Teacher's Guide

MATHEMATICS

2

Mathayom

Preface

Why do we have to learn mathematics?

In the 21st century learning, mathematics plays an important role because mathematics helps people to have creative, reasoning and systematic thinking mind and enables people to analyze problems or situations considerably. As a result, they can predict, plan, decide and solve real life problems appropriately, practically and efficiently. Mathematics is also a tool in the study of science, technology and other disciplines, besides being a fundamental of human resource development. In order to develop our country's economy on a par with other countries, the learning of mathematics needs to be updated progressively and accords fully with the current social and economic conditions while the knowledge of advanced science and application of technology must progress fast in the globalized world.

The Basic Education Curriculum B.E. 2551 (Revised Edition B.E. 2560) ensures students to have the skills they need for the 21st century workplace which includes analytical thinking skills, critical thinking skills, creative thinking skills, problem-solving skills, the skills of using technology and communication and collaboration. Consequently, students need to be competitive in order to live in the borderless society due to the changes in the global economy, culture and environment.

A successful mathematics education needs to prepare students for learning new things and life after graduation or furthering their study in higher levels. Therefore, schools should provide the appropriate learning environment according to students' ability.

General learning outcomes in each strand

The subject of mathematics is divided into three strands namely numbers and algebra, measurement and geometry, and statistics and probability.

- **Numbers and algebra**

Learning about the real number system, the properties of numbers, ratios, percentages, estimation, problem-solving involving numbers, the application of real numbers in real life, patterns, the relation of functions and set, logic, expressions, monomial, polynomials, equations, equation systems and inequality, graphs, the interest and values of money, sequences and series, and the application of the knowledge of numbers and algebra in various situations.

- **Measurement and geometry**

Learning about length, distance, weight, area, volume, capacity, money, time, measuring units, estimation for measurements, trigonometric ratios, geometric figures, visualization of geometric models, geometric theories, geometric transformation through translation, reflection and rotation, and the application of the knowledge of measurement and geometry in various situations.

- **Statistics and probability**

Learning about statistical enquiries, data collection, statistic calculations, presentation and interpretation of qualitative and quantitative data, the fundamental of counting principles, probability, the application of the knowledge of statistics and probability in explaining various situations as well as for facilitating decision-making in real life.

Strands and Learning Standards

Strand 1: Numbers and Algebra

Standard M1.1: Understand various ways of numbers presentations, number systems, number operations, the results of number operations and the properties of operations.

Standard M1.2: Understand and analyze patterns, relations, functions, sequences and series and application.

Standard M1.3: Use expressions, equations, inequalities and explanation of relations to solve problems.

Strand 2: Measurement and Geometry

Standard M2.1: Understand the fundamentals of measurements and measure, estimate the sizes of objects and apply them in solving problems.

Standard M2.2: Understand and analyze geometric figures, the properties of geometric figures, the relationships between geometric figures and geometric theories, and apply them in solving problems.

Strand 3: Statistics and Probability

Standard M3.1: Understand the statistical processes and apply them to solve problems.

Standard M3.2: Understand the fundamental counting principles, probability and apply them to solve problems.

Mathematical Skills and Processes

Mathematical skills and processes include the ability of applying the knowledge while learning other subjects in order to gain knowledge and apply it in daily life efficiently. Skills and processes in mathematics as mentioned above focus particularly on the essential ones that need to be developed in learners' abilities as followings:

1. **Problem-solving** is the ability to understand, analyze, plan and solve the problems, as well as to choose the appropriate methods with considerations for the reasoning and validity of the answers.
2. **Mathematical communication and representation** are the abilities to use mathematical language and symbols in communication, presentation and summary accurately and clearly.
3. **Connection** is the ability to use the knowledge of mathematics as a tool in learning mathematics and other disciplines and connect the mathematical knowledge with the real-world situations.
4. **Reasoning** is the ability to give and explain reasons and proofs behind a solution or choice of strategy to a problem and make and investigate mathematical conjectures.
5. **Creative thinking** is the ability to enhance the previous known concept or create new concepts to improve and develop the knowledge further.

