provides for:
 - Standard size classrooms (7m x 9m)
 - At least 2 computers, TV set, cassette recorder/player, LCD projector, OHP, VHS/VCD/DVD player per classroom
 - Science laboratories with basic science apparatus & equipment including microscopes, telescope, etc.
 - Computer laboratory with multimedia & Internet facilities (1:1 ratio of computer - student) and a technician
 - Speech laboratory
 - Music room and musical instruments
 - Gym with functional sports facilities



C. Support Services

- Offers student services through:
 - Guidance and Counseling Office
 - Library (with adequate number of updated textbooks, periodicals, references, etc. especially on Science and Mathematics)
 - Canteen
 - Medical-Dental Clinic
- Provides adequate electricity, water, and communication facilities
- Serves as a resource center/ venue for the improvement of Science, Mathematics, & English instruction in the division and region

V. SCHOOL HEAD

Standard

The SSES head is an empowered and committed professional with strong administrative leadership, and instructional and managerial skills.

Indicators

A. Professional Qualifications

- Preferably has Masters degree or its equivalent
- Has special training in Science, Mathematics, and/or Research
- Possesses good moral character and positive work ethics

B. Administrative Management

- Communicates school's vision and mission effectively and translates these to programs and projects
- Plans, implements, and evaluates school programs and projects with stakeholders
- Ensures that resources are utilized efficiently and effectively to achieve planned programs and projects
- Establishes linkages to generate support for the school

C. Instructional Leadership

- Is highly respected by teachers, learners, and the community for his/her leadership in the profession
- Possesses strong supervisory & administrative skills.
- Initiates innovations / interventions to raise the quality of Science, Mathematics and English instruction
- Provides opportunities for the professional growth of teachers and staff
- Empowers teachers to undertake innovative researches/projects
- Plans and implements a fair incentive system for teachers
- Documents and shares best practices of the school.

D. Public Relations

- Maintains good public relations with students, teachers, and the community to ensure their support



- Involves stakeholders in planning and implementing school plans

VI. HOME AND COMMUNITY

Standard:

The home and the community actively support and are committed to sustain the SSES program.

A. HOME (Parents/Guardians)

Indicators

- Monitor the progress and behavior change of their children
- Provide feedback to the teachers of any behavioral change observed
- Give the children the opportunity to practice what they have learned in school
- Encourage their children to actively participate/excel in the developmental activities of the SSES program
- Actively get involved in school activities regularly

B. COMMUNITY (LGUs, NGOs and other Stakeholders)

Indicators

- Get involved actively in the planning and implementation of the developmental projects/activities supportive of the SSES
- Provide opportunities/resources to enable the SSES program to be successfully implemented
- Involve the learners of the SSES program to participate in community projects/activities

C. CENTRAL OFFICE, REGIONAL OFFICE, DIVISION, DISTRICT LEVEL SUPPORT

Indicators

- Provide technical assistance
- Provide resources for the development of SSES
- Provide recognition and incentives for both teachers and school head



Appendix J
QUESTIONNAIRE FOR SCHOOL PRINCIPAL

Name of School: _____ Position: _____
Age: _____ Gender: _____
Civil Status: _____ Eligibility: _____
Years in service (as principal/mathematics teacher) : _____
Highest educational attainment: _____

In-service Training in Mathematics

Please indicate the adequacy of your in-service training in Mathematics:

Legend: 5 – Very Adequate 3 – Moderately Adequate 1 – Very Inadequate
4 – Adequate 2 – Inadequate

_____ conference _____ seminar _____ symposium
_____ forum lecture _____ workshop _____ panel Discussion

Please assess specific indicators if they are appropriately represents the components related to the Special Science Program in Elementary Schools. Check appropriate column using the given scales in indicating your response.

5 – Strongly Agree
4 – Agree
3 – Moderately Agree
2 – Disagree
1 – Strongly Disagree

A. VISION and MISSION	5	4	3	2	1
1. Provides for balanced program of development to students in:					
1.1 intellectual					
1.2 emotional					
1.3 moral					
1.4 social					
1.5 spiritual					
1.6 physical					



2. The school defines its preferred future through its vision and mission:					
3. The school's vision and mission:					
3.1 are attainable					
3.2 are focused on meeting the interests and abilities of elementary pupils					
3.3 are regularly					
3.3.1 reviewed					
3.3.2 evaluated					
3.3.3 updated					
3.3.4 monitored					
3.4 reflect awareness of national goals					
4. The following stakeholders are being oriented about the school's vision and mission					
4.1 pupils					
4.2 teachers					
4.3 personnel					
4.4 parents					
5. The Vision and Mission of the school harmonizes with that of the Department of Education.					
B. SSES GOALS AND OBJECTIVES					
6. Include a sense of nationalism through deepened appreciation in mathematics.					
7. Provide for students to positively apply and contribute their skills in the community.					
8. Incorporate the general skills and attitudes, values in the mind of the pupils in preparation for life and work in the society.					
9. The goals and objectives of the school harmonizes with that of the Department of Education Special Science program.					
10. Align instructional objectives and curricular goals with the shared vision.					



PROBLEMS ENCOUNTERED RELATED TO MATHEMATICS PROGRAM

Directions: Please put a check mark to describe how serious the problems are using the following scales:

5 - Very Serious (VS)

4 - Serious (S)

3 - Moderately Serious (MS)

2 - Not Serious (NS)

1 - Not a Problem (NP)

Problems	Extent of Seriousness				
	5	4	3	2	1
1. Inadequate supervisory assistance					
2. Inadequate facilities					
3. Inadequate instructional media					
4. Inadequate teaching aids					
5. Inadequate textbooks					
6. Inadequate reference materials					
7. Lack of interest of pupils in mathematics					
8. Absenteeism among pupils					
9. Lack of comprehension of pupils					
10. Lack of interest of mathematics teachers					
11. Lack of mastery of the subject matter by teachers					
12. Lack of support from the parents					
13. Inadequate faculty development program for teachers					
14. Insufficient funds for mathematics activities and training for both pupils and teachers					
15. Fast turnover of mathematics teachers					



Faculty Performance Evaluation

Teacher's Name: _____ Date: _____
Subject Taught: _____ School Year: _____
Grade Level of Mathematics class that the teacher is handling: _____

Directions: Place a check in the column that best describes the teacher's performance on the given criterion.

Definitions:

➤ *Commendable*

The teacher performs the criterion at a level which exceeds the school standards. The teacher demonstrates most of the descriptors consistently, accurately, and efficiently.

➤ *Proficient*

The teacher performs the criterion at a level which exceeds the school standards. The teacher demonstrates most of the descriptors consistently and without significant error.

➤ *Developing*

The teacher performs the criterion at a level which indicates improved performance is necessary to meet school standards. The teacher demonstrates many of the descriptors with minimal proficiency and/or the application of many of the descriptors reflects some inconsistency or error.

➤ *Unsatisfactory*

The teacher performs the criterion at a level which fails to meet school standards. The teacher often fails to demonstrate most of the descriptors and/or the application of most of the descriptors often reflects significant error.

➤ *N/A*

Criterion is not applicable



PERFORMANCE AREA 1. PRODUCTIVE TEACHING TECHNIQUES

CRITERIA	LEVELS OF PERFORMANCE				
	Commendable	Proficient	Developing	Unsatisfactory	N/A
1. Demonstrates effective planning skills.					
2. Implements the lesson plan effectively.					
3. Communicates effectively with students.					
4. Prepares appropriate evaluation activities.					
5. Provides students with appropriate evaluative feedback.					
6. Display a thorough knowledge of curriculum and subject matter.					
7. Selects learning content congruent with the prescribed curriculum.					
8. Provides opportunities for individual differences.					
9. Ensures student time on task.					
10. Sets high expectations for student achievement.					

PERFORMANCE AREA 2. STUDENT ACHIEVEMENT

CRITERIA	LEVELS OF PERFORMANCE				
	Commendable	Proficient	Developing	Unsatisfactory	N/A
11. Demonstrates evidence of students' academic growth.					

PERFORMANCE AREA 3. ORGANIZED, STRUCTURED CLASSROOM MANAGEMENT

CRITERIA	LEVELS OF PERFORMANCE				
	Commendable	Proficient	Developing	Unsatisfactory	N/A
12. Demonstrate evidence of personal organization.					
13. Establishes and maintains discipline.					
14. Organizes students for effective instruction.					

PERFORMANCE AREA 4. POSITIVE INTERPERSONAL RELATIONS

CRITERIA	LEVELS OF PERFORMANCE				
	Commendable	Proficient	Developing	Unsatisfactory	N/A
15. Demonstrates effective interpersonal relationship.					

PERFORMANCE AREA 5. TEACHER RESPONSIBILITIES

CRITERIA	LEVELS OF PERFORMANCE				
	Commendable	Proficient	Developing	Unsatisfactory	N/A
16. Demonstrates teacher responsibilities.					
17. Supports school regulations, programs and policies.					
18. Assumes responsibilities outside the classroom as they relate to school.					



PUPILS ADMISSION AND RETENTION REQUIREMENTS ON SSES

Directions: Please assess specific indicators if they are appropriately implemented as Requirements for Admission and Retention to the Program.

Indicators	YES	NO
A. Pupil Admission The SSES pupils undergo a selective admission process and other measures		
1. Conduct personal interview and give other non-test materials to determine the readiness in Science and Mathematics.		
2. Undergo the School Readiness Assessment (SRA).		
3. Give Mental Ability Test for Grade I entrants.		
4. Give qualifying tests for every grade level.		
5. Submit good moral character.		
B. Pupils Performance: Retention to the Program and Promotion The SSES learner applies acquired scientific and technological knowledge, attitudes, values and life-long skills in coping with everyday living.		
1. Maintain a general average of not lower than 83% with a grade of not lower than 85% in Science, Mathematics and English and not lower than 83% in other learning areas at all grade levels.		
2. Observes the school code of conduct.		
3. Excels in Science and Mathematics international, national, regional/division achievement tests with at least 80% Mean Percentage Score (MPS).		
4. Excels in Science and Mathematics local, national, and international competitions.		
5. Applies concepts and skills learned in daily life.		
6. Uses higher order thinking skills and creative thinking processes in solving problems.		
7. Undertakes investigatory projects/researches for Grades III-VI.		
8. Keeps abreast with the current scientific findings/phenomena.		



Appendix K
QUESTIONNAIRE FOR MATHEMATICS TEACHER

Name of School: _____ Position: _____
Age: _____ Gender: _____
Civil Status: _____ Eligibility: _____
Years in service (as principal/mathematics teacher) : _____
Highest educational attainment: _____

In-service Training in Mathematics

Please indicate the adequacy of your in-service training in Mathematics:

Legend: 5 – Very Adequate 3 – Moderately Adequate 1 – Very Inadequate
4 – Adequate 2 – Inadequate

_____ conference _____ seminar _____ symposium
_____ forum lecture _____ workshop _____ panel Discussion

Please assess specific indicators if they are appropriately represents the components related to the Special Science Program in Elementary Schools. Check appropriate column using the given scales in indicating your response.

5 – Strongly Agree
4 – Agree
3 – Moderately Agree
2 – Disagree
1 – Strongly Disagree

A. VISION and MISSION	5	4	3	2	1
1. Provides for balanced program of development to students in:					
1.1 intellectual					
1.2 emotional					
1.3 moral					
1.4 social					
1.5 spiritual					
1.6 physical					



2. The school defines its preferred future through its vision and mission:					
3. The school's vision and mission:					
3.1 are attainable					
3.2 are focused on meeting the interests and abilities of elementary pupils					
3.3 are regularly					
3.3.1 reviewed					
3.3.2 evaluated					
3.3.3 updated					
3.3.4 monitored					
3.4 reflect awareness of national goals					
4. The following stakeholders are being oriented about the school's vision and mission					
4.1 pupils					
4.2 teachers					
4.3 personnel					
4.4 parents					
5. The Vision and Mission of the school harmonizes with that of the Department of Education.					
B. SSES GOALS AND OBJECTIVES					
6. Include a sense of nationalism through deepened appreciation in mathematics.					
7. Provide for students to positively apply and contribute their skills in the community.					
8. Incorporate the general skills and attitudes, values in the mind of the pupils in preparation for life and work in the society.					
9. The goals and objectives of the school harmonizes with that of the Department of Education Special Science program.					
10. Align instructional objectives and curricular goals with the shared vision.					



PROBLEMS ENCOUNTERED RELATED TO MATHEMATICS PROGRAM

Directions: Please put a check mark to describe how serious the problems are using the following scales:

5 - Very Serious (VS)

4 - Serious (S)

3 - Moderately Serious (MS)

2 - Not Serious (NS)

1 - Not a Problem (NP)

Problems	Extent of Seriousness				
	5	4	3	2	1
1. Inadequate supervisory assistance					
2. Inadequate facilities					
3. Inadequate instructional media					
4. Inadequate teaching aids					
5. Inadequate textbooks					
6. Inadequate reference materials					
7. Lack of interest of pupils in mathematics					
8. Absenteeism among pupils					
9. Lack of comprehension of pupils					
10. Lack of interest of mathematics teachers					
11. Lack of mastery of the subject matter by teachers					
12. Lack of support from the parents					
13. Inadequate faculty development program for teachers					
14. Insufficient funds for mathematics activities and training for both pupils and teachers					
15. Fast turnover of mathematics teachers					



**ACADEMIC PREPARATION OF MATHEMATICS TEACHERS IN
TEACHING DIFFERENT SUBJECT MATTERS**

How well prepared do you think you can teach the following subject matters?

4 – Very Well Prepared (VP)
3 – Somewhat Prepared (SP)

2 – Not Well Prepared (NP)
1 – I do not teach these Topics (IT)

Subject Matters	Very Well Prepared	Somewhat Prepared	Not Well Prepared	I do not teach these topics
a. Fractions, decimals and percentages				
b. Ratios and proportions				
c. Measurement-units, instruments, and accuracy				
d. Perimeter, area and, volume				
e. Geometric figures-definitions and properties				
f. Geometric figures-symmetry, motions and transformations, congruency and similarity				
g. Coordinate geometry				
h. Algebraic representation				
i. Evaluate and perform operations on algebraic expressions				
j. Solving linear equations and inequalities				
k. Representation and interpretation of data in graphs, charts, and tables				
l. Simple probabilities-understanding and calculations				

Adequacy

Frequency

5 - Very Often (VO)
4 - Often (O)
3 - Sometimes (S)
2 - Rarely (R)
1 - Never (N)

[illegible]



ADEQUACY OF PHYSICAL FACILITIES

Directions: Please put a check mark to indicate how adequate the support services/facilities are in implementing the Mathematics Program of your school.

Use the scale below:

Adequacy

- 5 - Very Adequate (VA)
- 4 - Adequate (A)
- 3 - Moderately Adequate (MA)
- 2 - Inadequate (I)
- 1 - Very Inadequate (VI)

Facilities	Adequacy				
	5	4	3	2	1
1. Guidance and counseling office					
2. Canteen					
3. Computer laboratory					
4. Mathematics laboratory					
5. Music room with musical Instruments					
6. Library					
7. Medical/Dental clinic					
8. Speech laboratory					
9. Gymnasium with sports facilities					
10. Science laboratory with basic apparatus and equipment					

SCHEDULE / TIME ALLOTMENT FOR MATHEMATICS

Please indicate on the space provided the amount of time devoted to mathematics in terms of the number of minutes per day:

Nursery: _____
Kindergarten: _____
Preparatory: _____

Grade 1: _____
Grade 2: _____
Grade 3: _____

Grade 4: _____
Grade 5: _____
Grade 6: _____



CURRICULUM STANDARDS IN MATHEMATICS VI OF SSES

Directions: Please assess specific standards if they are appropriately represent the components of Mathematics VI curriculum of Special Science Program in Elementary Schools. Check appropriate column using the given scales in indicating your response.

- 5 – Strongly Agree**
4 – Agree
3 – Moderately Agree
2 – Disagree
1 – Strongly Disagree

Standards	5	4	3	2	1
1. The learner demonstrates mastery of number sense and performs standard numerical operations and estimations in a variety of ways.					
2. The learner understands rational numbers, ways of representing rational numbers, relationships among rational numbers, and rational number systems; and understands meaning and operations and how they relate to one another.					
3. The learner analyzes characteristics of two-to-three dimensional shapes and develops mathematical arguments about geometric relationships.					
4. The learner understands measurable attributes of object and units, systems, and processes of measurement; applies appropriate techniques, tools, and formulas to determine measurements.					
5. The learner understands the concepts of circle graphs, maps and scales and techniques of interpreting data and will use them to model situations, solve problems, and interprets and draws appropriate inferences from data.					
6. The learner selects and uses appropriate statistical methods to analyze data; develops and evaluates inferences and predictions that are based on data; and understands and applies basic concepts on probability.					
7. The learner understands real numbers, ways of representing real numbers, relationships among real numbers, and real number systems; and understands meanings of operations and how they relate to one another.					
8. The learner represents and analyzes relationships among variables, quantities and solve problems involving patterns, and algebraic concepts and processes.					

EFFECTIVENESS AND FREQUENCY OF TEACHING METHODOLOGIES

Directions: Please put a check mark to indicate how effective the teaching approaches are and how often you are using them in your mathematics class.

Use the scale below:

Effectiveness

- 5 - Very Effective (VE)
4 - Effective (E)
3 - Moderately Effective (ME)
2 - Ineffective (I)
1 - Very Ineffective (VI)

Frequency

- 5 - Very Often (VO)
4 - Often (O)
3 - Sometimes (S)
2 - Rarely (R)
1 - Never (N)

Teaching Methodologies	Effectiveness						Frequency				
	5	4	3	2	1		5	4	3	2	1
1. Discovery /Inquiry											
2. Investigatory Project											
3. Learning by Doing											
4. Problem-Solving											
5. Guided Practice											
6. Drills and Charts											
7. Small Group Instruction											
8. Whole Group Instruction											
9. Cooperative Learning											
10. Independent Learning											
11. Practical Work Approach											
12. Outdoor Work											
13. Concept formation											
14. Reflective teaching and learning											



DIFFERENT TYPES OF ASSESSMENT

Directions: In assessing the work of the pupils in your mathematics class, please put a check mark to indicate how often you are using the following types of assessment

Use the scale below:

Frequency

- 5 - Very Often (VO)
- 4 - Often (O)
- 3 - Sometimes (S)
- 2 - Rarely (R)
- 1 - Never (N)

Assessment for Learning	5	4	3	2	1
a. standardized test produced outside the school					
b. teacher-made short answer or essay tests that require pupils to describe or explain their reasoning					
c. teacher made multiple choice, true or false and matching type					
d. how well pupils do on homework assignments					
e. how well pupils do on projects or practical/laboratory exercises					



PERFORMANCE EVALUATION OF PRINCIPAL BY THE TEACHER

Directions: Place a check in the column that best describe your school principal with the following criterion.

- 5 – Strongly Agree
4 – Agree
3 – Moderately Agree
2 – Disagree
1 – Strongly Disagree

A. Administrative Management					
Criteria	5	4	3	2	1
1. communicates school's vision and mission effectively					
2. translates VMGO to programs and project					
3. plans, implements, and evaluates school program and projects with stakeholders					
4. ensures the utilization of resources efficiently and effectively, to achieve planned programs and projects					
5. establishes linkages to generate support for the school					
B. Instructional Leadership					
Criteria	5	4	3	2	1
1. highly respected by teachers, learners, and the community for his/her leadership in the profession					
2. possesses strong supervisory and administrative skills					
3. initiates innovations/interventions to raise the quality of mathematics instructions					
4. provides opportunities for the professional growth of teachers and staff					
5. empowers teachers to undertake innovative researches/projects related to mathematics program					
6. plans and implements a fair					



incentive system for teachers					
7. documents and shares best practice of the school					
C. Public Relations					
Criteria	5	4	3	2	1
1. maintains good public relations with students, teachers, and the community to ensure their support					
2. involves stakeholders in planning and implementing school plans					

ACADEMIC PERFORMANCE OF THE PUPILS

Directions: Please indicate the grade level of your mathematics class, number of pupils per class, and the general average of the class in mathematics for the school year 2012-2013.

Numerical Scale

95 – 100

89 – 94

83 – 88

77 – 82

Below 77

Descriptive Level

Outstanding

Very Satisfactory

Satisfactory

Fair

Needs Improvement

Grade level SY 2012- 2013	Number of pupils in a class	General Average of the class in mathematics for				
		1 st Grading Period	2 nd Grading Period	3 rd Grading Period	4 th Grading Period	Final Rating



WORKLOAD OF MATHEMATICS TEACHERS IN SSES

How many hours in a week do you spend in doing the following activities?

VARIABLES	Total Number in a week
Total number of classes	
Total number of pupils	
VARIABLES	Total Number of hours in a week
Number of teaching hours /week in mathematics	
Number of teaching hours /week in other learning areas	
Number of hours/week for student supervision	
Number of hours/week for student counseling/appraisal	
Number of hours/week for administrative duties	
Number of hours/week for individual curriculum planning	
Number of hours/week for cooperative curriculum planning	



Appendix L QUESTIONNAIRES FOR GRADE SIX PUPILS

I. Profile

Directions: Please fill out or check (/) the item that best describes yourself.