Learners' Quality of Grade 9 students

- Have knowledge and understanding of the real numbers, the relationships of real numbers, the properties of real numbers, and apply them to solve real life problems.

- Have knowledge and understanding of proportions and percentages, and apply them to solve real life problems.

- Have knowledge and understanding of exponents with whole number power and apply them to solve real life problems.

- Have knowledge and understanding of linear equations with one variable, the systems of linear equations with two variables, and linear inequalities with one variable, and apply them to solve real life problems.

- Have knowledge and understanding of ordered pairs, graph relationships and quadratic functions, and apply them to solve real life problems.

- Have knowledge and understanding of geometry and geometric tools, for example compass and ruler including the Geometer's Sketchpad Program or other dynamic geometry programs in order to create geometric figures as well as apply them to solve real life problems.

- Have knowledge and understanding of two and three-dimensional geometric figures and use them to find the relationship between two-dimensional geometric figures and three-dimensional geometric figures.

- Have knowledge and understanding of the surface area and the volume of prisms, cylinders, pyramids, cones and spheres as well as apply them to solve real life problems.

- Have knowledge and understanding of the properties of parallels, congruence and similarities of triangles, Pythagoras' theorems and converse as well as apply them to solve real life problems.

- Have knowledge and understanding of transformations and apply them to solve real life problems.

- Have knowledge and understanding of the trigonometric ratios and apply them to solve real life problems.

- Have knowledge and understanding of circle theorems and apply them to solve mathematical problems.

- Have knowledge and understanding of statistics in the presentation, data analysis, data interpretation related to dot diagrams, tree diagrams, histograms, box diagrams and mean as well as apply them including statistics to real life with the use of appropriate technology.

- Have knowledge and understanding of probability and apply them to solve real life problems.

Yearly Teaching Plan

Mathematics   **Grade 8 (Mathayom 2)**

11 chapters   **120 hours**

Learning area	Duration (hours)
1. Exponential Notation • Exponential notation • Addition and subtraction in exponential notation • Multiplication and division in exponential notation • Combined operations using exponential notation	8
2. Real Numbers • Rational numbers, irrational numbers and real numbers • Squares • Square roots • Cubes • Cube roots	13
3. Polynomials • Polynomials • Addition and subtraction of polynomials • Multiplication of polynomials • Division of polynomials by a monomial	11

4. Solving Quadratic Polynomial Equations	9
• Solving quadratic polynomial equations in the forms $ax^2 + bx = 0$ and $ax^2 + c = 0$ • Solving quadratic polynomial equations in the form $px^2 - q = 0$ where p and q are prefect squares • Solving quadratic polynomial equations in the form $ax^2 + bx + c = 0$ where a, b and $c \neq 0$	
5. Pythagoras' Theorem	8
• Relationship between the sides of a right-angled triangle • Converse of Pythagoras' theorem	
6. Surface Areas and Volumes of Prisms and Cylinders	10
• Surface areas of prisms and cylinders • Volumes of prisms and cylinders	
7. Parallel Lines and Angles	7
• Angles associated with transversals and parallel lines	
8. Transformations	22
• Transformation • Translation • Reflection • Rotation	

9. Congruence • Congruence • Congruent triangles	**6**
10. Mean and Data Presentation • Mean • Data presentation	**11**
11. Geometrical Constructions • Constructions	**15**

Note: The hours needed for each subtopic can be changed when necessary. The above allocated hours are just a suggestion. Total hours for this subject is as prescribed in the basic learning time structure, while the learners must attain the standard as prescribed in the learning standards and indicators.

Chapter 1 – Exponential Notation (8 hours)

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 1.1: 1. Understand and apply the properties of exponentiations with integer exponents to solve mathematical problems and real life problems.	• Exponential notation • Addition and subtraction in exponential notation • Multiplication and division in exponential notation • Combined operations using exponential notation

Learning Objectives

Students will be taught to:

1. Understand the concept of exponential notation.

2. Perform computations involving addition, subtraction, multiplication and division of numbers using exponential notation.