Name of School: _____

Age: _____

Favorite Subject : _____

Gender: Male : _____

Female: _____

II. Pupils Feedback on Teacher's Performance

Directions: Place a check in the column that best describe the performance of your mathematics teacher on the given criterion.

Legend: 4 – Always 2 – Rarely
 3 – Often 1 – Never

CRITERIA	4	3	2	1
1. My math teacher makes the class work interesting.				
2. My math teacher is fair to all students.				
3. My math teacher maintains discipline in the classroom.				
4. My math teacher is well prepared for classroom discussion.				
5. My math teacher gives assignment related to the topics that we are studying.				
6. My math teacher discusses and summarizes the lesson with the class.				
7. My math teacher ensures that our discussion focuses on the topic of the lesson.				
8. My math teacher likes it when students ask questions.				
9. My math teacher allows sufficient time to complete our work.				
10. My math teacher asks questions in class to check if we understand what has been taught.				
11. My math teacher explains new ideas in a way that is easy to understand.				
12. My math teacher monitors my work, to see if I understand the lesson.				
13. My math teacher is very knowledgeable about the subject he/she teaches.				
14. My math teacher has extra activities prepared for me to do, if I completed the task before the class is over.				
15. My math teacher often uses teacher-made materials and worksheets for me to use.				
16. My math teacher gives tests and quizzes.				
17. My math teacher returns tests and assignments quickly.				
18. My math teacher uses a variety of classroom activities and resources.				



III. Directions: Please give your honest answers to the following questions. You may state your answers in English or Filipino.

1. Why did you choose to enroll in a special science elementary school?

2. What are the goals and objectives of your school?

3. Do you think you have already achieved the goals and objectives of your school, if yes, in what ways?

4. Aside from your academic subjects, what other activities does the school provide to cater your multiple interest?

5. Are you still interested to continue your studies in a science high school? Why?

6. How do you show respect to teachers and to the school administrator?

THANK YOU for the time and effort you have put into completing this questionnaire.



Appendix M
QUESTIONNAIRES FOR PARENTS

Part I. Directions: Kindly fill out or check (/) the item that best describes yourself. Please give your honest answers to the following questions. You may state your answers in English or Filipino.

1. Name of School: _____

2. Who will fill-out this form?

_____ Father

_____ Guardians

_____ Mother

_____ Both parents

3. Who participates mostly in school activities?

_____ Father

_____ Guardians

_____ Mother

_____ Nanny

_____ Both parents

4. What are your reasons for enrolling your child in a special science elementary school?

5. Are you happy / satisfied with your decision in enrolling your child in a special science elementary school? Why?

6. Could you cite some advantages and disadvantages of having your child enrolled in special science elementary school?

Advantages	Disadvantages

7. Do you think your child is getting the best education in SSES in terms of his / her performance in mathematics? Why?

8. What do you think should be added in the mathematics program of the special science elementary school? How can it be improved?



APPENDIX N
TRANSCRIPTS FROM INTERVIEWS WITH PUPILS

1. Why did you choose to enroll in a special science elementary school?

➤ **PUBLIC SCHOOLS**

AMADEO ELEMENTARY SCHOOL (AES)

- To gain more knowledge
- To get the best education and learn more things about mathematics
- To learn more about anything so that I can reach my goals
- To learn other kinds of experiment
- It has the best quality of education from other schools
- My parents wanted me to enroll in this curriculum and I want to have a better quality of education
- To focus on my studies
- Low tuition fee, high quality standard education, and I know I will learn a lot
- Because I know that I will learn more things in science class and I will learn how to be independent and discipline
- Because I know that if I am in SSES I can learn more compare to other sections because this class is advance in their lessons
- Dahil alam ko po na maganda ang aral dito
- Dahil mas gusto ko advance ang aking pinag-aaral at matutukan kami ng aming guro sa SSES
- I think the teacher will guide me in every lesson she taught
- I want the advance study
- I want myself to be a well-prepared student for my high school life. I want to perform my best when I'm in high school stage or grade7
- To experience high quality standard learning
- I want to learn some interesting lessons that will help me in my secondary and college level
- Near my home
- To have best learning experience



NAIC ELEMENTARY SCHOOL (NES)

- Because I can learn more in this school
- I want to learn more things to be a better student to be ready for high school
- Dahil alam kong mas may matutunan ako sa SSES
- Because I know that this relevant science curriculum will help me a lot because of its advanced lessons
- Because I want to learn more ideas and information and it can help me when I grow up
- To improve my knowledge
- Because of my parents
- Because I want to widen my knowledge
- Because I want to know many things and to challenge myself
- To improve my courage to be ready in high school
- The school provides better education for the improvement of students' knowledge
- Because SSES class has an advance lessons and they have the greatest teacher

TRECE MARTIRES CITY ELEMENTARY SCHOOL (TMCES)

- I want to know more about science
- Because all subjects are in higher level and the teachers are always classified their lesson and all are interested to yourselves
- You will learn more than any school
- I know that the teachers here will teach properly and fair to all of their students and it's a good school anyway
- Because I want to be one of the gifted and talented pupils
- SSES have many advantages and the teachers are very industrious and intelligent in teaching in the class discussion
- It has a good quality education that is better than regular classes
- I want to enhance my skills and have a quality education
- To learn advance lessons, so that I can really understand every lesson I am studying
- It has many advantages that my family and I want
- To explore many things about SSES curriculum particularly on science subject
- So that my skills and talents will be better and more
- I know I deserve to enroll in SSES because I have enough skills that can be improved by the competent teachers



➤ **PRIVATE SCHOOLS**

GATEWAY INTERNATIONAL SCIENCE AND TECHNOLOGY (GIST)

- To learn more about things which I don't really dare understand. And also to make it as a way to know more science and its advantages as well as its disadvantages
- I heard that this school and the teachers teaches the students very well
- It's my mother choice
- SSES is interesting
- Ito lang po ang pinakamalapit na paaralan
- To know more knowledge about science and technology
- I want to gain more knowledge
- Para mas marami akong matutunan
- To learn more topics and communicate myself

GOVERNOR'S HILLS SCIENCE SCHOOL (GHSS)

- Love science
- Near in our house
- To learn more and to excel my knowledge
- It is a good school
- To learn many things about science

ST GENEVIEVE SCHOOL OF SCIENCE INTERNATIONAL SCHOOL (SGSSIS)

- To learn more



APPENDIX O

TRANSCRIPTS FROM INTERVIEWS WITH PARENTS

1. What are your reasons for enrolling your child in SSES?

➤ PUBLIC SCHOOLS

AMADEO ELEMENTARY SCHOOL (AES)

- It enhances student skills especially in science and math
- Advance and special technique in learning the advance technology
- Because of the minimal quantity of their class, and the advance lessons that they teach to their children
- Because in SSES, lessons are advanced that really a great help for the students
- I want my son to have the best education or learning experience that he can get
- Matuto ng mabilis ang bata. Maganda ang aral lalo na sa mathematics. Magagaling ang mga guro
- because this school has a good goal and objectives for their every students
- to avail of the best and up to date school curriculum that is available
- low tuition fee, high quality education
- for my child to have adequate knowledge in science and math
- because of quality education and advancement
- advance learning for my child

NAIC ELEMENTARY SCHOOL

- To lead them to the good and best learnings in that school
- I know that in SSES, my daughter will learn more
- Para mas ma challenge sya sa kanyang pag-aaral
- Para mahubog lalo ang kanyang kaalaman
- They have good quality education
- To improve her skill in major subjects
- For better improvements on my child's progress in all learning areas
- Because SSES provides better education for my child
- Dahil alam kong mas maraming matututunan ang anak ko kung sa SSES sya mapapasama
- To widen the knowledge of my son
- They have good quality of education



TRECE MARTIRES CITY ELEMENTARY SCHOOL (TMCES)

- To build her knowledge and learn more how to grow her interest to be part of our society even in her young age
- It is practical to be enrolled in SSES because the lessons are more advance than the regular class and has no tuition fees
- The advance curriculum and the small enrolment per class. And also the competent teachers
- Advance technique in teaching, particularly science
- Higher standard of education
- to have more advance knowledge in science education, to further develop his interest on science and mathematics, to farther develop his knowledge in research method and exploring the field of science.
- Opportunity to have good education
- As far as we know, this school is more advance compared to other schools
- To become equip and competent, develop her talent and potential as individual
- The first reason is that I want to give my daughter a good quality of learning and to prepare her for a better future.
- To acquire advance knowledge in different subjects and make my child study hard
- Dahil gusto ko syang matuto tungkol sa Science
- To be more knowledgeable in science and focus on academics, to learn more on other areas compared the usual curriculum. There is wide range and advance learning in SSES
- For her to be molded as responsible student, aiming high to reach her goal. Focus and be determined to surpass all the turbulent and hindrances that may arise on her way to success
- Good quality education

➤ PRIVATE SCHOOL

GATEWAY

What are your reasons for enrolling your child in SSES?

- So she could have a good education and values that will make her to be a successful individual
- The main reason for enrolling my child in SSES is to develop good study habits and view science on a broader perspective



- The school is near in our house and I can check him every now and then
- Important for me to have my child more safety and I could give them food in lunch break
- First affordable tuition and they have quality education
- Pinakamalapit na eskwelahan, magagaling ang mga guro
- To learn more and develop his potential well that will help him to understand and catch up all his lessons immediately
- I want them to concentrate to their studies

GOVERNORS HILLS

- I believe that Science School is more competent than other schools
- We decided to enroll them in special science school because we believe they have advance system of education
- Our reasons is for our child to know more because we know that science school is more advance compared to other and for our child to be competitive

ST GENEVIVE

What are your reasons for enrolling your child in SSES?

- To gain more knowledge
- To learn a lot
- The learning itself and its advancement
- Because I know that my daughter has the knowledge and capacity to learn what will be taught in this kind of school
- My mother influenced me to enroll my child in that specific school. Coming from private school, I also believe that teaching is better in Science elementary schools/private schools
- Gain more knowledge and skills

2. Are you happy/satisfied with your decision in enrolling your child in SSES? Why?

➤ PUBLIC SCHOOLS

AMADEO ELEMENTARY SCHOOL (AES)



- Yes, they have advance learning in science and math
- Yes, through this program, the application of advance technology to our children is very important. They can learn it so easy.
- Yes, because my child have learned a lot
- Yes, it is clearly seen the effect to my children the way they deal in school
- Yes, because I know my son's learning experience is maximized
- Oo, dahil nakita ko sa aking anak ang magandang resulta ng kaniyang pagpasok. Marami siyang natutunan talaga.
- Very satisfied, because I observe that my child can apply the skills she learn from this school
- Yes, because I can see how my daughter become a fast learner
- Yes, aside from tuition fee, my child really learn a lot
- Yes, I think the lessons and trainings my child got from the program gave a lot of challenges
- Yes, we can see the academic development with our child
- Yes, because she became more studious, she learned a lot, and she developed her self-esteem and become independent

NAIC ELEMENTARY SCHOOL (NES)

- Yes, because she enjoys the lessons in that school
- Yes, because my daughter learn good things in this school
- Yes, dahil marami siyang natutunang mga bagay bagay
- Yes, dahil alam ko na ang turo sa paaralang ito lalo na sa SSES ay advance at talagang maraming matutunan ang aking anak
- Yes, because my child learns more
- Yes, it's good for her improvement
- Yes, because my child has shown successfulness and better improvements
- Yes, because I witnessed how she developed her intelligence and talent
- Oo, dahil marami na ring nakapagsabi sa aking napakalaki ng advantage ng napasok sa SSES
- Yes, because my child learns more

TRECE MARTIRES CITY ELEMENTARY SCHOOL (TMCES)

- Yes, cause she learn more as I am expected
- My child improves a lot in terms of study habits
- Yes, my child develop his self-confidence, more activities and skills were gained



- Yes, my child gained better knowledge and the school made my child more confident of herself, more resourceful and independent
- Yes, because now he has already learned more knowledge in science, math and English more advance than a regular class students. More developed his interests and awareness on the field of science
- Yes, It's very near and lucky to belong to SSES
- Yes, since her skills/talents were improving compared than before
- yes, it made my child become responsible in her studies
- yes, because she deserves it.
- Yes, my child become curious to know more according to his lesson
- Oo, dahil siya ay natututo
- To be more knowledgeable in science and focus on academics
- yes, I am happy/satisfied. As I had observed my child learned and gained more knowledge and develop skills and confidence in everything he does
- yes we are, we saw her how she handle circumstances in a right manner. She learned the basic and the very foundation of how to focus on her studies
- yes, na develop ang kanyang knowledge at nabigyan siya ng pagkakataon na makasali sa mga competition

➤ **PRIVATE SCHOOLS**

Are you happy/satisfied with your decision in enrolling your child in SSES? Why?

- Yes, cause if it's not in the first place we wouldn't enrolled her in SSES
- Yes, I am happy and satisfied because she has gained extensive knowledge and has developed a deeper sense of awareness of the things around her
- Not much, because I don't think he is improving in his academic skills
- Yes, because in studying now my child are more mature to their studies, she grow
- Yes, because they deserve to have more knowledge especially in science and technology
- Opo, marami naman natututunan ang apo ko
- Yes, because with this my child had improved and he responses well on all of his lessons that he are now applying on his daily living
- Sometimes, because there was a time they focus on extra-curricular instead in focusing in academic



GOVERNOR'S HILL

- Yes, my daughter appreciated what the teacher/schools teaches to her
- Yes, because we can see the advance education

ST GENEVIVE

Are you happy/satisfied with your decision in enrolling your child in SSES? Why?

- Yes, my daughter got a third honor, in that case mu daughter learned a lot from SSES.
- Yes, Im satisfied
- Yes, due to lessons learned and its moral learning in a way the school mold their students
- Yes, im happy and satisfied with this decision because my daughter is talented and she has the desire and ability to learn more
- Mediocre. I can see my daughter's knowledge become better.
- Yes, for they have gained knowledge and skills and I believe, they will be used for their future

3. Do you think your child is getting the best education in SSES in terms of his/her performance in mathematics? Why?

NAIC ELEMENTARY SCHOOL (NES)

- Yes, because she can solve problems on her own
- Yes, mas naiintindihan niya lalo ito
- Yes. Dahil iba na ang pag-aaral o turo ng Math ngayon compare nun ako ay nag-aaral
- Yes, because they learn advance mathematics
- Yes, because they become more studious
- Yes, because I myself witnessed all their improvements on her performances in mathematics
- Yes, because she performs well in mathematics
- Oo, dahil alam kong mas may kaya pang gawin ang anak ko
- Yes, because they learn advance math
- yes, they can easily solve and analyze the problem
- yes, because my child can do her assignments easily
- yes, because based on his track record, he is doing good in his grades
- oo, dahil napansin naming ang mabilis niyang pagkatuto sa Math. Malaki ang improvements talaga



- yes, because the math teachers encourage and taught the children in their subjects very well
- Yes, because she always participated as a contestant in various math contests in and out of the school
- Yes, she can answer her assignment on her own
- I think so, I have seen the improvement in my child when facing math homeworks
- Yes, at the onset my child has no much interest in math. But because of their training and grievance she improved drastically

4. What do you think should be added in the mathematics program of SSES? How can it be improved?

NAIC ELEMENTARY SCHOOL (NES)

- More group activities that can help them to know the lessons easier and faster
- Mas lalo pa nila itong pagandahin upang mabilis nila itong maintindihan
- Longer discussion and more exercises
- Summer class
- Longer discussion, more exercises
- More time in having math class
- Longer discussion and more exercises
- they must apply one step ahead. And continuous developing the system or technique in teaching the subject to easily absorb or learn by the students
- more activities and interesting math problems, puzzles game etc.
- I think to catch-up with modern technology the mathematics curriculum should give much emphasis on Computer-Aided Instruction (CAI)
- I think every pupil should be given a chance to catch up on some different lessons by the help of the teacher
- The teacher's proper approach and study the pupils weaknesses in easy way where pupils understand easily and motivation to gain love to mathematics
- We can add MTAP not only for 6 days we should do it every year to the students to have more learnings in math
- Inclusion of more participatory activities or exercises to explore more their interest and desire to learn mathematics subject.



- Add more fun in teaching mathematics, teaching strategies that fit to the level of pupils
- We think that it should be added more problem solving and technique
- More seminars
- Advance Algebra for grade 6
- Teacher must do more repetition, how the computation done to make the answer correct
- I guess, more interesting visual aid or CAI (Computer Aided Instructions) so that students will also be entertained as well as learned
- Teaching technique should be given priority
- Program was advanced and sometimes intimidating which make it so interesting. MTAP should be prolonged in a much longer time not only by just a month
- Additional references, seminars of math teachers as well as the pupils. To adopt more learning techniques
- Activities that can practice applications. They can initiate more group activities practicing math learnings towards a situation

➤ **GOVERNOR'S HILLS**

- More activities, so maybe she will enjoy and encouraged to learn
- Mathematics should be taught in a common language (in our own language) for better understanding
- I suggest they hold math competition even within themselves (within the school) to enhance competitiveness in mathematics
- Need electives as advance mathematics/statistics

➤ **ST GENEVIVE**

- Add some facilities and laboratory
- Practical approach should be implemented wherein pupils discover the concept themselves
- No idea. Just be more patient in teaching children mathematics and teach it slowly in the manner that no student would be left behind the topic
- The use of multimedia
- Maybe the teacher have more discussion and assignments to be given
- Encouragement from the teachers
- Magkaroon pa ng maraming learning materials
- Maybe just a little bit encouragement from the mentors so that pupils would show interest and response on them as well. It could be improved through maybe little enthusiasm and cooperation of all faculty members



- I think that our teacher must undergo in some training regarding technique about mathematics that they can impart to the students

5. Could you cite some advantages and disadvantages of having your child enrolled in special science elementary school?

Advantages:

- Limited number of students on a classroom (35 only), issued with complete books on every subject. Teachers has complete aides and most have masteral degree
- Focus on learning, Give special attention, size of classroom is conducive for learning
- few students, all are talented, totally screened
- advance learning, good quality of learning
- no lazy hours, know more his lessons, he acquire more responsibilities to do his projects
- natuto ng maayos, dinidisciplina sila
- disciplined, responsible as a person, successfully molded as a bright studious student
- became independent
- Few students
- Advance education system, science centered education
- Focus on math and sciences, working more on experiments and workbooks
-

ST GENEVIVE

Advantages

- Advance lesson
- The advancement of the teachings, the innovations and the creativity, the way you mold your students
- It is near our house at alam ko ang kakayanan ng teachers
Centered in teaching, few students which allows all the students to be taught



GATEWAY INTERNATIONAL

Advantages

- Advance in learning, teaches good values
 - She develops good study habits, she gains confidence in dealing with classmates and teachers, she is more organized and manages her time well
 - More active in sports and other activities, more competitive
 - They have more experience in laboratories and advance lesson
 - Natuturuan sila ng maayos dahil konti lang sila
 - Widens the knowledge of my child, encourage my son to learn
 - Teaches different experiments
 - Widens the knowledge of my child, encourages my son to learn, teaches different experiments
 - Classroom are not congested, they can focus on studies, teacher and student can communicate
-
- Gained knowledge and skills, socialize with others

Disadvantages:

- Requiring projects beyond the capabilities of the child is truly enormous
- lots of things required and needed
- less time for family bonding, too much studying leads to stress
- less sleep, lack expenses for more projects and references in subject matter
- costly
- maraming projects at assignments, minsan nagpapractice para sa mga project
- sometimes forgot being a child for not having enough time to play and unwind with other children
- many school works
- Less socialization with other students, limited co-curricular activities
- Less extra-curricular activities
- High tuition fees, less moral discipline



➤ **ST GENEVIVE**

Disadvantages

- Costly

6. Do you think your child is getting the best education in SSES in terms of his/her performance in mathematics? Why?

➤ **GATEWAY INTERNATIONAL**

- Yes, she study with her own
- Yes it is, in SSES there is a healthy competition on who is the talented pupil
- my kid is not doing well in math, I think it would be best if SSES could introduce a medium/method how the pupil could catch the topic easier
- yes because of their competent teachers
- yes, my child hate mathematics but his performance were good and slowly adapted the teaching technique were application better and easy, motivation, approach by teachers help a lot to learn the pupils
- yes, she encounters advance math problems which gives her challenge to concentrate in work and study harder
- yes, cultivated more his interest in mathematics compared before that he hates mathematics subject
- yes, the teacher is knowledgeable with the expertise
- it is best as she learned in mathematics compared than before
- yes, I can see and observed as she applies math in her everyday life. As she helps her brother in some work discussions at home
- yes, because she has a good skill in solving difficult and easy problems
- yes, he study harder to learn more exact computation to get the correct answer
- Oo dahil siya ay natutong magcompute at nadadagdagan pa ang kaalamannot only in mathematics
- Yes, but not only in Mathematics almost in all subjects that I can be proud of
- Yes I think so, by joining the yearly program in math. She was able to enhance her ability in solving some problems and assessing how to solve it.
- not really the best because of lack of references