3. Perform computations involving combined operations of addition, subtraction, multiplication and division of numbers using exponential notation to solve problems.

Learning Outcomes

Students will be able to:

1. Understand and write numbers using exponential notation.

2. Perform computation involving addition and subtraction of numbers using exponential notation.

3. Perform computation involving multiplication and division of numbers using exponential notation.

4. Perform computations involving any combination of addition, subtraction, multiplication and division of numbers using exponential notation.

5. Solve problems involving combination of addition, subtraction, multiplication and division of numbers using exponential notation.

Learning Areas

- Exponential notation

- Addition and subtraction in exponential notation

- Multiplication and division in exponential notation

- Combined operations using exponential notation

Teaching and Learning Activities

1st hour (Exponential Notation)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.

2. Explain to students what exponential notation is, by using Examples 1 to 3.

3. Test students' understanding by having them to work individually on Test Yourself 1.1.

4. Ask students to do the exercises of this subtopic on page 2 of the Workbook as their homework.

2nd – 3rd hours (Addition and Subtraction in Exponential Notation)

1. Guide students to add numbers in exponential notation using Examples 4 and 5. Remind them that the numbers in exponential notation that have the same power of base number 10 can be added directly.

2. Test their understanding of the addition in exponential notation using Questions 1 and 2 in Test Yourself 1.2.

3. Guide students to subtract numbers in exponential notation using Examples 6 and 7. Remind them that the numbers in exponential notation that have the same power of base number 10 can be subtracted directly.

4. Test their understanding of the subtraction in exponential notation using Questions 3 to 5 in Test Yourself 1.2.

5. Ask students to do the exercises of this subtopic on pages 2 to 4 of the Workbook as their homework.

4th – 5th hours (Multiplication and Division in Exponential Notation)

1. Guide students to multiply numbers in exponential notation using Example 8.

2. Test their understanding of the multiplication in exponential notation using Questions 1 and 2 in Test Yourself 1.3.

3. Guide students to divide numbers in exponential notation using Example 9.

4. Test their understanding of the division in exponential notation using Questions 3 and 4 in Test Yourself 1.3.

5. Ask students to do the exercises of this subtopic on pages 4 and 5 of the Workbook as their homework.

6th – 7th hour (Combined Operations Using Exponential Notation)

1. Remind students the steps to perform computation involving combined operations using exponential notation.

2. Using Examples 10 and 11, show the steps in detail.

3. Have students work out the questions in Test Yourself 1.4 individually. Discuss the answers with them.

4. Ask students to do the exercises of this subtopic on pages 5 to 7 of the Workbook as their homework.

8th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistake column on page 12.

2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.

3. Revise the lesson using the Quick Revision column on page 13.

4. Encourage students to try the QR Quiz on page 13 by scanning the QR code.

5. Randomly select 5 questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.

6. Ask two of the students to work out the Spot the Errors on page 7 in the Workbook and discuss with them.

7. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Characteristics

1. Thinking skill

2. Problem-solving skill

3. Analyzing skill

Learning Materials

- Focus Smart Plus Mathematics Textbook Mathayom 2
- Focus Smart Plus Mathematics Workbook Mathayom 2

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Chapter 1 Exponential Notation

Explanation: Summary of learning outcomes

Feeling after learning this chapter:

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Contents that you need for teacher to explain further:

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Knowledge gained from this chapter:

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Chapter 1 Exponential Notation

Application of knowledge from this chapter on your daily life:

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Contents that you like the most in this chapter (give your reason):

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Exercises that you like and want to be selected as the outstanding work:

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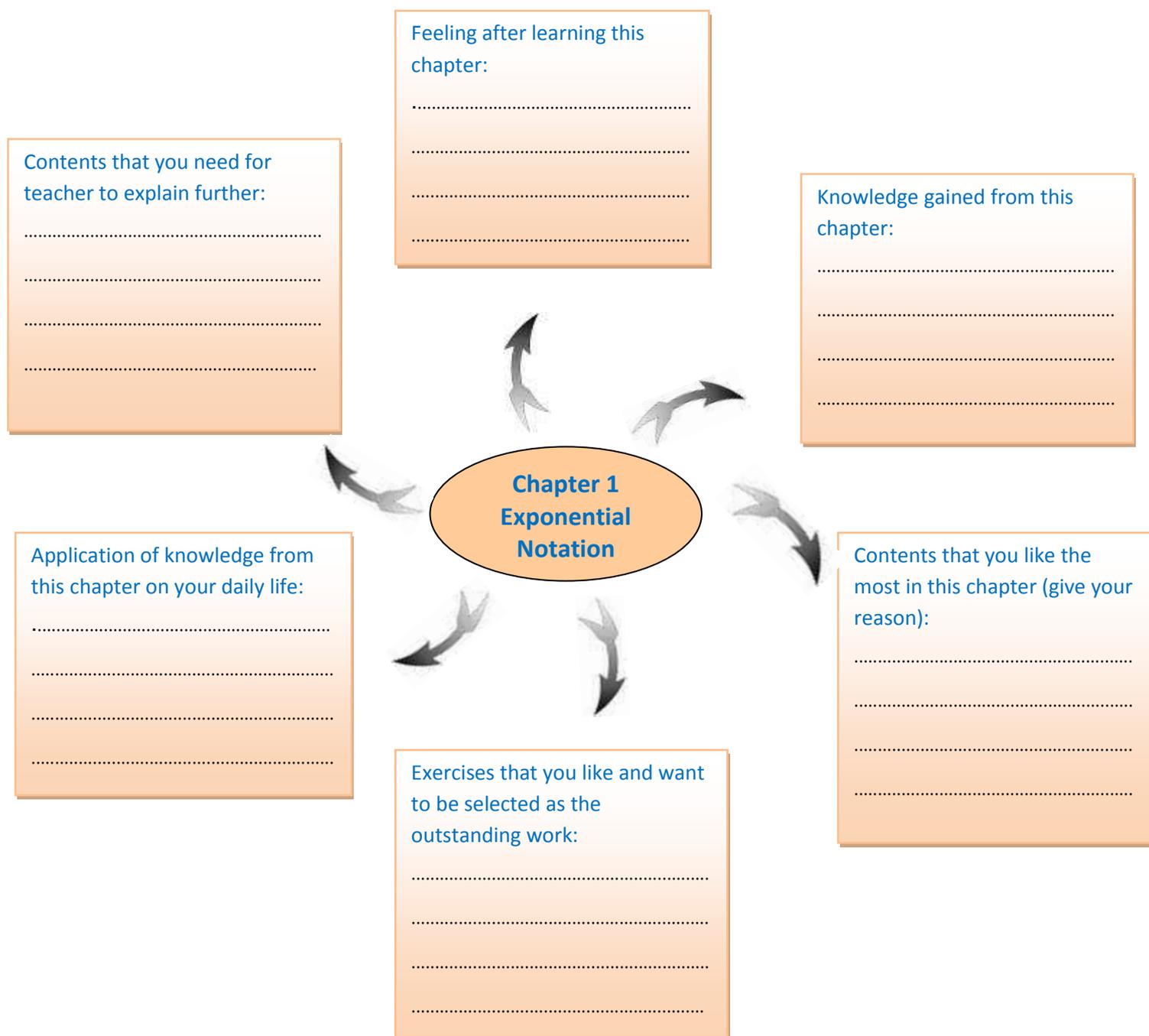
Chapter 2 – Real Numbers (13 hours)

Strand 1: Numbers and Algebra

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 1.1: 1. Understand real numbers and the relationship of real numbers as well as apply the properties of real numbers to solve mathematical problems and real life problems.	• Rational numbers, irrational numbers and real numbers • Squares • Square roots • Cubes • Cube roots

Learning Objectives

Students will be taught to:

1. Understand what rational numbers are.

2. Understand recurring decimals as rational numbers.

3. Convert recurring decimals into fractions and vice versa.

4. Understand what irrational numbers are.

5. Understand what surds are and surds as irrational numbers.

6. Understand what real numbers are.

7. Understand what squares and square roots are.

8. Estimate squares of numbers.

9. Estimate square roots of positive numbers.

10. Solve problems involving squares and square roots.

11. Understand what cubes and cube roots are.

12. Estimate cube roots of numbers.

13. Solve problems involving cubes and cube roots.

Learning Outcomes

Students will be able to:

1. Write fractions in decimal form and vice versa.

2. Understand what rational numbers are.

3. Understand what recurring decimals are.

4. Write fractions in recurring decimal form and vice versa.

5. Understand what irrational numbers, surds and real numbers are.

6. Understand what squares and square roots are.

7. Determine the squares of numbers.

8. Determine the square roots of perfect squares, fractions and decimals.

9. Estimate squares and square roots of numbers.

10. Solve problems involving squares and square roots.

11. Understand what cubes and cube roots are.

12. Determine cubes and cube roots of integers.

13. Estimate cubes and cube roots of numbers.

14. Solve problems involving cubes and cube roots.

Learning Areas

- Rational numbers

- Irrational numbers

- Real numbers

- Squares

- Square roots

- Cubes

- Cube roots

Teaching and Learning Activities

1st – 3rd hours (Rational Numbers, Irrational Numbers and Real Numbers)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.
2. Guide the students to understand what rational numbers are.
3. Using Examples 1 and 2, guide them how to write numbers in the form of *m/n*.
4. Have a few volunteers do Questions 1 and 2 in Test Yourself 2.1.
5. Explain to students what recurring decimals are and the way to write them by using Example 3.
6. Using Example 4, guide students to convert recurring numbers into fractions.
7. Have a few students try out some questions in Questions 3 to 5 in Test Yourself 2.1 in the class. Discuss the answers with them.
8. Explain to students what irrational numbers are by using Example 5.
9. Ask students to work on Question 6 on page 20 to test their understanding.
10. Guide students to understand what surds are.
11. Using Example 6, guide students to determine surds.
12. Explain to students what real numbers are.
13. Use Example 7 for further explanation.
14. Have students work on Questions 7 and 8 in Test Yourself 2.1.
15. Ask students to work on the exercises in this subtopic on pages 10 to 12 of the Workbook as their homework.

4th – 5th hours (Squares)

1. Guide students to write squares of numbers. Use Examples 8 and 9.
2. Revise the meaning of squares by asking them to work out Questions 1 and 2 in Test Yourself 2.2.

3. Guide students to determine the squares of numbers and mixed numbers by using Examples 10 and 11.

4. Ask students to work out Questions 3 and 4 in Test Yourself 2.2.

5. Guide students to estimate the squares of numbers by using

   - Approximation
   - Determining the range

   Use Examples 12 and 13 as samples.

6. Ask students to try Questions 5 and 6 in Test Yourself 2.2. Discuss the answers with them.

7. Explain to students what perfect squares are by using Examples 14 and 15.

8. Ask them to try Questions 7 and 8 in Test Yourself 2.2.

9. Using Example 16, guide students to solve problems involving squares of numbers.

10. Ask them to try Questions 9 to 11 in Test Yourself 2.2.

11. Have students work on the exercises in this subtopic on pages 12 to 16 of the Workbook as their homework.

6th – 8th hours (Square roots)

1. Explain what square roots are. Refresh students' memory of what square roots are by asking them to do Question 1 in Test Yourself 2.3.

2. Guide them to determine the square roots of perfect squares, fractions and decimals.

3. Ask them to try Questions 2 to 4 in Test Yourself 2.3. Discuss the answers with them.

4. Guide students to multiply two square roots.

5. Test students' understanding of the relationship between squares and square roots by asking them to try Questions 5 to 7 in Test Yourself 2.3.

6. Guide students to estimate square roots of positive numbers by

- Approximation
- Determining the range

Use Examples 18 and 19 as samples.