➤ **GOVERNOR'S HILLS**

- Yes, we parents are no mathematically inclined but enrolling her here in SSES improved her performance in mathematics
- No, because she still had a hard time in understanding math

➤ **ST GENEVIVE**

- Yes. She can solve problems on her own
- Yes, because she is the valedictorian
- Not so much because pupils were not given the chance to discover the concept by themselves
- A little bit. Until now she's still having difficulties with her subtractions and some division.
- I think so, for they have learned so much especially in decimals, fractions, and high levels of lesson in mathematics

➤ **GATEWAY INTERNATIONAL**

- Somewhat yes, she is not really good in math subject but she is very willing to learn
- Yes, the SSES has a wider scope of the subject and they give emphasis on the major subjects (Math and Science), to provide students more understanding on the subject matter
- I don't think so, he is not focusing his learning skills, not even talk about mathematics
- Hindi pa gaano kaya dapat pa siyang mag-aral
- Yes, it could be for science contains a lot of information involving Math. Now if he is good in math he could have a chance on getting best learning in science
- I don't think so, because some teacher are not well in mathematical technique



APPENDIX P
TRANSCRIPTS FROM QUESTIONNAIRE WITH THE PARENTS

3 REASONS FOR ENROLLING YOUR CHILD IN SSES

- Enhances/improves skills
- Advanced education/learning/curriculum
- Good/high standard/quality of education/learning
- Develop potentials/talents of students
- To make him much smarter
- To provide the best education
- To learn fast
- Teachers are effective
- Good goals/objectives for students
- No/low tuition fee (affordable)
- Widen knowledge/give adequate knowledge
- Students learn more
- To be challenged in studying
- Has many advantage
- Financial problem
- Passed entrance exam
- Few students
- Near (accessible)
- Safety
- More competent



WHY HAPPY OR SATISFIED WITH DECISION IN ENROLLING THE CHILD
WITH YES ANSWER

- Advance learning (especially in math and science)
- Learned a lot/more
- Positive effect on pupils
- Improved a lot
- Value for the payment
- Maximized learning experiences
- Can apply what have been learned
- Challenging lessons/teachings
- Academic development/improvement/excellence accomplished
- Pupil became more studious
- Pupil developed self-esteem
- Pupil became independent
- It is what pupil wanted
- Many advantages compared to regular elementary class
- good education was provided
- pupil is doing his/her best
- promotes healthy competition
- Near (accessible)
- Pupil became responsible
- Pupil deserved it/ suit the learner
- Effective teacher/good

WITH NO ANSWER

- No improvement



ADVANTAGES

- Exposed to competition
- Advanced/more learning
- Pupils learn fast
- Pupils develop good study habits
- Pupils develop analytical thinking
- Improves/enhances skills/ability of pupils
- Maximized learning experiences/learn more
- Effective teacher
- Good quality of education
- Pupils have good attitude/values
- Pupils actively participate
- Pupils make good decisions
- Up-to-date learning
- Wide scope instructional materials
- Few students
- Good social environment
- Pupils are disciplined
- Pupils wake up early
- Pupils were motivated to study hard
- No lazy hour for the pupils
- Pupils become independent
- Pupils more active in sports
- More lab works/experiments
- Accessibility/near



DISADVANTAGES

- NO RESPONSE
- No enough time for play
- Costly school fees
- Many projects/home works/school loads
- Pupils are pressured
- Some projects are beyond learners' capabilities
- Pupils become noisy
- Pupils always sleep late
- Less time for family bonding
- Stressful
- Less sleep
- High expenses on school requirements
- Longer time in school
- Less discussion
- Lacking materials
- Less socialization
- Less extra-curricular activities
- Less moral discipline
- Few students



GETTING BEST SSES EDUCATION IN TERMS OF MATH PERFORMANCES
WITH YES ANSWER

- Easily solve problems
- Doesn't find any difficulty
- Teachers teach well/are effective/are competent
- Advanced learning/curriculum
- Pupil is doing well
- Pupils participate in contests in school
- Pupils become independent learner/make his own assignment/project
- Pupils showed improvement in math
- Pupils become more studious
- Pupils learn a lot
- Pupil has high grades
- Pupil applies what have been learned in everyday life
- More challenging
- Wide scope of subject matter
- Good/better/best education

WITH NO ANSWER

- Lack of resources
- No focus
- Pupil needs to study even more
- Teacher is not good
- Pupils find difficulties



WHAT TO BE ADDED IN SSES' MATH PROGRAM

- Continuously improve the quality of teaching
- More advanced textbook
- More activities/games/puzzles/interesting problems/exercises
- Computer assisted instruction (CAI) in math
- More improvement for easy comprehension
- Summer class
- Longer discussion
- More teachers
- More math time
- More rooms
- Best and well-known teachers
- Time to catch up
- Paying attention to pupils' weaknesses
- Longer time for MTAP
- More fun
- More problem solving
- More seminars/trainings for teachers
- Advanced algebra in Grade VI
- Prioritize teaching techniques
- More references
- More combined science and math exercises
- More encouragement from teachers
- More learning materials
- Math taught in Filipino language
- Math competitions within the school
- Math electives/advance math /statistics
- More facilities/labs
- Practical work approach
- Use of multimedia



STUDENT QUESTIONNAIRE

WHY DID YOU CHOOSE TO ENROL IN SSES

- To gain more knowledge
- To have best/high quality education
- To learn more in math/science/all subjects
- Parent's choice
- To focus on my studies
- Low tuition
- Advanced lessons/curriculum/teaching
- Good/effective teachers
- Preparation for HS
- Near home
- Be one of the best
- Many advantages
- To enhance/improve my skills/talents
- Passed the exam
- Interesting/ love for science
- Science is fun



GOAL AND OBJECTIVES OF THE SCHOOL

- Enhance skills in math/science
- Help children learn more
- Help pupils succeed in life
- Nurture our gifts
- Improve/give knowledge
- Be fast learner
- For students to excel in different learning areas
- Readiness for high school
- Help pupils achieve their goals
- Give quality/special education
- All students to graduate
- To make good persons
- To teach more students
- To make student more intelligent
- To be on top/to be number 1
- To make students special
- To make achievers in school
- To be a popular school



WHAT WAYS THESE OBJECTIVES/GOALS WERE ACHIEVED

- Teach to learn many things
- I'm a better person/disciplined/responsible
- Improved myself a lot
- Participated in competitions (and won)
- Learned a lot
- I graduated/completed studies
- Improved my personality
- Achieved a lot of goals
- Experienced quality education
- Increased knowledge
- One of top schools
- Readiness for HS



OTHER ACTIVITIES SCHOOL PROVIDE TO CATER MULTIPLE INTEREST

- Extra/co-curricular activities
- Sports
- Programs/activities
- School organizations/clubs
- Campus journalism
- Campings
- Provide books
- Math Camp
- MTAP
- Contests/competitions
- Group work
- Arts
- Computer subject/lab
- Music
- Demos
- Educational parks
- Experiments
- Field trips
- Catering
- Feeding programs
- Family day



WHY INTERESTED TO CONTINUE IN SCIENCE HIGH SCHOOL

WITH YES ANSWER

- Further enhance learning (math/science)
- Find it interesting/love it
- Not to separate from classmates
- To learn more things
- Nourish my talents/skills
- Earn more knowledge
- To have better quality of education
- Readiness for college
- Good quality of education
- Advanced studies
- Want to be successful
- Make myself smarter
- Achieve dreams
- Continue studies
- Good/effective teachers
- Good future
- More opportunities/advantages
- Passed exam
- Fun
- Accessibility (near)

WITH NO ANSWER

- Parents want me to transfer



HOW DO YOU SHOW RESPECT

- Greet them courteously whenever I see them
- Use po and opo
- Helping them carry things
- Listen to them respectfully
- Follow/obey tasks they give
- Show good manners and kindness
- Respect them like my parents
- Do my best for them
- Show appreciation/thank them
- Don't forget what they did for me
- Study hard



APPENDIX Q Test of Reliability Using Cronbach Alpha

Reliability of Teacher Performance Scale as Rated by Pupils

Reliability Statistics

Cronbach's Alpha	N of Items
.844	18

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ITEM01	61.94	24.997	.562	.830
ITEM02	62.29	21.857	.684	.821
ITEM03	61.77	26.123	.362	.839
ITEM04	61.63	27.005	.535	.838
ITEM05	61.71	27.563	.183	.845
ITEM06	61.77	26.829	.269	.843
ITEM07	61.86	26.067	.447	.836
ITEM08	61.94	24.703	.506	.832
ITEM09	61.86	26.185	.421	.837
ITEM10	61.77	27.240	.184	.846
ITEM11	61.83	25.793	.452	.835
ITEM12	62.09	24.139	.641	.825
ITEM13	61.69	27.045	.363	.840
ITEM14	62.37	23.123	.539	.832
ITEM15	62.23	24.005	.540	.831
ITEM16	61.71	28.504	-.069	.852
ITEM17	62.23	25.005	.463	.835
ITEM18	62.03	23.499	.759	.819



Reliability (Scale on Teachers – Teaching Approaches Effectiveness)

Reliability Statistics

Cronbach's Alpha	N of Items
.846	14

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
TA01_E	48.20	55.700	.060	.860
TA02_E	49.00	52.000	.633	.833
TA03_E	48.00	52.000	.633	.833
TA04_E	48.60	47.800	.615	.827
TA05_E	48.20	47.700	.712	.822
TA06_E	48.40	48.300	.714	.823
TA07_E	48.60	44.300	.705	.819
TA08_E	49.60	47.300	.977	.813
TA09_E	49.20	46.700	.802	.817
TA10_E	49.20	51.700	.197	.863
TA11_E	49.20	51.200	.294	.851
TA12_E	49.60	47.300	.411	.847
TA13_E	48.80	56.700	.059	.852
TA14_E	49.20	51.200	.740	.829



Reliability (Scale on Teachers – Teaching Approaches Frequency)

Reliability Statistics

Cronbach's Alpha	N of Items
.797	14

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
TA01_F	46.20	42.200	.871	.742
TA02_F	47.00	45.500	.787	.757
TA03_F	45.00	55.000	.062	.804
TA04_F	45.40	53.800	.145	.801
TA05_F	45.00	55.000	.062	.804
TA06_F	45.80	54.700	.099	.802
TA07_F	46.00	48.000	.411	.785
TA08_F	45.40	44.800	.579	.769
TA09_F	46.00	43.500	.731	.755
TA10_F	46.00	56.000	-.088	.828
TA11_F	45.80	43.700	.716	.756
TA12_F	46.80	46.700	.328	.800
TA13_F	45.80	41.200	.909	.736
TA14_F	46.00	54.000	.076	.808



Reliability (Scale on Teachers – Instructional Materials Adequacy)

Reliability Statistics

Cronbach's Alpha	N of Items
.921	20

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
IM01_A	52.20	174.700	.837	.911
IM02_A	50.60	186.800	.818	.914
IM03_A	50.60	186.800	.818	.914
IM04_A	50.20	193.200	.834	.916
IM05_A	52.60	201.300	.177	.924
IM06_A	52.80	203.700	.053	.927
IM07_A	52.40	189.300	.654	.916
IM08_A	50.80	172.700	.847	.910
IM09_A	51.20	192.700	.314	.924
IM10_A	51.20	202.700	.068	.928
IM11_A	52.20	178.700	.622	.917
IM12_A	51.20	171.700	.810	.911
IM13_A	51.00	170.000	.782	.912
IM14_A	52.60	198.800	.155	.928
IM15_A	52.60	180.300	.691	.914
IM16_A	53.40	186.800	.761	.914
IM17_A	53.40	186.800	.761	.914
IM18_A	53.40	186.800	.761	.914
IM19_A	53.40	186.800	.761	.914
IM20_A	53.40	186.800	.761	.914



Reliability (Scale on Administrators' Performance as Rated by Teachers)

Reliability Statistics

Cronbach's Alpha	N of Items
.930	14

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
AM1	57.20	25.700	.419	.932
AM2	57.40	27.800	.000	.935
AM3	57.40	22.300	.749	.923
AM4	57.00	25.000	.456	.932
AM5	56.80	22.700	.920	.916
IL1	56.80	22.700	.920	.916
IL2	57.20	25.700	.419	.932
IL3	56.80	22.700	.920	.916
IL4	56.60	24.300	.748	.923
IL5	57.40	22.300	.749	.923
IL6	57.00	23.500	.753	.922
IL7	56.80	22.700	.920	.916
PR1	56.60	24.300	.748	.923
PR2	57.20	25.700	.419	.932



APPENDIX R
CERTIFICATION OF ENGLISH CRITIC



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3/4/2014
Date

TO WHOM THIS MAY CONCERN:

This is to certify that the thesis/narrative report/student portfolio, entitled TOWARDS
EVOLVING A MODEL FOR MATHEMATICS PROGRAM OF
SPECIAL SCIENCE ELEMENTARY SCHOOLS
of MS. RENELYN R. CORDIAL for the
course/degree Ph.D in Mathematics has been read and edited by the undersigned
English critic. Education

RHODORA O. CRIZALDO
(Name & Signature of English Critic)

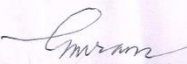


APPENDIX S
LANGUAGE EDITING CERTIFICATION

April 10, 2014

CERTIFICATION

This is to certify that I have read and edited in its entirety the Dissertation titled "*Towards Evolving a Model for Mathematics Program of Special Science Elementary Schools*" by **Ms. RENELYN R. CORDIAL**, Ph.D. in Mathematics Education student.


Merry Ruth M. Gutierrez, Ph.D.
Faculty, PNU



APPENDIX T
CERTIFICATION OF ANTI-PLAGIARISM

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CERTIFICATION

This is to certify that the dissertation of RENELYN CORDIAL entitled "*Towards Evolving A Model for the Mathematics Program of Special Science Elementary School*" **passed** the authenticity test performed by the office on March 26, 2014, using the Anti-Plagiarism software of the university.


ANTRIMAN Y. ORLEANS, Ph.D.
Director

PNU OR No: 139528
UCRSS PO: 2014-0046
Student No: G2008124084





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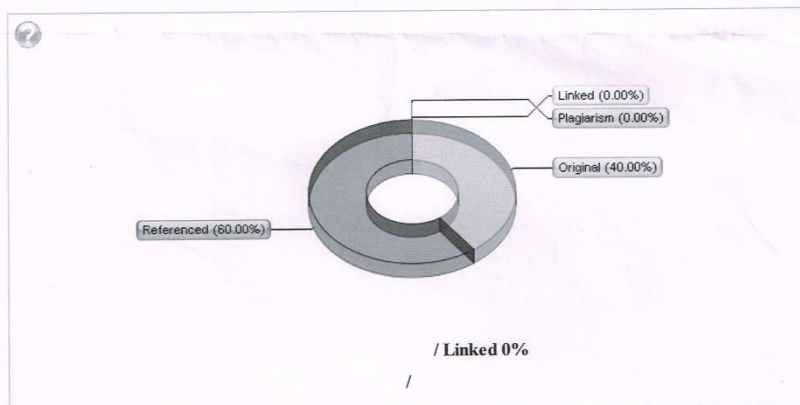
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APPENDIX U
INVITATION TO AN ORAL DEFENSE

 **Philippine Normal University**
The National Center for Teacher Education
**College of Graduate Studies and
Teacher Education Research**
OFFICE OF THE DEAN
Tel. No. (02)317-1768 loc 743 

INVITATION TO AN ORAL DEFENSE

April 10, 2014

Dr. Elisa S. Baccay
Dr. Olivia N. Buzon
Dr. Erminda C. Fortes

I take pleasure to invite you as members of the panel of examiner in the **Dissertation/Thesis** oral defense of:

Student : **Ms. Renelyn R. Cordial**
Degree : Doctor Philosophy in Mathematics Education
Title : **"Towards Evolving a Model for Mathematics Program of Special Science Elementary School"**

The Examination will take place at the University on –

Date : April 16, 2014
Time : 12:00NN
Place : RM 301, Pedro Orata Hall

Very truly yours,

ZENaida Q. REYES
Dean

For Panel Members:

- Please submit your written comments to the Dean's Office, in case the thesis needs major revision and does not qualify for oral defense not later than three days before the date scheduled for oral examination.
- **Kindly give this office three (3) days before the final defense to invite another panel member, in case; you cannot make it to the oral defense.**
- The Office of the Dean reserves the right to appoint a new panel member.

Thesis Committee	Guest Examiners
Chairperson : Dr. Zenaida Q. Reyes	Dr. Elisa S. Baccay Dr. Olivia N. Buzon Dr. Erminda C. Fortes
Adviser : Dr. Rene R. Belecina Dr. Gladys C. Nivera	



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**Dissertation: TOWARDS EVOLVING A MODEL FOR
MATHEMATICS PROGRAM OF SPECIAL
SCIENCE ELEMENTARY SCHOOLS**

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A

MODEL

FOR

THE MATHEMATICS PROGRAM OF

SPECIAL SCIENCE

ELEMENTARY SCHOOLS



Backgrounder:

The evolving mathematics model presents the different areas needed to improve the overall implementation of Mathematics Program of Special Science Elementary Schools.

Evaluating the learners' learning outcomes is a part of a larger undertaking of program evaluation. Any program worthy of funding and support needs to be evaluated completely, for unless, this is objectively assessed, there is no way to tell how good a program is.

Program evaluation must also occur to determine quality and relevance. Today, no one can ignore the technological revolution sweeping the world. Science and technology have shaped the very horizons of the imaginable world. Rapid economic development and technical changes have dramatic impact on the students we educate. Accordingly, it is a powerful strategy for distinguishing programs and interventions that make a difference from those that don't. It is a driving force for developing and adapting sound strategies, improving existing programs, and demonstrating the results of investments in time and other resources. It also helps determine if what is being done is worth the cost (Milstein, 2002).



Objectives of the Evolving Model for the Mathematics Program of SSES

This model generally aims to enhance the implementation of mathematics program of Special Science Elementary Schools. This was done by evaluating the existing program and identify the common problems and the needs of the program.

The following objectives served as the basis in modifying and enhancing the existing program.

Context

1. To review periodically the Vision, Mission, Goals, and Objectives by the stakeholders' representatives by forming a committee who will review and reappraise the existing VMGO.
2. To ensure that there is awareness, acceptance, and participation of the school's Vision, Mission, Goals, and Objectives by the stakeholders by conducting a survey of the stakeholders' perception on the school's VMGO.
3. To involve the stakeholders in the attainment of the school's VMGO by displaying the school's VMGO in strategic location and by strengthening the Parents-Teachers Association.



Input

1. To retain/keep school head and mathematics teachers who are qualified, competent and sufficient in number to be able to implement the program as it should be by reviewing the school's policy on recruitment/hiring, selection and promotion which are based on merit and legal practices.
2. To enhance the faculty and staff development program by making a summary report on the school's personnel involvement in professional organization and attendance to professional seminars and trainings relevant to Mathematics. Conduct regular performance evaluation or performance appraisal, school-based training program, and plan for short-term and long-term/continuing professional training.
3. To motivate the pupils to be more interested in Mathematics and develop a more positive attitude towards the subject by making connections between mathematical concepts and real-world application.
4. To turn mathematics to interesting subjects by encouraging the learners to be more engaged in learning by providing and utilizing appropriate instructional materials and methodologies.
5. To promote a mathematical learning atmosphere by exposing both the mathematics and learners to various trainings and competitions in the



different levels like district, division, regional, national, or international.

Give incentives to Mathematics teachers and pupils who bring honor or awards in the field of mathematics and organize MTAP training program in the school.

6. To provide support services/facilities that are adequate and functioning well by reviewing the budget allocation for support services and instructional materials, soliciting funds or come up with activities for fund-raising.
7. To have adequate or sufficient and appropriate budget allocation to sustain the school operation by:
 - Propose an annual budget based on the institutional budget performance monitoring report.
 - Appropriate sufficient budget for the different areas such as professional development, mathematics program, support services, facilities, equipment, instructional materials, and pupils' training.
 - Develop a long-range budgetary planning in accordance with applicable DepEd policies and standards

Process



1. To improve the policy and standards of the curriculum and program by reviewing the existing policies and standards and benchmark with the policy or the DepEd for Special Science Elementary Schools.
2. To follow the number of minutes allotted for mathematics in every grade level of SSES by reviewing class schedule and academic program.
3. To assign teaching loads according to existing legal practices by reviewing load assignments and duties of teachers.
4. To provide evidence that overload pay is accorded to the concerned teachers by reviewing financial records allotted for salary and benefits.
5. To help teachers improve their teaching methodologies and become innovative by:
 - Conducting thorough classroom observation
 - Conduct self-evaluation of teaching methodologies
 - Send teachers to training or workshops that focus updating or acquisition of new teaching methodologies in mathematics
6. To improve assessment practices of mathematics teachers
 - Evaluate teachers through their art of questioning and their test construction
 - Provide school-based training for assessment test constructions and taxonomy of learning objectives



- Send the mathematics teachers to workshops and training on assessment
7. To improve administrative support for the following areas: supervision and assistance, professional development. Moral and academic
- Establish a healthy working and learning atmosphere
 - Foster a productive environment for teaching and learning
 - Establish collaboration and open-dialogue with the teachers and other stakeholders
 - Establish collaborative and collegial relationships among the staff and leaders
 - Conduct regular assessment and inventory of the different support services, facilities, and instructional materials

Product

1. To improve the academic performance of the pupils in mathematics by
 - Identify all the variables or factors that affect academic performance, evaluate them and enhance if needed
 - Expose the pupils to different trainings and competitions in mathematics
 - Enhance the school-based MTAP training.