7. Have volunteers try Questions 8 and 9 in Test Yourself 2.3. Discuss answers with them.

8. Guide them to solve problems involving squares and square roots by using Examples 20 and 21.

9. Have students work on Questions 10 to 12 in Test Yourself 2.3.

10. Ask students to work on the exercises in this subtopic on pages 17 to 20 of the Workbook as their homework.

9th – 10th hours (Cubes)

1. Explain what a cube of a number is. Guide students to determine the cubes.

2. Refresh students' memory of what cubes are by asking them to do Questions 1 to 3 in Test Yourself 2.4. Discuss the answers with them.

3. Use Example 22 as a sample.

4. Guide students on how to estimate cubes by using Example 23 and 24.

5. Have volunteers try Questions 4 and 5 in Test Yourself 2.4.

6. Using Example 25, help students to solve problems involving cubes.

7. Test their understanding by asking them to work on Questions 6 and 7 in Test Yourself 2.4.

8. Ask students to work on the exercises in this subtopic on pages 20 to 23 of the Workbook as their homework.

11th – 12th hours (Cube roots)

1. Explain what cube roots of numbers are.

2. Refresh students' memory of what cube roots are by asking them to do Question 1 in Test Yourself 2.5.

3. Guide students to determine the cube roots of integers, fractions and decimals by using Examples 26 to 28.

4. Have a few students work on Questions 2 to 4 in Test Yourself 2.5. Discuss the answers with them.

5. Show students how to estimate cube roots of numbers by using Examples 29 and 30.

6. Ask them to work on Questions 5 and 6 in Test Yourself 2.5.

7. Guide students to solve problems involving cubes and cube roots by using Example 31.

8. Have two students try Questions 7 and 8 in Test Yourself 2.5. Discuss the answers with them.

9. Guide students to compute operations involving squares, square roots, cubes and cube roots by using Example 32.

10. Have a few volunteers work on Question 9 in Test Yourself 2.5.

11. Ask students to work on the exercises in this subtopic on pages 23 to 27 of the Workbook as their homework.

13th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 39.

2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.

3. Revise the lesson using the Quick Revision column on page 40.

4. Encourage them to try the QR Quiz on page 40 by scanning the QR code.

5. Ask 3 students to work out the Spot the Errors on page 28 in the Workbook and discuss with them.

6. Randomly select 5 questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.

7. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Characteristics:

1. Thinking skill

2. Problem-solving skill

3. Analyzing skill

Learning Materials:

- Focus Smart Plus Mathematics Textbook Mathayom 2
- Focus Smart Plus Mathematics Workbook Mathayom 2

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Mathayom: ………………………………………………………… Date: …………………………

Chapter 2 Real Numbers

Explanation: Summary of learning outcomes

Feeling after learning this chapter:
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Contents that you need for teacher to explain further:
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Knowledge gained from this chapter:
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Chapter 2
Real Numbers

Application of knowledge from this chapter on your daily life:
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Contents that you like the most in this chapter (give your reason):
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Exercises that you like and want to be selected as the outstanding work:
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Chapter 3 – Polynomials (11 hours)

Strand 1: Numbers and Algebra

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 1.2: 1. Understand the principle of polynomial operations and apply polynomials to solve mathematical problems.	• Polynomials • Addition and subtraction of polynomials • Multiplication of polynomials • Division of polynomials by a monomial

Learning Objectives

Students will be taught to:

1. Understand what polynomials are.
2. Realize the types of polynomials.
3. Differentiate variables, exponents and constants in polynomials.
4. Understand what like terms are.
5. Add and subtract polynomials.
6. Multiply polynomials.
7. Divide polynomials by monomials which the quotients are polynomials.

Learning Outcomes

Students will be able to:

1. Define the term "polynomial".

2. Identify variables, exponents and constants.

3. Identify the degree of polynomials.

4. Add polynomials.

5. Subtract polynomials.

6. Multiply polynomials.

7. Divide polynomials.

Learning Areas

- Polynomials

- Addition of polynomials

- Subtraction of polynomials

- Multiplication of polynomials

- Division of polynomials

Teaching and Learning Activities

1st – 3rd hours (Polynomials)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.