MODEL

This model is relevant in promoting effective learning for pupils in Special Science Elementary Schools. It particularly involves different components which lead to improved quality of learning and teaching and increased attainment and achievement for the learners.

The model provides a framework for the implementation of mathematics program in SSES that sets out what a learner should be able to do and the experiences that contribute to their learning.

Figure 2 conceptually illustrates the framework of the model for Mathematics program of SSES that was evolved from the findings of the study. The model can be used to enhance the implementation of the existing Mathematics Program of the selected SSES in the province of Cavite.

The model framework shows a schematic guide for the implementation of mathematics program in SSES. The mathematics program is the totality of experiences which are planned for the learner through their education. The purpose of this is to enable the learners to develop the four characteristics, namely: physical ability, intellectual achievement, social adjustment, and leadership ability. Hence, the framework puts the learners at the center of learning provision, which was surrounded by their performance and experiences as the product of learning. It is the responsibility of the school to bring out the best performance and experiences of the learner in the field of mathematics. The framework provides different components that have the most direct impact on the



learners, namely: VMGO, curriculum standards, teaching methodologies, human and physical resources, administrative and stakeholders support, and the assessment for learning.





Figure 2. FRAMEWORK OF THE MODEL

Every young learner is entitled to experience a high quality mathematics program of the school, hence, the said components were establish using the Standards and Indicators on the establishment of the Special Science Elementary Schools (Appendix I). Likewise, the results of the study served as a basis in modifying and enhancing the existing program. In accordance with K-12 RRISD and Pennsylvania Mathematics Standards and NCTM Standards (NCTM, 1989), the goals and objectives of the math program has developed. The curriculum standard of the model was aligned to K to 12 mathematics curriculum to adhere on the DepEd implementation of seamless K to 12.

It is important to ensure that all children and young people receive the support which they need to become successful learners, confident individuals, responsible citizens and effective contributors.

On VMGO

The school's VMGO is the most important step toward creating a successful program. These give clarity and direction for a school. A muddy vision or mission can result to continuing conflicts and can have difficulty identifying priorities. The creation of effective schools ultimately depends on the ability of



educators to visualize how schools look. Vision converts ideas, knowledge, experience, and futurist thinking into a reality that is clearly understood and achievable by practitioners. Vision provides the bridge between innovative ideas and purposeful, coordinated action. Therefore, it is critically important that educators are aware of the latest thinking, and of what holds the greatest promise of improving education. The vision of ideal schools help them to rework and reshape existing curriculum content, instructional methods, and delivery system (Cunningham & Cordeiro, 2009).

On Curriculum Standards

The learners have an entitlement to a curriculum which will support them in developing their values and beliefs and enable them to achieve the highest possible levels of literacy, numeracy, and cognitive skills. Experience challenge and success so that they can develop well-informed views and act responsibly. They should be encouraged to adopt an active and healthy lifestyle and be equipped with the skills needed for planning their future lives and careers. The curriculum is the totality of experiences which are planned for children and young people through their education, wherever they are being educated (The Scottish Government, 2008).

On Teaching Methodologies

Method, as used in connection with the act of teaching, assumes a clearly defined way of pursuing an educational objective. Such objective could be stated



in terms of knowledge that should be gained or skills and values that should be developed. In undertaking classroom instruction, a particular method may take a form of strategy or technique resorted to in introducing a subject. In daily lessons, it is a systematic plan of presenting a topic. Educators view method as a “procedural context that requires close adherence in order to insure the attainment of a learning outcome.” It can be said therefore that method is an integral part of teaching (Salandanan, 2000).

On School Administrators

School administration is an important part of our education system. Administrators face a variety of issues on a daily basis. Take a look at strategies and techniques used to combat those issues. School administrators must be visible, student and teacher centered, and willing to tackle issues for which there are no easy answers. The shift in educational leadership has gone from instructional leader to the more appropriate term of “learning leader” (Schmoker, 2006). In the past, a principal or school administrator worked in isolation and was predominantly concerned with personal autonomy and the top down approach. This type of leadership practice will no longer work if schools are to create an effective environment for student learning and achievement. Schmoker (2006) asserts that schools will not improve until the building leader begins to work cooperatively with teachers. The role of the school administrator encompasses teamwork, exploration, creation, and the ability to “lead by doing the right things” (Lindley, 2009, p. 4).



Principals cannot simply ride into a school on a white horse and turn around a low-performing school by themselves. However, research strongly suggests they are a key ingredient to improving a school's performance, especially low-achieving schools and those schools serving traditionally disadvantaged students. As the Wallace Foundation stated, "There are virtually no documented instances of troubled schools being turned around without intervention by a powerful leader" (Leithwood, et al. 2004 cited in Hull, 2012).

Several researchers show that principals play a significant role in student achievement. One study found that an average school led by a highly effective principal performed 10 percentage points higher than if that school was led by an average principal (Waters, Marzano and McNulty 2003 cited in Hull, 2012). A more recent study found that, based on value-added scores, having a highly effective principal increased students' achievement from the 50th percentile to between the 54th and the 58th percentiles in just one year, depending on the type of analysis conducted (Branch, Hanushek and Rivkin 2012 cited in Hull, 2012). Such impact on student achievement is similar to that of reducing class size by five students (Branch, Hanushek and Rivkin 2012, Rivkin, Hanushek and Kain 2005 cited in Hull, 2012).

On Teachers

The teacher in the teaching arena assumes a critical role. Educators express a strong adherence to the dictum "as the teacher, so is the pupil." Truer



than at any other time due to the fast-changing force in the learning factors that impinge on the intellectual, social, and emotional development of the growing child, it is upon the teacher education sector to adequately prepare and transform the youth to corresponding ideal mold. The responsibility for such a noble mission rests upon the shoulder of the mentors who should just as well keep up with the rapid studies in society and be willing to adopt new ways of nurturing their “minds and hearts” (Salandanan, 2000).

The school is very much alive when the teachers are dynamic, alert, and zealous of their teaching, research, and service function. In order to articulate the philosophy, vision, and mission of the school in relation to the changing needs of the immediate society, in general, of which integral part, the teacher has a tremendous task. The teacher is not just a cog in the wheel, s/he is the wheel in the total complex of the educational system. S/He is the central figure in the school system, notwithstanding the pupils/students. S/He can give flesh to the noble aspirations of the learners, translate into commodity, and transform values and attitudes into functional attributes (Zulueta, 2008).

Students learn best from high quality teachers who know the subject matter and how to deliver it. Ensuring that teachers are competent and have opportunities to improve their skills is critical (Colley 2002).

On Pupils



In most instances, children come to school ready to learn but with different cultural, educational, and environmental experiences to draw from. It is the responsibility of the educational system to meet children where they are and encourage and support their development from that point. To promote learning for all children, educators must provide a school environment that acknowledges children's diverse backgrounds, helps children transition comfortably into the next instructional level, and provides community supports when necessary. Such provisions support each child's readiness to learn as well as each school's readiness to educate young children (Vo-Vu, 1999).

The concept of school readiness has been defined and redefined over the years, resulting to different viewpoints. Several theories of child development and learning have been used to explain the term. In fact, there appears to be two types of readiness: *readiness to learn*, which involves a level of development at which the child has the capacity to learn specific materials, and *readiness for school*, which involves a specific set of cognitive, linguistic, social, and motor skills that enables a child to assimilate the school's curriculum (Kagan, 1990; Crnic & Lamberty, 1994; Lewit & Baker, 1995 cited in Vo-Vu, 1999). Early studies fostered the belief that children should have certain skills--such as being able to count or recite the alphabet--or that they should be able to conform to a set of desired behaviors before they enter kindergarten. Current research in the fields of early childhood education, child psychology, and neuroscience is changing what many researchers, practitioners, and parents have come to understand



about child development and the learning process, however, instead of placing the burden of readiness on children, educators are being challenged to reconsider traditional beliefs about the school's role in helping young children continue learning and succeed in the school culture (Southern Regional Education Board, 1994; Lamberty & Crnic, 1994, Katz, 1991 cited in Vo-Vu, 1999). Recent studies on readiness, children, and schools indicate that there actually are two sides to the readiness issue: getting children ready for school and getting schools ready for children.

On Instructional Materials

Palma (2009) defines instructional materials as resources available to the teacher and the learners, which serve as stimuli in the teaching-learning process. The whole purpose of materials is to initiate the students to the “real world” they live in. They represent elements found in that world and are meant to help students understand and explain reality.

Schools must consider the selection of instructional material as a very vital part of the institutional planning. These must be allocated in alignment with the school's mission and goals and used in ways that further productive student learning. They are utilized to maximize student achievement of essential goals for their learning (Glatthorn, A.A. 1993a).

On School Facilities and Equipment



School facilities can be defined as those things that enable the teacher to do his/her work very well and helping the learners to learn effectively. The chalkboard for example, facilitates the imparting of information on the learner. School facilities also include school building e.g. classrooms, assembly halls, laboratories, workshops, libraries, etc. They also include teaching aids, chairs, tables, devices such as modern educational hardware and software in the form of magnetic tapes, films, and transparent stripes. School facilities are all the things that are needed for effective teaching – learning process to take place. They are designed to enhance the process of teaching. The absence of school facilities implies the non-existence of any set up that may be referred to as school (Lawanson, 2011).

Castaldi in Peretemode (2001:45) as cited in Lawanson (2011) concludes that “educational facilities are those things of education which enables a skillful teacher to achieve a level of instructional effectiveness that far exceeds what is possible when they are not provided”. The successful implementation of any educational program depends mostly on the quality of available school facilities that are to be provided for such program. This is supported by the view of Adaralegbe in Abraham (2003:105) as cited in Lawanson (2011) who posits that “the type of atmosphere required for effective learning is that consisting of better school buildings, more and better teaching facilities”.

Also, Adesina in Abraham (2003:160) as cited in Lawanson (2011) posits that “the quality of education that our children get bears direct relevance to the



availability or the lack of physical facilities and overall atmosphere where the learning takes place. Also in the words of Castaldi (1984:4) as cited in Lawanson (2011) are these wise saying “Excellent school facilities and dedicated teachers are basic ingredients of good educational program”. The desire for education attainment is on the high side, the consumers of education therefore expect the attainment of standard and quality education that will give them a sense of belonging, fulfillment and satisfaction.

Our schools can only be what we want them to be if only proper steps are taken in the provision of all that will make teaching and learning effective. Learning cannot take place where facilities are not provided. Therefore the provision of facilities such as building, equipment e.t.c. is of utmost importance. It is important to note that students and indeed their teachers need a conducive environment to be able to teach and learn adequately and effectively. The school facilities therefore, must meet the needs of the school community. Each building in the school should be ceiled to reduce the intensity of heat. They must also be constructed with a design that makes for cross ventilation. Good sanitary facilities must be provided. Classrooms must not be overcrowded and must be spacious enough for free movement (Jacobson et al in Abraham, 2003 cited in Lawanson, 2011).

However, these school facilities must be sufficiently provided in our educational institutions and well maintained to ensure that optimal use and



achievement of educational objectives both in the immediate and in the future, given the available resources.

On Financial Management

Financial management is crucial to the health of a school in order to provide adequate funding for day-to-day needs and in planning for the future. A lapse in financial management-or deliberate fraud-diverts the attention of staff and trustees and may cause a reduction in the funds available for curriculum delivery. Problems with a school's financial governance and management almost always impact the education being provided to students (NZEducation, 2014)

Budgeting is a process for preparing a summary of the programs of the school reflecting the expected revenues and expenditures. This statement is the school budget which guides a head through the various school activities, as well as towards achieving the objectives of the school. It is a systematic way to achieve the planned mission and objectives of a school that has three major functions, namely: 1. provides an operational cost-time framework for the implementation of school programs. It is therefore the major planning instrument in your school; 2. serves as an instrument for the delegation of authority. The school budget is designed to show which particular people are responsible for specific programs; 3. can be an instrument for controlling and evaluating performance (Commonwealth Secretariat, 1993).



On Administrative Support

The decisions that school leaders make and how they make them have a direct impact on the learners and the working conditions. Teachers often complain that decisions affecting them are usually made without their knowledge. Leaders need to involve teachers in making decisions. For example, leaders can involve staff in departmental scheduling, student scheduling and duty assignments (Price, 2003).

Every school should have a mission statement and a vision based on shared values and beliefs. Leaders can engage all stakeholders in the process of developing the mission statement and vision for the school that provides focus and direction for all involved. (DiPaola, Walther-Thomas, 2003). If the school already has a mission and vision, revisit them occasionally with the stakeholders involved. Good leaders encourage others to be leaders and help bring out those qualities. Therefore, if teachers attend a conference or workshop, have them share their knowledge with the rest of the staff when they return. Leaders can have experienced teachers work together to solve an instructional problem (Spitz, 2003).

Administrators must be familiar with available resources to support the diverse needs of students, families and staff and must know how to access additional support in order to ensure appropriate education for all students and support for teachers. For example, leaders can make sure English as a Second Language and bilingual programs are effectively supported (DiPaola, Walther-



Thomas, 2003). They can make special education concerns integral when planning for professional development, distribution of materials, books, classroom space and equipment. They can ensure that special education is not put at the end of the line as an afterthought (CEC, 2000).

School leaders should go beyond simply involving the community and create relationships among the school, families and the community. Leaders can visit families at home when possible. They can become familiar with business people and community organizations and ask them if they could help create learning experiences for students. Leaders can seek to make available health, social, mental health, counseling and other family services in the school and increase the number of adults in the building to provide care and guidance for students. Leaders can generate a broad set of activities in which family and community members can participate and contribute their talents to the school (Ferguson 2003).

Most educators and parents have had no training on how to work with one another, and many fear and avoid one another. School leaders should consider providing staff and parents with ongoing, research-based training on how to work together and create non-threatening social activities to bring them together (Wherry, 2003).

On Stakeholders' Support



The starting point for learning is a respect and trust based upon shared values across the school community, including parents, whether for young people in school or those not in school. All members of staff should contribute through open, positive, supportive relationships where children and young people will feel that they are listened to; promoting a climate in which children and young people feel safe and secure; modelling behavior which promotes effective learning and wellbeing within the school community; and by being sensitive and responsive to each young person's wellbeing. Children and young people should be encouraged to contribute to the life and work of the school and, from the earliest stages, to exercise their responsibilities as members of a community. This includes opportunities to participate responsibly in decision-making, to contribute as leaders and role models, offer support and service to others and play an active part in putting the values of the school community into practice.

The success of curricula would somehow depend on the support given by the stakeholders. Involving parents, families and the community in meaningful ways is critical to the success of students and influences a teacher's decision about continuing in a particular school or leaving it to go somewhere else. School leaders need to look for ways to involve the community. Leaders can start by involving families when creating a mission statement and vision for the school (DiPaola and Walther-Thomas, 2003). They can involve families and the community when addressing safety and discipline issues including the establishment of a school safety committee that includes community



representatives to gather and analyze data, put together and implement a plan, and monitor its results (NEA, 2003). Leaders can include parents on the school's interviewing and hiring committee to illustrate parent involvement in important activities (Johnson and Birkeland 2003). They also can learn what it is that parents want to know and provide them the information frequently and briefly (Wherry, 2003).

On Assessment for Learning

The purpose of an assessment is to provide feedback to both the teacher and learner regarding the learner's progress towards achieving the learning objectives. This feedback should be used by the teacher to revise and develop further instruction. This helps build a shared language that everyone can use to describe growth and learning (Davies, 2007).

The arrangements for assessment should enable and motivate learners to develop to their fullest across the four capacities. The framework provides the opportunity to build on their prior learning and provide breadth, depth and enrichment (The Scottish Government, 2008)

There are several essential elements of the classroom assessment process that supports student learning. To ensure success for all learners, especially those who struggle, students need to know what they already know, what needs to be learned and what success looks like. Students also need to



learn how to guide their own learning through being involved in setting and using criteria, giving themselves feedback for learning (self-assessment), setting goals, collecting evidence and communicating that evidence of learning to others (Davies, 2007).

In order to communicate learning meaningfully to a variety of stakeholders, teachers involve students in collecting and organizing a broad range of evidence or proof of learning. Further, as teachers review evidence of learning from three different sources (observations of students engaged in learning, conversations with students about their learning, and reviewing their products (i.e. notebooks, tests, quizzes, projects, assignments, electronic data), they compare each student's learning not to other students but to the learning destination. This requires that teachers not only understand what students need to know and do but that they understand the level of quality appropriate for the course or grade level (Davies 2007).

In classrooms where assessment for learning is practiced, students are encouraged to be more active in their learning and associated assessment. The ultimate purpose of assessment for learning is to create self-regulated learners who can leave school able and confident to continue learning throughout their lives. Teachers need to know at the outset of a unit of study where their students are in terms of their learning and then continually check on how they are progressing through strengthening the feedback they get from their learners.



Students are guided on what they are expected to learn and what quality work looks like (Wikipedia, 2014)

COMPONENTS OF THE MATHEMATICS PROGRAM OF SSES

I. LEARNER

The purpose of this model for the mathematics program of SSES is to produce learners who exhibit the following characteristics:

A. Performance

1. Manifests inclination to Mathematics as shown in his/her academic performance
2. Excels in Mathematics achievement tests
3. Excels in Mathematics competitions
4. Maintains grade and general average above the minimum required grades in Mathematics of special science elementary schools

B. Experiences

1. Uses higher order thinking skills and creative thinking processes in solving problems



2. Copes with the academic and challenges of mathematics curriculum

- **Physical/Psychomotor Characteristics** – students must generally be healthy, alert and active, and have heightened sensory awareness.
- **Intellectual/Academic Aspect** – students must acquire knowledge fast and accurately; have quick mastery and recall of factual information, superior reasoning ability, inquisitive and curious about a lot of things, observant and quick to note details; have a ready grasp of underlying principles and can make valid generalizations; have a large storehouse of information about a variety of topics; can concentrate for long periods of time; and can analyze ideas in different ways and find varied solutions to problems.
- **Social/Emotional/Motivational Aspect** – students must be adaptable and flexible, responsible, enjoy doing challenging and different tasks; prefer to work independently and require little directions from teachers; are self-motivated in accomplishing their work, discerns right from wrong, good from bad, evaluates and suspends judgment on events, people, and things; are God-fearing, humane, nationalistic, and ecologically responsible.
- **Leadership/Creativeness** – students must participate actively in school/community activities; are self-confident with children of their own age as well as adults; initiate worthwhile activities; create new



ideas and products; give original ideas or solutions to questions; use varied ways in solving problems, and have varied interests and abilities, among others.

II. VISION, MISSION, GOALS, AND OBJECTIVES

Standard:

A clear, well-aligned, relevant, and active Vision, Mission, Goals, and Objectives that promotes the acquisition of Mathematical skills, attitude, and knowledge, in collaboration with school's stakeholders.

Vision: The SSES envisions developing Filipino children who are equipped with mathematical knowledge, skills and attitude; creative and have positive values; and lifelong learning skills in collaboration with school's stakeholders to become productive partners in the development of the community and society.

Mission: The SSES provides a learning environment to mathematically inclined children through a special curriculum which recognizes multiple intelligences and is geared towards the development of God-loving, disciplined, nationalistic, creative, ecologically aware,



productive, scientifically, technologically oriented and skilled individuals who are empowered through lifelong learning skills.

Goals:

Demonstrate understanding and skills in computing with considerable speed and accuracy, estimating, communicating, thinking analytically and critically, and in solving problems in daily life using appropriate technology.

Objectives:

1. To provide every learner with the opportunity to be mathematically literate
2. To function in a technological world
3. To provide the foundation for further study of mathematics
4. To improve the math skills of all learners so that they become independent problem solvers
5. Learners will accept responsibility, take initiative, and set priorities regarding their learning
6. Learn to value mathematics
7. Learn to communicate and reason mathematically

Indicators:

1. Clearly articulated and actively implemented statements of the VMGO



2. Joint statement of the stakeholders' vision of the school and learners
3. Aligned with the national development goals, values, and beliefs of the community the school serves

III. HUMAN RESOURCES

A. SCHOOL PRINCIPAL

Standard:

More qualified, competent, and effective school principal with relevant and adequate seminars and trainings.

Indicators:

1. With appropriate master's degree
2. At least with 5 years of teaching experience and with 3 years of administrative experience in the capacity of Academic Coordinator or Master Teacher
3. Has special training in Science, Mathematics, and Research and shows evidence of professional growth and continuing education
4. Participates in professional education
5. Possesses PRC License
6. Promotes the atmosphere of research and innovations among the teachers and learners



7. Establishes linkages for benchmarking and support.
8. Possesses relevant and exemplary supervisory, leadership and management skills.

B. MATHEMATICS TEACHER

Standard

The teacher exhibits above average professional competence and is morally upright. An effective mathematics teacher with relevant and adequate seminars and trainings.

Indicators:

➤ Personal and Professional Qualifications

1. Preferably has MA degree/units or its equivalent
2. Education graduate or its equivalent and specialized in Mathematics and Science
3. A seasoned Mathematics teacher, with outstanding teaching performance
4. Has relevant training or experience and have initiated innovations in teaching mathematics
5. Achieves professional growth as evidenced by his/her engagement in further studies and attendance in professional trainings



6. Possess PRC License
7. Possess good moral character, positive work ethics, and good communication skills
8. Must be computer literate and with experience in conducting research
9. Physically fit

➤ **Teaching Competence**

1. Shows evidence of mastery of subject matter
2. Selects, prepares and utilizes instructional materials and aids effectively in achieving teaching goals
3. Creates and tries out appropriate strategies and materials that meet the peculiar needs and problems of children
4. Identifies specific needs, interest and capacities of individual pupils and provides adequately for these
5. Models the skills of scientific inquiry, curiosity, creativity, openness to ideas and skepticism
6. Displays readiness in teaching the subject by utilizing relevant and adequate instructional materials, applying appropriate teaching methodologies, and identifying specific learning tasks and needs.



7. Uses varied and appropriate assessment tools in instruments to evaluate pupils' learning.
8. Maintains an organized system of record-keeping of student performance and behavior.
9. Demonstrate effective classroom management
10. Applies classroom learning to the context and needs of the community and the world with values integration and real life situations

C. PUPILS

Indicators:

1. Shows mastery of the relevant Mathematical competencies and skills
2. Must be engaged in learning
3. Possesses positive attitude towards Mathematics

➤ Pupil Admission

(Pupils admitted should not exceed 35 to a class)

Standard

The SSES learner undergo a selective admission and other measures.

Indicators:



1. Manifests inclination in mathematics (personal interview and other non-test materials)
2. Undergoes the School Readiness Assessment (SRA) and passes the Mental Ability Test for Grade I entrants
3. Passes the qualifying tests of the grade level (the same for transferees but no transferees after Grade III)
4. Must have a good moral character

Requirements for admission are the following:

- a. Original report card (form 138) with no grades below 83% in any subjects in any grading period and signed by the authorities of school last attended
- b. Original and photocopy of NSO birth certificate
- c. Two copies 1x1 most recent I.D. picture
- d. Accomplished registration form/information sheet
- e. Testing fee
- f. Passed admission test and interview
 - No students will be admitted without the above listed requirements

The following should be considered in pupil admission of

- Grade 1 entrants:



1. Age- six years old (up to 6 years and 11 months) definitely not younger than five years old by the start of the school year
 2. Readiness for schooling – the top 50 pupils based on the SReA (School Readiness Assessment) shall be given the mental ability test'
 3. Mental Ability- mental ability test shall be administered by the Regional Offices to the SSES candidate and results will show the children's Mental Ability or IQ at least 115
- Grade 2 entrants:
1. Age- seven years old (up to 7 years and 11 months) definitely not younger than six years old by the start of the school year
 2. Performance in Grade 1 – the top 15-20 % (depending on the population) of the outgoing Grade1 pupils in every school based on Grade 1 general average (as certified by the school head)
 3. Performance in English and Mathematics screening test shall be administered by the Central office to the candidates to select the top 50



4. Mental ability- mental ability test shall be administered by the Regional Offices to the top 50 SSES candidates to select the top 35.

➤ **Pupil Performance: Retention to the Program and Promotion**

Standard

The SSES learner applies acquired scientific and technological knowledge, attitudes, values and life-long skills in coping with everyday living.

SSES pupil shall be retained within the program provided that the following are satisfied:

1. Maintains a grade of not lower than 85% in Mathematics at all grade level.
2. Observe the school code of conduct
3. Excels in Mathematics international, national, regional/division achievement tests with at least 80% Mean Percentage Score (MPS)



4. Excels in Mathematics local, national, and international competitions
5. Applies concepts and skills learned in daily life
6. Uses higher order thinking skills and creative thinking processes in solving problems
7. Undertakes investigatory projects from Grade III to Grade VI

Note: Students, who do not meet the above criteria despite remediation by the teachers, shall be advised to move to the regular program in the succeeding school year. However, parents may voluntarily pull-out their child any time within the school year.

➤ **Transferees to the Program**

The program may admit transferees to grade 2 and 3 only, if slots are available. The rule for screening/selecting Grade 2 entrants shall apply

The transferees during the beginning of the school year shall be admitted provided that they completed the basic admission requirements as follows:



- a. Original report card (form 138) with no grades below 83% in any subjects in any grading period and signed by the authorities of school last attended
- b. Original and photocopy of NSO birth certificate
- c. Two copies 1x1 most recent I.D. picture
- d. Certificate of good moral character
- e. Accomplished registration form/information sheet
- f. Testing fee
- g. Passed admission test and interview

➤ **Determining Honors**

Indicator

- Meet the criteria set by the Department of Education in determining honors

IV. PHYSICAL RESOURCES

A. INSTRUCTIONAL MATERIALS

Indicators

1. More than what the pupils need or adequate, relevant, and is functioning well
2. Provide students the learning experiences that promotes positive attitude towards Mathematics



3. Support the teachers and the pupils in achieving instructional objectives and in the delivery of students services as well as optimal learners' development and achievement

B. PHYSICAL FACILITIES

Standard

The SSES is a dynamic community that nurtures excellence in teaching and learning.

Indicators

A. The School Plant

- Centrally, strategically located and is accessible to most schools in the Division/Region
- Has enough space for infrastructure improvement and other projects, like science/botanical garden

B. Classroom Facilities and Equipment

- Has "the state of the art" technology
- Provides for:
 - Standard size classrooms (7m x 9m)
 - At least 2 computers, TV set, cassette recorder/player, LCD projector, VCD/DVD player per classroom.
 - Science laboratories with basic science apparatus and equipment, including microscopes, telescope, et al.



- Computer laboratory with multimedia and internet facilities
(1:1 ratio of computer-pupil) and a technician
- Speech laboratory
- Music room and musical instruments
- Gymnasium with functional sports facilities

*Note: Physical facilities are used to serve the student's actualization in various learning areas. It is the duty and responsibility of each pupil to use it properly and follow the rules and regulations

C. SUPPORT SERVICES

- Offers student services through:
 - Guidance and Counseling Office
 - Library (with adequate number of updated textbooks, periodicals, references, etc. especially in Mathematics and Science)
 - Canteen
 - Medical-Dental Clinic
- Provides adequate electricity, water, and communication facilities
- Serves as a resource center/venue for the improvement of Science, Mathematics, and English instruction in the division and region.



D. FINANCIAL RESOURCES

Indicators

1. Must be appropriately allocated in terms of the purpose of the school and specific programs it offers, size, and population
2. Must be sufficient to sustain the yearly operation of the school and the implementation of Mathematics program or sufficient for the continuity and stability of services
3. Must be sufficient to provide competitive compensation for school principals and teachers, especially in the private schools
4. Must be sufficient to hold competent school personnel

Note: Finances must be duly certified by a public accountant and audited annually by an auditor who ensures that the school applies acceptable accounting practice and the school's viability to meet its obligations

V. CURRICULUM

Standards

The SSES utilizes an enriched Mathematics curriculum that will provide for the development of life-long learning skills and foster the holistic development of the child.



Indicators:

1. Policies and procedures conform with the existing policies for Special Science Elementary Schools and aligned to the K to 12 mathematics curriculum.
2. Enriched Mathematics curriculum that provide for the development of life-long learning skills and holistic development of every learner.
3. Learner-centered
4. Provides adequate and quality time for Mathematics instruction
(Grades I-III - 80 minutes, Grades IV-VI - 60 minutes)
5. Multi-disciplinary and integrative
6. Develops the learners' info processing skills, critical thinking skills, quest for innovation and discovery
7. Introduces investigatory project starting Grade III in Mathematics
8. Design special activities that will enhance and develop pupils' talents and expertise in other learning areas
9. Christian values shall be taught and integrated in the subject areas. Strategies shall be provided for pupils to internalize their values in and out of the school through the reflection of Christ with conscious preference to social peace, justice and decisions as a committed individual.



CURRICULUM STANDARDS IN MATHEMATICS I FOR THE SPECIAL SCIENCE ELEMENTARY SCHOOLS

EXPECTATIONS: At the end of Grade I, the learner is expected to demonstrate understanding and appreciation of key concepts and skills involving whole numbers up to 100. Perform addition and subtraction of 1 to 2-digit numbers; multiply 1 to 2-digit numbers; introduce the concept of division; and apply the concepts learned to solve problems, including money, fractions, measurement, simple geometric figures, pre-algebra concepts, data collection and representation as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decision in real life.

STANDARD 1: *The learner shows a clear understanding of the concept of whole numbers and enjoys using the concept interpret and give meaning to objects and things including money that he/she sees in his/her environment; understands the concepts of addition and subtraction of whole numbers including money and appreciates using them to solve everyday problems.*

I. WHOLE NUMBERS and OPERATIONS

A. Comprehension of Whole Numbers

1. Recognize cardinal Numbers from 0 to 100
 - 1.1 Identify common objects according to:
 - 1.1.1. color
 - 1.1.2. thickness



- 1.1.3. size
- 1.1.4. shape
- 1.2 Classify sets using common objects according to
 - 1.2.1 color
 - 1.2.2 thickness
 - 1.2.3 size
 - 1.2.4 shape
- 1.3 *Count by 1's through 10*
- 1.4 Tell the number of objects in a given set of 10 or less
- 1.5 Order sets with 1 to 10 objects from least to greatest and vice versa
- 1.6 Construct sets with objects 1 to 10 in
 - 1.6.1 the one more order
 - 1.6.2 the one less order
- 1.7 Associate number with sets having objects 0 to 10
- 1.8 Compare 2 sets using the expressions "fewer than", "more than", and "as many as"
- 1.9 Tell the relationship of numbers using the expressions "less than", "greater than", "equal"
- 1.10 Order numbers 1 to 10 including zero from least to greatest and vice-versa
- 1.11 Read and write numbers from 0 to 10 in symbols
- 1.12 Count by 1's from 11 through 50
- 1.13 Identify numbers in sets having 11 to 50 subjects
- 1.14 Skip count by 2's, 5's and 10's through 50
- 1.15 Associate numbers with sets having 51 to 100 objects
- 2. Read and write numbers through 100 in symbols and in words
 - 2.1 Read numbers from 11 through 100 in symbols and in words
 - 2.2 Write numbers from 11 through 100 in symbols and in words
 - 2.3 Write numbers from 11 through 100 in expanded forms
 - 2.4 Give the place value of each digit in a 1-to-3 digit numbers
 - 2.5 Regroup sets of ones into sets of tens and sets of tens into hundreds using objects
- 3. Read and write ordinal numbers 1st, 2nd, 3rd, up to 10th in a given set
 - 3.1 Identify the 1st, 2nd, 3rd, up to 10th object in a given set from a given set of reference
- 4. Read and write money up to ₱100.00
 - 4.1 Read and write the symbol of ¢ for centavo and ₱ for pesos



- 4.2 Tell the value of a given set of coins and paper bills up to ₱ 100.00
- 4.3 Compare values of the different denominations of coins and paper bills through ₱100.00 using the relation symbols
- 4.4 Skip count by ₱5s, ₱10s up to ₱100ws
- 5. Express Roman numerals to equivalent Hindu-Arabic Numerals
 - 5.1 Read and write Roman Numerals
 - 5.2 Change Roman Numerals to equivalent Hindu-Arabic Numerals and vice versa

B. Comprehension of Addition

- 1. Add 1-to-2 digit numbers with sum through 99 without and with regrouping
 - 1.1 Add two to three 1-digit numbers with sums up to 18 horizontally and vertically
 - 1.1.1 Join two sets with 1 to 9 objects
 - 1.1.2 Show the relationship of joining sets to addition of whole numbers
 - 1.1.3 Add two 1-digit numbers having sums of:
 - 6 and less
 - 7 through 10 (after concept 1-10)
 - 1.1.4 Illustrate that any given number plus zero is the same number
 - 1.1.5 Show the changing the order of two addends does not affect the sum
 - 1.1.6 Add three 1-digit numbers having sums up to 18
 - 1.1.7 Show the changing the grouping of three or more addends helps make computation easy.
 - 1.2 Add 1-to-2 digit numbers with sum through 99
 - Without regrouping
 - With regrouping
- 2. Add mentally two to three 1-digit addends with sums up to 18
- 3. Application of Addition
 - 3.1 Solve 1-step word problems involving addition of whole numbers including money with sums up to 99 without and with regrouping
 - 3.1.1 Analyze the word problem
 - 3.1.1.1 Tell:
 - what is asked



- what is/are given
- the word clues
- the operation to be used

3.1.2 Transform the word problem into a number sentence

3.1.3 Use the correct operation

3.1.4 State the complete answer

C. Comprehension of Subtraction

1. Subtract 1-to-2 digit numbers with minuends up to 99 without and with regrouping

1.1 Visualize situations when subtraction is used

1.1.1 Remove a subset from a given set of objects (taking away)

1.1.1.1 Show the relationship of the removal of a group of objects from a given set to subtracting of whole numbers

1.1.1.2 Show that subtraction is the inverse of addition

1.2 Subtract 1-digit numbers with minuends through 18 (basic facts)

1.3 Subtract 1-to-2 digit numbers with minuends up to 99

1.3.1 without regrouping

1.3.2 with regrouping

1.3.3 Subtract 2-digit without regrouping

1.3.4 Subtract 2-digit with regrouping

2. Subtract mentally 1-digit numbers from minuends up to 18 without regrouping

3. Application of Subtraction

3.1 Solve word problems involving subtraction of whole numbers including money with minuends up to 99 without and with regrouping

3.1.1 Analyze the word problems

3.1.1.1 Tell:

-tell what is asked

-what is/are given

-the word clues

-the operations to be used

3.1.2 Transform the word problem into a number sentence

3.1.3 Use the correct operation

3.1.4 State the complete answers



D. Comprehension of Multiplication

1. Multiply 1-to-2 digit numbers by a 1-digit numbers with products up to 45
 - 1.1 Multiply 1-digit by 1-digit number with or without regrouping with products up to 45
 - 1.1.1 Show the relationship of putting together 2 or more number of elements of repeated addition
 - 1.1.2 Show multiplication of whole numbers as repeated addition on the number line or array, etc.
 - 1.1.3 Transform an addition of similar whole numbers into a multiplication sentence
 - 1.1.4 Identify the parts of a multiplication sentence
 - 1.1.5 Show that a number multiplied by 1 is the same number
 - 1.1.6 Show that a number multiplied by zero is zero
2. Multiply mentally 1-digit numbers with products up to 81 without regrouping
3. Solving One-to-Two Step word problems.

STANDARD 2: *The learner understands the concepts of halves and fourths and derives satisfaction in applying the concept in separating an object or a group of objects.*

II. RATIONAL NUMBERS

A. Comprehension of Fractions

1. Recognize $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ of a whole
2. Separate a whole object into halves/fourths
3. Separate group of objects into halves/fourths
4. *Identify parts of a fraction*

STANDARD 3: *The learner understands and appreciates the basic properties of geometric shapes and applies them in simple tessellation and symmetry.*

III. GEOMETRY

A. Comprehension of Shapes

1. *Identify different shapes common in the home and in the school (e.g. square, rectangle, triangle, and circle)*
2. *Classify shapes according to numbers of sides and corners*
 - 2.1 *Describe shapes according to the number of sides*
 - 2.2 *Describe shapes according to the number of corners*
 - 2.3 *Compare shapes according to the number of sides and corners*



3. *Discriminate shapes/figures that show symmetry*
4. *Tessellate a surface using triangles and other shapes*

STANDARD 4: *The learner understands that things around him/her differ and that the differences can be compared and measured in different ways*

IV. MEASUREMENT

A. Comprehension of time measure

1. Tell the number of days in a week/months in a year using the calendar
2. Indicate time to the hour/half hour
 - 2.1 Show that 60 minutes make an hour
 - 2.2 Express the relationship between the “hour hand” and the “minute hand” of the clock
3. Indicate time to the nearest 15 minutes of an hour like 1:15, 1:30, 1:45
4. Read and write time as shown on the clock
5. Tell the time using the digital clock

B. Comprehension of Linear Measure

1. Make measurement using non-standard units of linear measure
 - 1.1 *Measure with multiple copies of units of the same size, such as paper clips laid end to end*
 - 1.2 *Use repetition of a single unit to measure something larger than the unit for instance, measuring the length of a room with a single meter stick*
 - 1.3 *Use tools to measure.*
2. Compare among the non-standard units of linear measure in terms of consistency and accuracy
 - 2.1 *Develop common referents for measures to make comparisons and estimates*

C. Comprehension of Mass Measure

1. *Recognize the attributes of mass*
2. Measure mass using non-standard units of mass measures
3. Compare among the non-standard units of mass measure in terms of consistency and accuracy
 - 3.1 *Compare and order objects according to their mass*

D. Comprehension of Area



1. Measure area using non-standard units
2. Compare among the non-standard units of measuring area in terms of consistency and accuracy

E. Comprehension of Capacity

1. Measure capacity using non-standard units
2. Compare among the non-standard units of capacity measure in terms of accuracy of measurement

STANDARD 5: *The learner understands and appreciates the relevance of things around him/her: collect, organize and display relevant data.*

V. STATISTICS AND PROBABILITY

1. *Gather data about themselves and their surroundings*
2. *Sort and classify objects according to their attributes*
3. *Reading and interpreting pictograph and bar graphs*
4. *Probability of an event*

**CURRICULUM STANDARDS IN MATHEMATICS II
FOR THE SPECIAL SCIENCE ELEMENTARY SCHOOLS**

EXPECTATIONS: At the end of Grade II, the learner is expected to demonstrate understanding and appreciation of key concepts and skills involving whole numbers up to 1000. Perform addition and subtraction of 3 to 4-digit numbers, understand basic facts of multiplication and division; and apply the concepts learned to solve problems, including money, fractions, measurement, simple geometric figures, pre-algebra concepts, data collection and representation and analysis as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decision in real life.

STANDARD 1: The learner shows a clear understanding of the concept of larger whole numbers including money by displaying proficiency in associating whole numbers with objects around him/her as well as reading and writing these numbers in symbols and in words; understands the concept of the four operations of whole numbers and applies the concept in a variety of problem situations.



I. WHOLE NUMBERS and OPERATIONS

A. Comprehension of Whole Numbers

1. Identify numbers from 101 through 1000
 - 1.1 Associate numbers with sets having 101 up to 500 objects/things
 - 1.2 Associate number with sets having 501 up to 1000 object/things
2. Read and write numbers from 101 through 1000 in symbols and in words
 - 2.1 Give the place value of each digit in a 4-digit number
 - 2.2 Compare numbers using $>$, $<$ and $=$
 - 2.3 Read numbers through 1000 in symbols and in words
 - 2.4 Write numbers through 1000 in symbols and in words
 - 2.5 Write 3-digit numbers in expanded form
3. Round numbers to the nearest tens and hundreds
4. Skip count numbers by 50s up to 1000
5. Read and write ordinal numbers from 11th through 20th objects of given sets from a given point of reference
6. Identify the 11th through 20th objects of given sets from a given point of reference
7. Identify the pattern of naming ordinal numbers e.g. 21st, 22nd, 23rd, 24th, etc.
8. Use the pattern of naming ordinal numbers beyond 20
9. Read and write money value through ₱1000.00
 - 9.1 Read money in symbols through ₱1000.00
 - 9.2 Express money as pesos and centavos through ₱1000.00
 - 9.3 Compare values of the different denominations of coins and paper bills through ₱1000 using the relation symbols
10. Express Roman numbers in equivalent Hindu-Arabic through C (100)
 - 10.1 Read and write Roman numbers through C
 - 10.2 Change Roman Numbers in equivalent Hindu-Arabic through C and vice versa

B. Comprehension of Addition

1. Add 2-to-4-digit numbers with sums up to 9999
 - 1.1 without regrouping
 - 1.2 with regrouping



2. Add 2-to-4-digit numbers with zero in any of the addends without regrouping with sums up to 9999
 - 2.1 without regrouping
 - 2.2 with regrouping
3. Show properties of addition in adding numbers
 - 3.1 Show the commutative property addition
 - 3.2 Show the associative property of addition
4. Add mentally 1-to-2-digit numbers with sum up to 50
5. Application of Addition
 - 5.1 Solve word problems involving addition of whole numbers including money with sums up to 999 without and with regrouping
 - 5.1.1 Analyze the word problem
 - 5.1.1.1 Tell:
 - what is asked
 - what is/are given
 - the word clues
 - the operation to be used
 - 5.1.2 Transform the word problem into a number sentence
 - 5.1.3 Use the correct operation
 - 5.1.4 State the complete answer

C. Comprehension of Subtraction

1. Subtract 2-to-4-digit numbers with minuends up to 9999 without and with regrouping
 - 1.1 Illustrate how subtraction is used when:
 - 1.1.1 taking away from the given set
 - 1.1.2 comparing two sets
 - 1.1.3 finding a missing addend
 - 1.2 Subtract 2-to-4-digit numbers with regrouping
 - 1.2.1 in the tens place without or with zero difficulty
 - 1.2.2 in the hundreds place without or with zero difficulty
2. Use addition to check subtraction
3. Subtract mentally 1-digit number from 1 or 2-digit numbers with minuends up to 50 without regrouping
4. Application of Subtraction
 - 4.1 Solve 1-step word problems involving subtraction of whole numbers including money with minuends up to 9999 without and with regrouping
 - 4.1.1 Analyze the word problem
 - 4.1.1.1 Tell:
 - what is asked
 - what is/are given



- the word clue/s
 - the operation to be used
 - 4.1.2 Transform the word problem into a number sentence
 - 4.1.3 Use the correct operation
 - 4.1.4 State the complete answer
- 5. Application of Addition and Subtraction
 - 5.1 Solve 2-step word problems involving addition and subtraction of 2-to-4-digit numbers including money
 - 5.1.1 Analyze the word problems
 - 5.1.1.1 Tell:
 - what is asked
 - what is/are given
 - the word clue/s
 - the hidden question
 - the operation to be used
 - 5.1.2 Transform the word problem into a number sentence
 - 5.1.3 Use the correct operation
 - 5.1.4 State the complete answer

D. Comprehension of Multiplication

1. Give the factors of a given number
2. Multiply mentally 1-digit numbers with products up to 81 without regrouping
3. Multiply 1-to-2-digit numbers by 1-digit numbers with products up to 81 without regrouping
4. Application of Multiplication
 - 4.1 Solve 1-step word problems involving multiplication of whole numbers including money
 - 4.1.1 Analyze the word problem
 - 4.1.1.1 Tell:
 - what is asked
 - what is/are given
 - the word clue/s
 - the operation to be used
 - 4.1.2 Transform the word problem into a number sentence
 - 4.1.3 Use the correct operation
 - 4.1.4 State the complete answer
5. Identify the zero property of 1 of multiplication
6. Application of Multiplication and any of the Addition/Subtraction
 - 6.1 Solve 2-step word problems involving multiplication of whole numbers including money



E. Comprehension of Division

1. Divide whole numbers with dividends through 81 by 1-digit divisors
 - 1.1 Show division as repeated subtraction
 - 1.2 Identify the parts of a division sentence namely dividend, divisor and quotient
 - 1.3 Illustrate division
 - By partition (including the equal parts of a number)
 - By distribution (finding how many times a number is contained in a given number)
 - As inverse of Multiplication
 - 1.4 Transform a division sentence into multiplication sentence and vice versa
 - 1.5 Divide 1-to-2-digit numbers by 1-digit number with dividends through 81
2. Application of Division
 - 2.1 Solve 1-step word problems involving division of whole numbers with dividends up to 81
 - 2.1.1 Analyze the word problem
 - 2.1.1.1 Tell:
 - what is asked
 - what is/are given
 - the word clue/s
 - the operation to be used
 - 2.1.2 Transform the word problem into a number sentence
 - 2.1.3 Use the correct operation
 - 2.1.4 State the complete answer
3. *Application of Division and Any of the other three fundamental operations*
 - 3.1 *Solve 2-step word problem involving whole numbers including money*
 - 3.1.1 *Analyze the word problem*
 - 3.1.1.1 Tell
 - what is asked
 - what is/are given
 - the hidden question
 - the word clue/s
 - the operation to be used
 - 3.1.2 Transform the word problems into a number sentence
 - 3.1.3 Use the correct operation
 - 3.1.4 State the complete answer



STANDARD 2: The learner displays a clear understanding of unit fractions and enjoys/appreciates applying the concept in separating an object or group of objects and comparing them

II. RATIONAL NUMBERS

A. Comprehension of Fractions

1. Identify unit fractions (e.g. $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, etc.)
2. Read and write unit fractions in symbols and in words
3. Recognize fractional parts of a whole
4. Separate a whole or group of objects into fractional parts
5. Compare unit fractions using relation symbols
6. Adding and Subtracting Similar Fractions
7. Solving Problems Involving Addition and Subtraction of Similar Fractions

STANDARD 3: *The learner analyzes characteristics and properties of two dimensional geometric shapes and develops mathematical arguments about geometric relationships; apply transformations and use symmetry to analyze mathematical situations.*

III. GEOMETRY

A. Comprehension of Shape

1. *Recognize/name two dimensional shapes*
2. *Build/draw two dimensional shapes*
3. *Compare/sort two dimensional shapes according to the number of sides and corners*
4. *Describe attributes and parts of two dimensional shapes*
5. *Investigate and predict the results of putting together and taking apart two-dimensional shapes*
6. *Recognize and apply slides, flips and turns*
7. *Tessellate a surface using triangles and squares*
8. *Recognize and create shapes that have symmetry*
9. *Recognize geometric shapes and structure in the environment and specify their location*

STANDARD 4: *The learner understands the basic concept of measurement and enjoys measuring, describing and estimating by using standard units.*

IV. MEASUREMENT



A. Comprehension of Time Measure

1. Use the calendar to tell the number of
 - 1.1 weeks in a month
 - 1.2 days in a month
 - 1.3 months in a year
 - 1.4 weeks in a year
 - 1.5 days in a year
2. Determine the number of days in a given number of
 - Weeks
 - Months
 - One year
3. Compare the digital clock and analog clock (with minute and hour hands)
4. Read and write time as shown in a clock
5. Solve simple word problems involving time without and with conversion of standard units
6. *Solve simple word problems involving time with conversion of standard units*

B. Comprehension of Linear Measure

1. *Recognize attributes of length*
2. Make measurement using standard units of linear measure e.g. centimeter, meter
3. Approximate measurement of length, width, height and distance
4. *Compare and order objects according to length*

C. Comprehension of Mass Measure

1. Make measurement using standard units of mass measure (e.g. centimeter, meter)
2. Convert standard units of mass measure to lower or higher units
3. Approximate measurement of mass
4. Investigate accuracy in measuring mass and quantity of things bought (e.g. knowledge in using the weighing scale)

D. Comprehension of Capacity

1. Make measurement using standard units of capacity measure e.g. liter, milliliter
2. Convert standard units of capacity measure to lower or higher units
3. Approximate measurement of capacity



E. Comprehension of Area

1. Find the area of a given figure using square units
 - 1.1 Visualize plane figures and square units
 - 1.2 Tell the number of square units covering a given area
2. Solve word problems involving area

STANDARD 5: The learner understands and appreciates the relevance of things around him/her, collect, organize and display relevant data.

V. STATISTICS AND PROBABILITY

1. *Formulate questions and gather data about their surroundings*
2. *Sort and classify objects according to their attributes and organize data about the objects*
3. *Represent data using concrete objects and pictures*
4. *Probability of an Event*

CURRICULUM STANDARDS IN MATHEMATICS III FOR THE SPECIAL SCIENCE ELEMENTARY SCHOOLS

Expectations: At the end of Grade III, the learner is expected to demonstrate understanding and appreciation of key concepts and skills involving whole numbers up to 100 000. Perform the four fundamental operations of whole numbers; and apply the concepts learned in solving problems, including money, fractions, measurement, simple geometric figures graphs, maps, the use of calculator, pre-algebra concepts, data collection and representation and analysis as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decision in real life.

WHOLE NUMBERS AND OPERATIONS



Standard 1: *The learner comprehends the concept of whole numbers, place value and derives satisfaction in counting, rounding, comparing and using them in real-life situation.*

A. Comprehension of Whole Numbers

1. Read and write numbers from 1001 through 100 000 in symbols and in words
 - 1.1 Identify cardinal numbers
 - 1.1.1 1 001 through 10 000
 - 1.1.2 10 001 through 10 000
 - 1.2 Give the place value of each in 4 to 5-digit numbers
 - 1.3 Read numbers from 1001 through 100 000 in symbols and in words
 - 1.4 Write numbers from 1001 through 100 000 in symbols and in words
 - 1.5 Write 4 to 5-digit numbers in expanded form
 - 1.6 Express the relationship of numbers using expressions “less than” “greater than” and “equal to” ($>$ $<$ $=$)
2. Round number to the nearest thousands and ten thousands
 - 2.1 *nearest tens and hundreds*
 - 2.2 *nearest thousands and ten thousands*
3. Tell when a number is odd or even
4. Read and write money in symbols through ₱10 000.00
 - 4.1 Read money value in symbols through ₱10 000.00
 - 4.2 Write money value in symbols through ₱10 000.00
 - 4.3 *Compare values of the different denominations of coins and bills through ₱10 000.00 using expression “less than”, “greater than” and “equal to” ($>$, $<$, $=$)*
5. Express Roman numbers through M in Hindu-Arabic symbols and vice-versa
 - 5.1 Read and write the value of Roman numbers in Hindu-Arabic and vice-versa
 - 5.1.1 I to L
 - 5.1.2 L to C
 - 5.1.3 D to M

Standard 2: *The learner shows high improvement in performing the basic operations of whole numbers through the correct use of*



regrouping, estimating, mental computation and apply them in daily life-situation.

B. Comprehension of Addition

1. Add 4 to 5-digit numbers up to four addends with sums up to 99 999
 - 1.1 Without regrouping
 - 1.2 With regrouping in
 - 1.2.1 Tens and hundreds places
 - 1.2.2 Thousands and ten thousands places
2. Show the zero/identity property of addition
3. *Estimate the sums of 4 to 5-digit addends including money*
4. Add mentally 1 to 2-digit numbers with sums up to 100 without regrouping
5. Application of Addition
 - 5.1 Solve word problems involving addition of whole numbers with sums up to 99 999 including money following the steps in problem solving
 - 5.2 Solve mentally 1 step word problems involving addition with sums up to 100 without regrouping

C. Comprehension of Subtraction

1. Subtract 3 to 4 digit numbers from 4 to 5-digit numbers with minuends up to 99 999 without and with regrouping and with zero difficulty
 - 1.1 Subtract 3 digit numbers from 4 to 5-digit numbers with minuends up to 99 999 without regrouping
 - 1.2 Subtract three to four-digit numbers from four to five-digit numbers with regrouping
 - 1.2.1 in thousands place
 - 1.2.2 in the ten thousands place
 - 1.2.3 with zero difficulty
2. *Estimate the difference of two numbers with 3 to 4-digits including money*
3. Subtracts mentally 2-digit numbers with minuends up to 99 without regrouping
4. Application of Subtraction
 - 4.1 Solve 1-step word problems involving subtraction of whole numbers including money with minuends up to 99 999 without and with regrouping following the steps in problem solving
 - 4.2 Solve mentally 1-step word problems involving subtraction without regrouping



- 4.3 Solve 2-step word problems involving addition and subtraction of whole numbers including money following the steps in solving 2-step problems

D. Comprehension of Multiplication

1. *Differentiate the prime and composite numbers*
 - 1.1 *identify prime and composite numbers*
2. Show that changing the order and/or regrouping in multiplication makes computation easy (commutative/associative)
3. *Multiply 2 to 4-digit numbers by 1 to 2-digit numbers without and with regrouping in all places*
 - 3.1 Multiply 2 to 4-digit numbers without and with regrouping
 - 3.1.1 Multiply 2 to 4-digit numbers by 1 to 2-digit numbers without regrouping
 - 3.1.2 Multiply 2 to 4-digit numbers by 1 to 2-digit numbers with regrouping
 - 3.1.3 Multiply 2 to 4-digit numbers by 1-digit numbers with zero in the multiplicand
 - 3.1.4 Multiply 2 to 4-digit numbers by multiples of 10 and 100
4. Estimate the product of 2 to 4-digit factors by 1 to 2-digit factors
5. Multiply mentally 2-digit numbers by 1-digit numbers without regrouping with products up to 100
6. Application of Multiplication
 - 6.1 Solve word problems involving multiplication of whole numbers including money following steps in problem solving
 - 6.2 Solve 2-step word problems involving multiplication as well as addition/subtraction including money following the steps in solving 2-step problems

E. Comprehension of Division

1. Divide 2 to 4-digit numbers by 1 to 2-digit numbers without or with remainder and with zero difficulty
 - 1.1 Show the renaming 2 to 3-digit numbers help make computation easy
 - 1.2 Divide 2 to 3-digit numbers by 1-digit number without remainder
 - 1.3 Divide 2 to 3-digit numbers by 1-digit number with remainder
 - 1.4 Divide 2 to 3-digit numbers by multiples of 10 up to 90
 - 1.5 Divide 2 to 3-digit numbers by 1 to 2-digit numbers with zero difficulty
 - 1.6 Divide 3 to 4-digit numbers by 1 to 2-digit numbers without or with remainder and with zero difficulty
2. Divide multiples of 5 by 5.
3. Divide multiples of 10 by 10 and 100



4. Estimate the quotient of 2 to 4-digit numbers by 1 to 2-digit numbers
5. Divide mentally 2-digit numbers through 99 by 1-digit numbers without remainder
6. Application of Division
 - 6.1 Solve 1-step word problem involving division of 2 to 4-digit numbers by 1 to 2-digit numbers including money following the step in solving problems
 - 6.2 Solve two-step word problems involving division and anyone of the fundamental operation including money following the steps in solving 2-step problems
 - 6.3 Solve three-step word problems involving division and any two of the other fundamental operations including money following the steps in solving 2-step problems.

Standard 3: *The learner understands the concepts of fractions, basic kinds of fractions and decimals including money and enjoys simplifying, ordering and relating them in day to day situation.*

I. Rational Numbers

A. Comprehension of Fractions

1. Order fractions less than one/equal to one/more than one
 - 1.1 Identify fractions less than one
 - 1.2 Identify fractions equal to one
 - 1.3 Comprehend fractions more than one
 - 1.3.1 Recognize fractions more than one
 - 1.3.2 Separate group of objects to show fractions more than one
 - 1.3.3 Read and write fractions more than one in symbols and words
 - 1.4 Order fractions less than one/equal to one/more than one with the same denominator
2. Change fractions to lowest terms
 - 2.1 Identify equivalent fractions
 - 2.2 Find the greatest common factor (GCF) of 2 given number
 - 2.3 Reduce fractions to lowest terms
3. Find the fractional part of set/regions (e.g. $\frac{1}{3}$ of 12)
4. *Identify proper fractions/ improper fraction from a given set of fractions.*
5. *Order similar fractions written in different forms from least to greatest and vice-versa*



B. Decimals and Money

1. Read and write fractions with ten as denominators in decimals through tenths
 - 1.1 Visualize fractions with ten as denominators as decimals
 - 1.2 Read and write decimals through tenths
 - 1.3 Compare decimals through tenths
2. Express money as pesos and centavos

Standard 4: *The learner shows understanding of the concept of lines, line segment, angles, plane figures, tessellation, symmetry, and finds satisfaction in constructing and relating to things in their environment.*

II. Geometry

A. Comprehension of Line, Line Segment and Angle

1. Distinguish perpendicular, parallel and intersecting lines
 - 1.1 Visualize perpendicular, parallel and intersecting lines
 - 1.2 Identify perpendicular, parallel and intersecting lines
2. Illustrate congruent line segments
 - 2.1 Visualize congruent line segments
 - 2.2 Identify congruent line segments
 - 2.3 Draw congruent line segments
3. Comprehension of Angles
 - 3.1 Visualize right angle, obtuse angle and acute angle
 - 3.2 Describe right angle, obtuse angle and acute angle
 - 3.3 Name/Identify right angle, obtuse angle and acute angle
4. Draw right angle, obtuse angle and acute angle

B. Comprehension of Plane Figures

1. Describe square, rectangle, triangle and circle
2. Identify square rectangle triangle and circle
 - 2.1 identify quadrilaterals

C. Comprehension of symmetry and Tessellation

1. Form simple symmetrical designs out of given shapes
2. Describe a turn, flip or slide
3. Determine which motion: turn, flip or slide creates a given tessellation
4. Create a tessellation by turning, flipping or sliding a shape



Standard 5: *The learner extends his/her understanding on the concept and application of time, area, mass and capacity measures and appreciates using them to solve daily life problems.*

III. Measurement

A. Comprehension of Linear Measure

1. *Recognize attributes of length*
2. *Select the appropriate type of unit for measuring length*
3. *Carry out simple unit conversions; such as from centimeters to meters and vice versa, within the system for measurement*
4. *Select and apply appropriate standard units and tools to measure length*

B. Comprehension of Time Measure

1. Convert time measure from smaller to larger units and vice-versa
 - 1.1 days to years, years to days
 - 1.2 seconds to minutes, minutes to hours, hours to day
2. Find the exact time between
3. Application of time measure
 - 3.1 Solve 1 step word problems involving time measure following the steps in problem solving

C. Comprehension of Area

1. Find the area of a figure in square meters
 - 1.1 Visualize the area of a rectangle
 - 1.2 Visualize the area of a square
 - 1.3 Derive a formula to compute the area of a rectangle/ square
2. Application of concept of area
 - 2.1 Solve word problems involving area of rectangle/square following the steps in problem solving

D. Comprehension of Mass

1. *Find the mass using standard units of measure (e.g. kilograms, grams)*
2. *Convert mass measure from smaller to larger units and vice-versa*
3. *Application of measurement of mass*
 - 3.1 *Solve word problems involving mass measure following the steps in problem solving.*

E. Comprehension of Capacity

1. Find capacity using standard units of measure, e.g. liter (L), milliliter (mL)



2. Convert capacity measure from smaller to larger units and vice-versa
3. Application of measurement of capacity
 - 3.1 Solve word problems involving capacity measure following the steps in problem solving

Standard 6: *The learner shows appreciation of the pictograph through reading, interpreting and organizing data*

IV. Graphs

A. Comprehension of Pictograph

1. Interpret data presented in a pictograph
 - 1.1 Name the following parts of a pictograph
 - a. title
 - b. legend
 - c. labels
 - 1.2 Interpret the legend
2. Construct pictograph
 - 2.1 Organize data in a pictograph

Standard 7: *The learner understands primary and secondary directions and applies the concepts learned in reading and interpreting maps.*

V. Maps

A. Comprehension of Maps

1. Name four primary directions
2. Name four secondary directions
3. Tell the position of objects/places in a given map given a certain point of reference

Standard 8: The learner understands and appreciates the relevance of things around him/her, collect, organize and display relevant data.

VI. Statistics

1. Collect data using observations
2. Represent data using pictographs
3. Probability



Standard: *The learner begins to recognize the basic parts of a calculator and appreciates its functions.*

VII. Introduction to Calculator

A. Comprehension of Calculator

1. Identify the parts of a calculator
2. Tell the function of each part of a calculator
3. Solve simple problems using a calculator

**CURRICULUM STANDARDS IN MATHEMATICS IV
FOR THE SPECIAL SCIENCE ELEMENTARY SCHOOLS**

EXPECTATION

At the end of Grade IV, the learner is expected to demonstrate understanding and appreciation of key concepts and skills involving whole numbers up to millions and billions. Perform the exact and estimated computation on the four fundamental operations; and apply the concepts



learned to solve problems, decimals including money, ratio, angles, fractions, ratio, angles, plane figures like squares, rectangle, and triangle, measurement (perimeter, area of triangle, parallelogram and trapezoids, volume of cubes and rectangular prisms, pre-algebra concepts, data collection, representation and analysis as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decision in real life.

1.

Standard 1: *The learner shows mastery of the concept of whole numbers and enjoys giving the place value and rounding numbers*

I. WHOLE NUMBERS and OPERATIONS

A. Comprehension of Whole Numbers

1. Read and write numbers through millions in symbols and in words
 - 1.1 Identify numbers from 100 001 through millions/billions
 - 1.2 Give the place value of each digit in a 6 or more digit numbers
 - 1.3 Read and write numbers through millions/billions in symbols
 - 1.4 Read and write numbers through millions/billions in words
2. Round off numbers to the nearest
 - 2.1 Tens, hundreds, thousands
 - 2.2 Ten thousands, hundred thousands
 - 2.3 Millions, ten millions, hundred millions, billions

Standard 2: *The learner shows mastery of the four operations, estimation, exact and mental computations involving whole numbers and exhibits confidence in solving problems*

B. Comprehension of Addition

1. Add 6 more or more digit numbers with 4 or more addends with sums through billions
 - 1.1 without regrouping
 - 1.2 with regrouping in any two or more places, all places
2. Show the properties of addition
 - 2.1 Commutative Property
 - 2.2 Associative Property
 - 2.3 Identity Property
3. Estimate the sum of 4 or more addends with 6 or more digits



4. Add mentally 2 to 3-digit numbers with sums up to 300 without regrouping
5. Application of Addition
 - 5.1 Solve word problems involving addition of whole numbers including money with sums through millions and billions without and with regrouping following the steps in problem solving
 - 5.2 Solve mentally 1-step word problems involving addition with sums up to 300 without regrouping

C. Comprehension of Subtraction

1. Subtract 5 or more digit numbers from 6 or more digit numbers without and with regrouping in any or all places and involving three or more zeros *both in the minuend and subtrahend*.
 - 1.1 Subtract 5 or more digit numbers from 6 or more digit numbers without regrouping
 - 1.2 Subtract 5 or more digit numbers from 6 or more digit numbers with three continuous or non-continuous zeros in both minuends and subtrahend and with regrouping in any or all places
 - 1.3 Estimate the difference of two numbers with four to six digits
2. Subtract mentally numbers with minuends up to 300 without regrouping
3. Application of Subtraction
 - 3.1 Solve 1-step word problems involving subtraction of whole numbers including money without and with regrouping following the steps in problem-solving
 - 3.2 Solve mentally 1-step word problems involving subtraction without regrouping
4. Application of Addition and Subtraction
 - 4.1 Solve 2-step word problems involving addition and subtraction including money following the steps in solving 2 step problems

D. Comprehension of Multiplication

1. Show the properties of multiplication
 - Zero Property
 - Identity Property
 - Distributive Property of Multiplication over Addition
2. Multiply 5 or more digit factors by 3 to 5-digit factors without and with regrouping and with zero in any of the factors
 - 2.1 Multiply 5 or more digit factors by 3 to 5-digit factors without regrouping



- 2.2 Multiply 5 or more digit factors by 3 to 5-digit factors with regrouping
- 2.3 Multiply 5 or more digit factors having one to three zeros in both factors without and with regrouping
- 2.4 Multiply 5-digit or more factors by multiples of 10, 100 and 1000
- 3. Estimate the products of two factors with 5 or more digits by 2 to 3-digit number
- 4. Multiply mentally 2-digit numbers with products up to 200 without regrouping
- 5. Application of Multiplication
 - 5.1 Solve word problems involving multiplication of whole number including money following the steps in problem-solving
 - 5.2 Solve 2-step word problems involving multiplication and any of addition/subtraction following the steps in solving 2-step word problems

E. Comprehension of Division

- 1. Divide 5 or more digit numbers by 3 or more digit numbers without or with remainder and with zero difficulty
 - 1.1 Divide 5 or more digit number by 3 or more digit numbers without remainder
 - 1.2 Divide 5 or more digit numbers by 3 or more digit numbers with remainder
 - 1.3 Divide 5 or more digit numbers by 3 or more digit numbers with zeros in the middle or continuous zero in the dividend
- 2. Divide multiples of 10 by 10 or 100 or 1000
- 3. Estimate the quotient of 5 or more digit dividends by 3 or more numbers.
- 4. Divide mentally 2-3 digit numbers by 1-digit numbers without remainder
- 5. Application of Division
 - 5.1 Solve 1-step word problems involving division of 5 or more digit numbers including money following the steps in problem-solving
 - 5.2 Solve 2 to 3-step word problems involving division and any one or two of the other fundamental operations learned including money following the steps in solving 2-step word problem

STANDARD 3: *The learner understands the concept of decimals and money and enjoys reading and writing, rounding, renaming and giving the place value of decimals;*



demonstrates understanding of addition and subtraction of decimals and applies them in problem solving; understands differentiating, ordering and renaming fractions and enjoys using the knowledge in everyday life situation; and performs addition, subtraction and multiplication of fractions and applies them to solve everyday life problems

II. RATIONAL NUMBERS

A. Comprehension of Factors and Multiples

1. Identify/list all the factors of a given number
2. Determine the common factors of given numbers in a set
3. Identify the Greatest Common Factor (GCF) from the common factors of given numbers in a set
4. Identify/list the common multiples of given numbers in a set
5. Find the Least Common Multiple (LCM) of given numbers in a set.

B. Comprehension of Fractions

1. Differentiate fractions including those with denominators of 10 and 100
 - 1.1 Identify proper fraction/improper fraction/mixed forms from a given set of fractions including those with denominators of 10 and 100
 - 1.1.1 Identify Fractions using regions, sets and number line
 - 1.1.2 Use fraction to represent division
 - 1.2 Identify similar and dissimilar fractions from a given set of fractions
2. Order similar fractions written in different forms from least to greatest and vice-versa
3. Change improper fraction to mixed forms and vice-versa
4. Change one (1) whole to fraction form and vice-versa
5. Rename decimals to fractions and vice-versa
6. Change fractions to lowest terms
 - 6.1 Find the greatest common factor (GCF) of the given set of numbers
 - 6.2 Reduce fractions to lowest terms

C. Comprehension of Addition and Subtraction of Fractions

1. Add similar fractions and whole numbers without regrouping
 - 1.1 Visualize addition of similar fractions
 - 1.2 Add similar fractions



- 1.3 Add fraction and a whole number
- 1.4 Add dissimilar fractions
- 1.5 Add mixed numbers and proper fractions
- 1.6 Add mentally similar fractions
- 2. Subtract similar fractions without regrouping
 - 2.1 Visualize subtraction of similar fractions
 - 2.2 Subtract similar fractions
 - 2.3 Subtract a fraction from a whole number
 - 2.4 Subtract dissimilar fractions
 - 2.5 Subtract mixed numbers (with proper fractions)
 - 2.6 Subtract mentally similar fractions
- 3. Application of addition and subtraction of fractions
 - 3.1 Solve word problems involving addition of similar fractions without regrouping following the steps in problem solving
 - 3.2 Solve word problems involving subtraction of similar fractions without regrouping following the steps in problem solving
 - 3.3 Solve 2-step word problems involving addition and subtraction of fractions.

D. Comprehension of Multiplication of Fractions

- 1. Multiply fractions
 - 1.1 Visualize multiplication of fractions (visual models)
 - 1.2 Find a fractional part of a number
 - 1.2.1 Translate expressions such as:
$$\frac{1}{2} \square \frac{2}{3}$$
 - 1.3 Multiply a fraction by another fraction
 - 1.4 Multiply whole number by a fraction
 - 1.5 Multiply mixed number by a fraction
- 2. Application of Multiplication
 - 2.1 Solve word problems involving multiplication of fractions following the steps in problem solving
 - 2.2 Solve 2 step word problems involving multiplication and either addition or subtractions of fractions

E. Comprehension of Decimals and Money

- 1. Read and write common fractions in decimal form through hundredths
 - 1.1 Visualize common fractions as decimals using models like blocks, grid and money



- 1.2 Write common fractions in decimal forms
- 1.3 Read and write decimal numbers through hundredths
- 1.4 Rename fractions whose denominators are 10 and 100 in decimal form and vice versa
- 1.5 Give the place value of each digit of a given decimal through hundredths
2. Express money as pesos/centavos
3. Round decimal to the nearest tenths/hundredths

F. Comprehension of Addition and Subtraction of Decimals

1. Add and Subtract decimals through hundredths without and with regrouping
 - 1.1 Add decimals through hundredths without and with regrouping
 - 1.2 Subtract mixed decimals with regrouping
2. Add and subtract mixed decimals with regrouping
 - 2.1 Add mixed decimals with regrouping
 - 2.2 Subtract mixed decimals with regrouping
3. Application of addition and subtraction of decimals
 - 3.1 Solve word problems involving either addition or subtraction of decimals including money following the steps in problem solving
 - 3.2 Solve 2-step word problems involving addition and subtraction of decimals including money following the steps in solving 2-step problems

G. Comprehension of Multiplication of Decimals

1. *Multiply decimals*
 - 1.1 *Visualize multiplying tenths by tenths*
 - 1.2 *Multiply tenths by tenths*
 - 1.3 *Multiply mixed decimals with tenths by whole numbers and vice versa*
 - 1.4 *Multiply mixed decimals with tenths*
2. *Solve problems involving decimals*
3. *Solve 2-step word problems involving multiplication and either addition or subtraction of decimals*

Standard 3: *The learner understands the concept of perpendicular, parallel, intersecting and congruent lines and line segments, angles and plane figures like square, rectangle and triangles, symmetry and tessellations; enjoys constructing and exploring similar objects around him/her.*



III. GEOMETRY

A. Comprehension of Line and Line Segment

1. Distinguish perpendicular, parallel and intersecting lines
 - 1.1 Visualize perpendicular, parallel and intersecting lines
 - 1.2 Identify perpendicular, parallel and intersecting lines
2. Illustrate congruent lines and line segments
 - 2.1 Visualize congruent lines
 - 2.2 Illustrate congruent lines
 - 2.3 Visualize congruent line segments
 - 2.4 Illustrate congruent line segments

B. Comprehension of Angles and Plane Figures

1. Describe different kinds of angles
 - 1.1 Visualize different kinds of angles
 - 1.2 Identify parts of an triangle
 - 1.3 Find the total interior angle of a triangle
 - 1.4 Name different kinds of angles such as: right angle, acute angle and obtuse angle
 - 1.5 Classify angles as right angle, acute and obtuse
 - 1.6 Identify congruent angles
 - 1.7 Draw congruent angles
2. Describe plane figures according to their attributes
3. Illustrate three or four-sided plane figures using ruler and protractor

C. Comprehension of Symmetry and Tessellations

1. Form a simple symmetrical designs out of given shapes
2. Describe a turn, a flip or slide
3. Determine which motion: turn, flip or slide creates a given tessellation.
4. Create a tessellation by turning, flipping or sliding a shape

Standard 4: *The learner understands the attributes of perimeter, area, volume, circumference and enjoys measuring, comparing, approximating and applying the formulas in solving variety of problems.*

IV. MEASUREMENT

A. Comprehension of Perimeter

1. Find the perimeter of polygons



1.1 Find the perimeter of polygons

- triangle
- quadrilateral
- pentagon, etc.

2. Derive a formula for finding the perimeter of regular polygons
3. Find the perimeter of irregular polygons
4. Application of perimeter
 - 4.1 Solve word problem involving circumference measures following the steps in problem solving

B. Comprehension of Area

1. Find the area of square, rectangle, parallelogram and triangle in square meter/centimeter
 - 1.1 Visualize the area of a parallelogram and triangle
 - 1.2 Derive a formula for finding the area of a:
 - 1.2.1 parallelogram
 - 1.2.2 triangle
 - 1.3 Find the area of a parallelogram and triangle
2. Solve word problems involving area of parallelograms and triangles following the steps in problem solving

C. Comprehension of Volume and Capacity

1. Make measurement using non-standard units:
 - cubes, rectangular prism
 - marbles, etc.
2. Compare among the non-standard units of measuring volume in terms of consistency and accuracy
3. Approximate measurement of volume
4. *Find capacity using standard unit of measure (e.g. liter, milliliter)*
5. *Application of measurement of volume and capacity*
 - 5.1 *Solve word problems involving measurement of volume and capacity*

Standard 5: *The learner shows appreciation of the bar graph through reading, interpreting, constructing and finding average data.*

V. GRAPHS AND MAPS

A. Comprehension of Bar Graphs

1. Read and interpret data presented in a bar graph



- 1.1 Read the following parts of a bar graph (vertical and *horizontal bar graphs*)
 - a. title
 - b. legend
 - c. labels
- 1.2 Interpret bar graphs
2. Construct bar graphs (vertical and horizontal graphs)
 - 2.1 Organize data in a bar graph
 - 2.2 Construct a bar graph for a given data (vertical or horizontal)
3. Find the average data presented in a bar graph

B. Comprehension of Maps

Standard 6: *The learner understands simple statistics through gathering data and organizing data on a table; collects data using interviews and surveys; and represents data using tables and bar graphs.*

VI. STATISTICS

- A. *Comprehension of Statistics*
 1. *Gather data using interviews and surveys*
 2. *Organize data in a table*
 - 2.1 *Construct frequency table/distribution for the given data*
 3. *Represent data using bar graphs*

CURRICULUM STANDARDS IN MATHEMATICS V FOR THE SPECIAL SCIENCE ELEMENTARY SCHOOLS

Expectation

At the end of Grade V, the learner is expected to demonstrate understanding and appreciation of key concepts and skills involving whole numbers, decimals including money, ratio and proportion, percent,



fractions, geometry (circles and five or more-sided polygons), measurement (circumference, area of circle, volume of cubes and rectangular prisms, temperature) and graphs. Have understood the concepts of statistics, probability, pre-algebra, data collection, representation and analysis as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decision in real life.

Standard 1: *The learner understands the meaning and concepts of order of operations: Parenthesis, Exponents, Multiplication, Division, Addition and Subtraction, (PEMDAS) of whole numbers and performs standard numerical operations in varied ways of relating them to a variety of whole numbers.*

I. WHOLE NUMBERS and OPERATIONS

1. Review
 - 1.1 Place Value/Value
 - 1.2 Rounding Numbers
 - 1.3 Properties of Addition and Multiplication
 - 1.4 Differentiate prime and composite numbers
 - 1.5 Find the prime factors of given numbers
 - 1.6 Give the common factors of given set of numbers
 - 1.7 Find the common multiples and least common multiple (LCM)
2. *Order of Operations of Whole Numbers through Parentheses, Exponents, Multiplication, Division, Addition and Subtraction (PEMDAS)*
 - 2.1 Give the meaning of exponent and base
 - 2.2 Give the value of numbers written with exponents
 - 2.3 Analyze and interpret PEMDAS rules correctly
 - 2.4 Perform two-to-three different operations on whole numbers without or with exponents
 - 2.5 Perform two-to-three different operations on whole numbers without or with parentheses
3. *Application of the Order of Operations in Solving Two-step Word Problems*
 - 3.1 Solve 2-step word problems involving whole numbers following the steps in problem solving
4. *Divisibility Rules*
 - 4.1 Determine numbers which are visible by 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11



Standard 2: *The learner shows understanding of the concept of rational numbers, ways of representing rational numbers, relationships among rational numbers and rational number system; shows mastery of performing the basic operations of rational numbers and makes use of this knowledge to solve problems.*

II. RATIONAL NUMBERS

1. Comprehension of Fractions

- 1.1 Review concepts of fractions and kinds of fractions
- 1.2 Change dissimilar fractions to similar fractions
 - 1.2.1 Visualize changing dissimilar fractions to similar fractions
- 1.3 Change mixed numbers to improper fractions and vice versa
- 1.4 Identify equal fractions using common denominators or “cross-product”
- 1.5 Form equivalent fractions
- 1.6 Solve for the missing term in a pair of equivalent fractions
- 1.7 Reduce fractions to lowest terms/express fractions to higher terms
- 1.8 Compare fractions in simple and mixed forms using
 - 1.8.1 Visual reasoning and renaming to similar fractions
 - 1.8.2 Cross product method
 - 1.8.3 LCD method
- 1.9 Order dissimilar fractions in simple and mixed forms in ascending or descending order
- 1.10 Estimate fractions close to 0, $\frac{1}{2}$, or 1.

2. Comprehension of Addition of Fractions

- 2.1 Add similar and dissimilar fractions in mixed forms without and with regrouping
 - 2.1.1 Visualize addition of dissimilar fractions (using concrete and visual/pictorial models)
 - 2.1.2 Estimate sums of fractions in simple form without regrouping
 - 2.1.3 Add dissimilar fractions
 - 2.1.4 Add dissimilar fractions and whole numbers
 - 2.1.5 Add dissimilar fractions and mixed number
 - 2.1.6 Add mentally two fractional units with dissimilar denominators

3. Application of Addition of Fractions



3.1 Solve one-step word problems involving addition of fractions in simple or mixed forms without or with regrouping

4. Comprehension of Subtraction of Fractions

4.1 Subtract similar fractions in simple and mixed forms without and with regrouping

4.1.1 Visualize subtraction of fractions in simple and mixed forms (using concrete and visual/pictorial models)

4.1.2 Estimate differences of fractions in simple and mixed forms

4.1.3 Subtract whole numbers from mixed forms without and with regrouping

4.1.4 Subtract mixed numbers from whole numbers without and with regrouping

4.1.5 Subtract mixed numbers from mixed numbers without and with regrouping

4.1.6 Subtract mentally similar fractions in simple and mixed forms

4.2 Subtract dissimilar fractions without and with regrouping

4.2.1 Subtract dissimilar fractions in simple form from mixed numbers without and with regrouping

4.2.2 Subtract mixed number from mixed number without and with regrouping

5. Application of Subtraction of Fractions

5.1 Solve one-step word problems involving subtraction of fractions following the steps in solving problems

6. Application of Addition and Subtraction of Fractions

6.1F Solve two-step word problems involving addition and subtraction of fractions following the steps in problem solving

7. Comprehension of Multiplication of Fractions

7.1 Visualize multiplication of fractions in simple and mixed forms (using visual/pictorial models)

7.2 Multiply fractions

7.2.1 Whole number by a fraction and vice versa

7.2.2 Mixed form by a fraction or vice versa

7.2.3 Mixed form by a mixed form

7.3 Multiply mentally fractional units

8. Application of Multiplication of Fractions



- 8.1 Solve one-step word problems involving multiplication of fractions
- 8.2 Solve two-step word problems involving multiplication and either addition or subtraction of fractions following the steps in problem solving

9. Comprehension of Division Fractions

- 9.1 *Visualize division of whole numbers by a fraction; a fraction by another fraction*
- 9.2 *Divide a fraction in simple form by a fraction*
- 9.3 *Divide a whole number by a fraction in simple form and vice versa*

10. Application of Division of Fractions

- 10.1 *Solve one-step word problems involving division of fractions*
- 10.2 *Solve two-to-three step word problems involving all operations of fractions following the steps in problem solving*

11. Comprehension of Decimals

- 11.1 Visualize thousandths
 - 11.1.1 Name the decimal for a given model (regions/blocks, money, number line or grid)
- 11.2 Rename fractions whose denominators are powers of 10 in decimal form and vice versa
- 11.3 Give the place value and value of a digit in a decimal number
- 11.4 *Round decimals to the nearest tenths, hundredths and thousandths*
- 11.5 *Read and write decimals through thousandths in different notations*
 - 11.5.1 *standard notation*
 - 11.5.2 *expanded notation*
 - 11.5.3 *scientific notation*
- 11.6 *Compare and order decimals in tenths, hundredths and Thousandths*

12. Comprehension of Addition and Subtraction of Decimals

- 12.1 Add decimals through thousandths without and with regrouping
- 12.2 Add mixed decimals without and with regrouping
- 12.3 Add mixed decimals and whole numbers without and with regrouping
- 12.4 Subtract decimals through thousandths without and with regrouping
- 12.5 Subtract mixed decimals from whole numbers without and



with regrouping
12.6 Subtract mixed decimal from mixed decimals without and
with
Regrouping

13. Application of Addition and Subtraction of Decimals

- 13.1 Solve one-step word problems involving either addition or subtraction of decimals including money
- 13.2 Solve two-step word problems involving addition and subtraction of decimals including money

14. Comprehension of Multiplication of Decimals

- 14.1 Visualize multiplication of decimals using models
- 14.2 Multiply tenths by another tenth
- 14.3 Multiply hundredths by tenths and vice-versa
- 14.4 Multiply mixed decimals with tenths and hundredths by whole number
- 14.5 Multiply mixed decimals by mixed decimals with tenths and hundredths
- 14.6 Multiply one-to-three digit factors by one-to-two digit factors in whole numbers and decimals without and with regrouping
- 14.7 Multiply decimals mentally by 0.1, 0.01, and 0.001

15. Application of Multiplication of Decimals

- 15.1 Solve one-step word problems involving multiplication of decimals including money
- 15.2 Solve two-step word problems involving multiplication and either addition or subtraction of decimals including money

16. Comprehension of Division of Decimals

- 16.1 Visualize division of decimals using visual models
- 16.2 Divide decimals by decimals through hundredths
- 16.3 Divide decimals by whole numbers
- 16.4 *Estimate quotients of whole numbers and decimals*
- 16.5 *Divide two-to-four digit decimals by one-to-two digit decimals*
- 16.6 *Divide two-to-four digit whole numbers by one-to-two digit decimals*

17. Application of Division of Decimals

- 17.1 Solve one-step word problems involving division of decimals
- 17.2 *Solve two-to-three step word problems involving division and anyone or two of the other 3 operations involving decimals including money*



18. Comprehension of Ratio and Proportion

- 18.1 Express the ratio of two quantities
 - 18.1.1 Visualize ratio of two given set of objects
 - 18.1.2 Express the ratio of two numbers by using either colon (:) or a fraction (a/b)
- 18.2 Reduce ratios to lowest terms
- 18.3 Identify equivalent ratios
- 18.4 Find the missing term in a proportion

19. Application of Ratio and Proportion

- 19.1 Solve word problems involving ratio and proportion*

20. Comprehension of Percent

- 20.1 Relate fractions, ratios, decimals and percent
 - 20.1.1 Visualize the meaning of percent
 - 20.1.2 Give the relationship
 - 20.1.2.1 between fractions, ratios and percent using visual models
 - 20.1.2.2 between percent and decimals using visual models
 - 20.1.2.3 among fractions, ratios, decimals and percent
- 20.2 *Write fractions and decimals as percent and vice versa*
- 20.3 *Give the meaning of the elements used in percent (Rate, Base and Percentage)*

21. Application of Percent

- 21.1 *Solve the three types of problems involving percent*
 - 21.1.1 *Finding a certain percent (percentage) of a number*
 - 21.1.2 *Finding what percent (rate) a number is of another number*
 - 21.1.3 *Finding the number (base) when a certain percent of it is given*

Standard 3: *The learner analyzes characteristics of lines, rays, angles, circles and two-to-three dimensional figures and develops mathematical arguments about geometric relationships; and appreciates similar things around him/her.*

III-GEOMETRY



1. Comprehension of Adjacent and vertical angles; complementary and supplementary angles

- 1.1 Describe adjacent angles, vertical angles, complementary and supplementary angles
- 1.2 Name pairs of adjacent angles; vertical angles; complementary angles and supplementary angles

2. Comprehension of Polygons, Congruent Polygons, Similar Polygons and Circles

- 2.1 Describe the five or more sided polygons
- 2.2 Identify the five or more sided polygons
- 2.3 Illustrate five-or-more sided polygons
- 2.4 Describe congruent and similar polygons
 - 2.4.1 Visualize/ identify congruent polygons
 - 2.4.2 Describe a motion or a series of motions that will show that two shapes are congruent
 - 2.4.3 Visualize/identify similar polygons
 - 2.4.4 Construct similar polygons
- 2.5 Describe a circle
 - 2.5.1 Visualize a circle
 - 2.5.2 Identify the terms associated with circle (radius, diameter, etc.)
 - 2.5.3 Illustrate circles with different radii

3. Comprehension of Spatial Figures (Cubes and Prisms)

- 3.1 Visualize a cube, rectangular prism and triangular prism
- 3.2 Describe a cube, rectangular prism and triangular prism
- 3.3 Draw a cubes, rectangular prisms and triangular prisms
- 3.4 Construct models of cubes, rectangular prisms and triangular prisms

Standard 4: *The learner understands the concepts of circumference, area and volume and temperature measure and apply the knowledge learned in real life situations.*

IV. MEASUREMENT

1. Comprehension of Circumference

- 1.1 Visualize circumference of a circle
- 1.2 Derive the formula for finding the circumference of a circle
- 1.3 Find the circumference of a circle in a centimeter

2. Application of Circumference



2.1 Solve word problems involving circumference of a circle using the derived formula

3. Comprehension of Area of Plane Figures (trapezoid and circle)

3.1 Tell the unit of measure for measuring area

3.2 Convert one square unit of measure to a smaller or bigger unit

3.3 Visualize area of parallelogram, trapezoid and circle

3.4 Derive the formula for finding the area of a trapezoid and circle

3.5 Find the area of trapezoid and circle in square centimeter and square meter.

4. Application of Area of Plane Figures

4.1 Solve word problems involving area of trapezoid and circle

5. Comprehension of Area of Irregular Figures

5.1 Visualize area of irregular figures

5.2 Find the area of irregular figures in square centimeter and square meter

6. Application of Areas of Irregular Figures

6.1 Solve word problems involving areas of irregular figures

7. Comprehension of Surface Area (cubes, rectangular and triangular prisms)

7.1 Identify the faces of cubes, rectangular, and triangular prisms

7.2 Name the unit of measure used

7.3 Visualize surface area of cubes, rectangular and triangular prisms

7.4 Derive the formula for finding the surface area of cubes, rectangular and triangular prisms

7.5 Find the surface area of cubes, rectangular and triangular prisms using the derived formula

8. Application of Measurement of Surface Area

8.1 Draw a picture to better understand the problem

8.2 Solve word problems involving surface area of cubes, rectangular and triangular prisms

9. Comprehension of Volume (Cubes and rectangular prisms)

9.1 Name the unit of measure used for measuring the volume of cubes, rectangular and triangular prisms

9.2 Convert one cubic unit of measure to smaller or bigger unit

9.3 Visualize volume of cubes, rectangular and triangular prisms



9.4 Derive the formula for finding the volume of cubes, rectangular and *triangular prisms*

9.5 Find the volume of cubes, rectangular and triangular prisms using the derived formula

10. Application of Measurement of Volume

10.1 Draw a picture to better understand the problem

10.2 Solve word problems involving volume

11. Comprehension of Temperature Measure (in degree Celsius)

11.1 Give body/weather temperature using degree Celsius

11.1.1 Identify the parts of thermometer

11.1.2 Read a thermometer

12. Application of Temperature Measure

12.1 Solve word problems involving body/weather temperature

13. Comprehension of Meter Reading (Electric and Water)

13.1 *Read and interpret electric and water meter*

13.2 *Find the monthly electric and water consumption*

14. Application of Meter Reading

14.1 *Solve word problems involving electric and water meter reading*

Standard 5: *The learner understands the concepts of line graphs and techniques of interpreting data and uses them to model situations; solves problem, interprets and draws appropriate inferences from data.*

V. GRAPHS

1. Comprehension of Line Graphs, Double Line Graphs

1.1 Read and interpret data presented in a line graph/*double line graph*

1.2 Construct a line graph and *double line graph*

1.2.1 Organize data in a line graph/*double line graph*

1.3 Compass and Direction

Standard 6: *The learner understands the concepts of simple statistics and probability; utilizes statistical methods of collecting, organizing and interpreting data; and applies the basic concept learned in a real life making decision.*



VI. STATISTICS and PROBABILITY

1. *Collect, organize, and interpret data*
2. *Construct a frequency distribution/table for a set of data*
3. *Explore experimental probability (Tossing Coins, Picking Marbles, etc.)*
4. *Tell the probability of an event to happen (Less likely to happen, equally likely to happen, more likely to happen, certain to happen, impossible to happen etc.)*

Standard 7: *The learner shows understanding of basic concepts of expression, equation and integers and applies the concepts learned in real life situations.*

VII. INTEGERS

1. **Comprehension of Integers**
 - 1.1 *Visualize integers in their order on the number line*
 - 1.2 *Define integers*
 - 1.3 *Compare integers*
 - 1.4 *Order integers in increasing/decreasing order*

CURRICULUM STANDARDS IN MATHEMATICS VI FOR THE SPECIAL SCIENCE ELEMENTARY SCHOOLS

Expectations: At the end of Grade VI, the learner is expected to have mastered the concepts and operations on whole numbers, demonstrates understanding and appreciation of the key concepts and skills involving decimals including money, ratio and proportion, percent,



fractions, rate, integers, geometry (spatial figures), measurement (surface area, volume, meter reading), pre-algebra concepts, data collection, representation and analysis, probability, expressions and equations as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decision in real life.

Standard 1: *The learner demonstrates mastery of number sense and performs standard numerical operations and estimations in a variety of ways.*

I. WHOLE NUMBERS and OPERATIONS

Review

- a. Place Value/Value through trillions
- b. Rounding Numbers
- c. Properties of Addition, Multiplication and Division
- d. Order of Operations (operations in a series/2 to 4 operations in a row/without or with exponents/parentheses)
- e. One-to-three-Step Word Problems Involving Large Numbers
- f. Odd and Even Numbers
- g. Prime and Composite Numbers
- h. Prime Factors, Common Factors and Greatest Common Factor
- i. Multiples and Least Common Multiple
- j. Divisibility Rules

Standard 2: *The learner understands rational numbers, ways of representing rational numbers, relationships among rational numbers, and rational number systems; and understands meanings and operations and how they relate to one another.*

II. RATIONAL NUMBERS

1. Reviewing Fractions

1.1 Comprehension of Fractions

- 1.1.1 Rename fractions as decimals and vice-versa
- 1.1.2 Identify equivalent fractions
- 1.1.3 Compare fractions in simple and mixed forms using visual models, common denominators and Cross-product

1.2 Comprehension of Addition of Fractions



- 1.2.1 Visualize addition of fractions (Using concrete, visual/pictorial models)
- 1.2.2 Estimate sums of fractions in simple and mixed forms
- 1.2.3 Add similar fractions in simple and mixed forms without regrouping
- 1.2.4 Add similar fractions in simple and mixed forms with regrouping in the sum
- 1.2.5 Add dissimilar fractions in simple and mixed forms without regrouping
- 1.2.6 Add dissimilar fractions in simple and mixed forms with regrouping in the sum
- 1.2.7 Add mentally similar and dissimilar fractions using the properties of addition

1.3 Application of Addition of Fractions

- 1.3.1 Make drawings or diagrams to better understand the problem
- 1.3.2 Write an equation to represent the problem
- 1.3.3 Solve word problems following the steps in problem solving

1.4 Comprehension of Subtraction of Fractions

- 1.4.1 Visualize subtraction of fractions using concrete and visual models
- 1.4.2 Estimate differences of fractions in simple and mixed forms
- 1.4.3 Subtract similar fractions in simple and mixed forms without regrouping
- 1.4.4 Subtract similar fractions in simple and mixed forms with renaming and regrouping
- 1.4.5 Subtract dissimilar fractions in simple and mixed forms with renaming and regrouping
- 1.4.6 Subtract dissimilar fractions in simple and mixed forms with renaming and regrouping

1.5 Application of Subtraction of Fractions

- 1.5.1 Make pictures and drawing to better understand the problem
- 1.5.2 Write an equation to represent the problem
- 1.5.3 Solve word problems using the steps in problem solving

1.6 Application of Addition and Subtraction of Fractions

- 1.6.1 Make pictures or diagrams to better understand the problem



- 1.6.2 Write the equation for the hidden question in the problem
- 1.6.3 Write an equation to represent the problem
- 1.6.4 Solve 2-step word problems following the steps in problem solving

1.7 Comprehension of Multiplication of Fractions

- 1.7.1 Visualize multiplication of fractions in simple and mixed forms using visual models
- 1.7.2 Multiply fractions in simple and mixed forms
- 1.7.3 Show that multiplying a fraction by its reciprocal is equal to 1

1.8 Application of Multiplication of Fractions

- 1.8.1 Make pictures or drawings to represent the problems
- 1.8.2 Write an equation to represent the problem
- 1.8.3 Solve 1 step word problems using the steps in problem solving
- 1.8.4 Solve 2 step word problems involving multiplication either addition or subtraction of fractions using the steps in problem solving

1.9 Comprehension of Division of Fractions

- 1.9.1 Visualize division of whole number by a fraction; a fraction by another fraction
- 1.9.2 Divide a whole number by a fraction
- 1.9.3 Divide a fraction by a fraction
- 1.9.4 Divide fractions in different forms
(Mixed form by a fraction, mixed form by a whole number)

1.10 Application of Division of Fractions

- 1.10.1 Make drawings or pictures to better understand the problem
- 1.10.2 Write equation to represent the problem
- 1.10.3 Solve 1 step word problems following the problem solving steps
- 1.10.4 Solve 2-3 step problems involving division and any 1 or 2 of the other 3 operations involving fractions using the steps in problem solving.

2. Comprehension of Decimals (through ten thousandths)

- 2.1 Give the place value and value of a digit in a decimal number
- 2.2 Read and write decimals through ten thousandths in standard and expanded forms
- 2.3 Compare and order decimals through ten thousandths

3. Comprehension of Addition and subtraction of Decimals



- 3.1 Add decimals through ten thousandths without regrouping
- 3.2 Add decimals through ten thousandths with regrouping
- 3.3 Subtract decimals through ten thousandths without regrouping
- 3.4 Subtract decimals through ten thousandths with regrouping
- 4. Application of Addition and Subtraction of Decimals**
 - 4.1 Solve word problems involving either addition or subtraction of decimals
 - 4.2 Solve 2-step word problems involving addition and subtraction of decimals following the steps in problem solving
- 5. Comprehension of Multiplication of Decimals**
 - 5.1 Multiply decimals and mixed decimals through thousandths without and with regrouping and with zero difficulty
 - 5.1.1 Estimate products of whole numbers and decimals
 - 5.1.2 Multiply 1 to 3 digit factors by 1 to 2 digit factors without and with regrouping and with zero difficulty
 - 5.1.3 Multiply mixed decimals by mixed decimals with thousandths
- 6. Application of Multiplication of Decimals**
 - 6.1 Estimate quotients of whole numbers and decimals
 - 6.2 Solve 2 step word problems involving multiplication and either addition or subtraction of decimals following the steps in problem solving
- 7. Comprehension of Division of Decimals**
 - 7.1 Estimate quotients of whole numbers and decimals
 - 7.2 Differentiate terminating and repeating decimals from non-terminating decimals
 - 7.3 Divide 2 to 5 digit whole number by 1 to 2 digit decimal
 - 7.4 Divide 2 to 5 digit whole number by mixed decimal and vice versa
 - 7.5 Divide mixed decimal by mixed decimal
 - 7.6 Divide decimals by 10, 200 and 1000 mentally
 - 7.7 Divide decimals by 0.1, 0.01, and 0.001 mentally
- 8. Application of Division of Decimals**
 - 8.1 Solve word problems involving decimals including money
 - 8.2 Solve 2-3 step word problems involving division and any 1 or 2 of the other 3 operations involving decimals including money following the steps in problem solving
- 9. Comprehension of Ratio and Proportion**



- 9.1 Form ratio for group of objects/numbers using colon (:) and in fraction form
- 9.2 Form proportion for group of objects/numbers using colon and in fraction form
- 9.3 Find the missing term in proportion

10. Application of Ratio and Proportion

- 10.1 Set up a proportion for a given situation
- 10.2 Solve word problems with direct proportion, partitive proportion and inverse proportion

11. Comprehension of Percent

- 11.1 Review the elements used in percent (Rate, Base and Percentage)
- 11.2 Solve problems involving:
 - Percent of Change (increase and decrease)
 - Discounts, original price, rate of discount, net price
 - Sale price, Mark-up price
 - Commission, Rate of commission, Total Sales, Net Sales
 - Sale Tax, Selling Price
 - Simple interest, rate of interest, Principal, Time, Amount of Interest, Total Amount Due

Standard 3: *The learner analyzes characteristics of two-to-three dimensional shapes and develops mathematical arguments about geometric relationships*

III. GEOMETRY

- 1. Comprehension of Spatial Figures (pyramids, cylinders, cones, sphere)
 - 1.1 Visualize the different spatial figures: pyramids, cylinders, cones, spheres
 - 1.2 Describe different spatial figures: pyramids, cylinders, cones, spheres
 - 1.3 Identify similarities and dissimilarities of spatial figures
 - 1.4 Draw the different spatial figures

Standard 4: *The learner understands measurable attributes of object and the units, systems, and processes of measurement; applies appropriate techniques, tools, and formulas to determine measurements*

IV. MEASUREMENT



1. Comprehension of Surface Area of cylinders, *pyramids and spheres*

- 1.1 Show the surface area of solids
- 1.2 Tell the unit of measure used for measuring the surface area of solids
- 1.3 Derive a formula for finding the surface area of cylinder, pyramid and sphere
- 1.4 Find the surface area of a solid using the derived formula

2. Application of Measurement of Surface Area

- 2.1 Draw a picture or diagram to better understand the problem
- 2.2 Solve word problems involving measurement of surface area following the steps in problem solving

3. Comprehension of Volume (Pyramids, Cylinder, Cones and Spheres)

- 3.1 Tell the unit of measure used for measuring the volume of solids
- 3.2 Convert one cubic unit of measure to a smaller or larger unit
- 3.3 Derive the formula for finding the volume of solids
- 3.4 Find the surface area of a solid using the derived formula

4. Comprehension of Volume of Irregular Solids

- 4.1 Find the volume of irregular solids by displacement method

5. Solving Problems Involving Volume

- 5.1 Draw a picture to better understand the problem
- 5.2 Solve word problems involving volume following the steps in problem solving

6. Reviewing Temperature Measure

7. Converting Degree Celsius to Degrees Fahrenheit and vice-versa

- 7.1 Convert temperature in degree Celsius to degree Fahrenheit and vice versa
- 7.2 Solve word problems involving temperature in degrees Celsius and Fahrenheit

Standard 5: *The learner understands the concepts of circle graphs, maps and scales and techniques of interpreting data and will use them to model situations, solve problems and interprets and draws appropriate inferences from data.*

IV. GRAPHS, MAPS AND SCALE DRAWINGS



1. Comprehension of Circle Graphs

- 1.1 Read and interpret data presented in a circle graph
- 1.2 Present data gathered through a table
- 1.3 Construct a circle graph
 - 1.3.1 Organize the data in a circle graph

2. Comprehension of Maps

- 2.1 Interpret a map
- 2.2 Use the primary and secondary directions to tell the position of an object/place given a specific reference point

3. Comprehension of Scale Drawings

- 3.1 interpret a drawing drawn to scale
- 3.2 Applies concept of similar polygons to solve problem involving scale drawings
- 3.3 Make drawings given a scale

Standard 6: *The learner selects and uses appropriate statistical methods to analyze data; develops and evaluates inferences and predictions that are based on data; and understands and applies basic concepts on probability*

V. STATISTICS AND PROBABILITY

1. Range, mean, mode and median

- 1.1 Find the range in a given set of data
- 1.2 Find the mean of a given set of data
- 1.3 Find the mode of a given set of data
- 1.4 Find the median of a given set of data

2. Favorable outcomes/chances

- 2.1 Tell the number of favorable outcomes/chances
- 2.2 Use the fundamental counting principles or tree diagram to find all possible outcomes

Standard 7: *The learner understands real numbers, ways of representing real numbers, relationships among real numbers, and real number systems; and understands meanings of operations and how they relate to one another.*

VI. REAL NUMBER SYSTEMS

1. Integers

- 1.1 Review integers
- 1.2 Describe opposite quantities in real life
- 1.3 Compare integers



1.4 Order integers in increasing and decreasing order

2. Absolute Value

2.1 Define the absolute value of an integer

2.2 Determine the absolute value of an integer

3. Perform the Fundamental operations of integers

3.1 Multiply integers with like and unlike signs

3.2 Divide integers with like and unlike signs

3.3 Add integers with like and unlike signs

3.4 Subtract integers with like and unlike signs

Standard 8: The learner represents and analyzes relationships among variables, quantities and solve problems involving patterns, and algebraic concepts and processes

VII. SIMPLE ALGEBRA

1. Patterns

1.1 Recognize, describe, extend and create patterns involving whole numbers like Pascal's triangle (where each entry is the sum of the entries above it) and the Fibonacci Sequence: 1, 1, 2, 3, 5, 8,...

2. Evaluating Expressions

2.1 Evaluate expressions involving 1 to 2 variables, given the value for each variable (e.g. Evaluate $3x + 5$, where $x=4$; Evaluate $5a - 2b$, where $a=5$ and $b=2$)

3. Translating Mathematical/English phrases into symbols and vice versa

3.1 Translate Mathematical/ English phrases into symbols and vice versa

4. Equations and Inequalities

4.1 Differentiate equations from inequalities

4.2 Solve equations and inequalities

VI. TEACHING METHODOLOGIES

Standard:



The SSES instruction focuses on mastery learning utilizing various innovative teaching strategies for the development of higher order thinking skills, creativity, scientific, technological and lifelong learning skills.

Indicators

1. Student-centered goal is to gain knowledge, skills, and values.
2. Facilitates, guides and encourages more student participation
3. Allows substitution of materials during activities if needed
4. Provides learning tasks that enhance pupils' higher order thinking skills, scientific attitude, life-long skills
5. Utilizes varied teaching methodologies to address the multiple intelligences, learning styles and needs of the learners
 - ❖ Learning by Doing
 - ❖ Problem-Solving
 - ❖ Guided Practice
 - ❖ Drills and Charts
 - ❖ Computer-Aided Instruction



6. Promotes access to technology, enhances creativity, inventiveness and the development of life-long skills
7. Appropriate and relevant to the objectives, nature and scope of the subject matter

VII. Assessment for Learning

Indicators

1. Measures all instructional objectives
2. Covers all learning tasks
3. Tests items are appropriate, valid, and reliable
4. Improves learning
5. Within the ability of the learners
6. Includes performance and output based forms of assessment
7. Uses qualitative assessment tools such as performance and output

VIII. Extent of Administrative Support



Indicators

1. Maintains good relations with the Mathematics teachers
2. Provides necessary teaching needs
3. Conducts regular classroom observations
4. Utilizes results of classroom observations to help the Mathematics teachers improve their teaching performance
5. Involves teachers in planning activities related to Mathematics program
6. Provides assistance to teachers in dealing with situations or problems
7. Allows teachers to attend seminars and trainings
8. Sets goals and objectives for teachers' development in Mathematics
9. Allows teachers to pursue higher educational training or enroll in graduate studies
10. Provides school-based trainings and workshops in Mathematics
11. Allows and supports Mathematics to engage in research and innovations
12. Allows and supports teachers' and pupils' activities and program relevant to Mathematics



13. Allots budget for faculty development program, purchase of instructional materials, improvement of facilities, academic program, competitions, and teachers' incentives and benefits.

IX. STAKEHOLDERS SUPPORT

Standard:

The home and the community actively support and are committed to sustain the SSES mathematics program.

Indicators:

A. HOME (Parents/Guardians)

1. Monitor the progress and behavior change of their children
2. Provide feedback to the teachers of any behavioral change observed
3. Give the children the opportunity to practice what they have learned in school
4. Encourage their children to actively participate/excel in the developmental activities of the mathematics program
5. Actively get involved in school activities regularly



B. COMMUNITY (LGUs, NGOs, GOs, other partners in education)

1. Get involved actively in the planning and implementation of the developmental projects/activities in mathematics program
2. Provide opportunities/resources to enable the successful implementation mathematics program.
3. Involve the learners to participate in community projects/activities
4. Participate in the evaluation of the mathematics program

**C. CENTRAL OFFICE, REGIONAL OFFICE, DIVISION, DISTRICT
LEVEL SUPPORT**

1. Provide technical assistance
2. Provide resources for the development of mathematics program
3. Provide recognition and incentives for both teachers and school head.