2. Guide the students to understand what polynomials are.

3. Using Examples 1 to 3, identify terms, variables, exponents and constants.

4. Have students work on Questions 1 to 3 in Test Yourself 3.1. Discuss the answers with them.

5. Explain the degree of a polynomial in one variable which is the largest exponent in the polynomial using Example 4.

6. Ask them to try Question 4 in Test Yourself 3.1.

7. Have students work on the exercises in this subtopic on page 32 of the Workbook as their homework.

4th – 6th hours (Addition and Subtraction of Polynomials)

1. Show students how to add polynomials using Example 5.

2. Ask students to do Questions 1 to 3 in Test Yourself 3.2.

3. Guide students how to subtract polynomials using Example 6.

4. Have students try Questions 4 and 5 in Test Yourself 3.2. Discuss the answers with them.

5. Have students work on the exercises in this subtopic on pages 33 to 35 of the Workbook as their homework.

7th – 8th hours (Multiplication of Polynomials)

1. Show students how to multiply polynomials using Examples 7 to 11.

   - Multiplying a monomial by a monomial

   - Multiplying a monomial by a binomial

   - Multiplying a binomial by a monomial

   - Multiplying a binomial by a binomial

   - Multiplying polynomials

2. Have students work on Questions 1 to 5 in Test Yourself 3.3. Discuss the answers with them.

3. Have students work on the exercises in this subtopic on pages 36 to 38 of the Workbook as their homework.

9th – 10th hours (Division of Polynomials by a Monomial)

1. Show students how to divide polynomials by a monomial using Examples 12.

2. Have students work on Questions 1 and 2 in Test Yourself 3.4.

3. Have students work on the exercises in this subtopic on pages 39 and 40 of the Workbook as their homework.

11th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 53.
2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.
3. Revise the lesson using the Quick Revision column on page 54.
4. Encourage them to try the QR Quiz on page 54 by scanning the QR code.
5. Ask two students to work out the Spot the Errors on pages 40 and 41 in the Workbook and discuss with them.
6. Randomly select 5 questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.
7. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Characteristics:

1. Thinking skill
2. Problem-solving skill
3. Analyzing skill

Learning Materials:

- Focus Smart Plus Mathematics Textbook Mathayom 2
- Focus Smart Plus Mathematics Workbook Mathayom 2

Name-Surname: ………………………………………………… **No.** …………………………

Mathayom: ………………………………………………… **Date:** …………………………

Chapter 3 Polynomials

Explanation: Summary of learning outcomes

Feeling after learning this chapter:

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Contents that you need for teacher to explain further:

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Knowledge gained from this chapter:

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Chapter 3 Polynomials

Application of knowledge from this chapter on your daily life:

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Contents that you like the most in this chapter (give your reason):

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Exercises that you like and want to be selected as the outstanding work:

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Chapter 4 – Solving Quadratic Polynomial Equations (9 hours)

Strand 1: Numbers and Algebra

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 1.2: 1. Understand and use factorization of polynomials of second degree (quadratic polynomials) to solve mathematical problems.	• Solving quadratic polynomial equations in the forms $ax^2 + bx = 0$ and $ax^2 + c = 0$ • Solving quadratic polynomial equations in the form $px^2 - q = 0$ where p and q are prefect squares • Solving quadratic polynomial equations in the form $ax^2 + bx + c = 0$ where a, b and $c \neq 0$

Learning Objectives

Students will be taught to:

1. Understand what second degree polynomials are.
2. Understand what quadratic polynomial equations are.
3. Factorize quadratic polynomials.
4. Solve quadratic polynomial equations using
   - distributive property.
   - completing the square method.
   - difference of squares method.

Learning Outcomes

Students will be able to:

1. Understand what quadratic polynomials are.

2. Solve quadratic polynomial equations.

Learning Areas

- Quadratic polynomial

- Quadratic polynomial equation

- Root of the quadratic polynomial equation

- Factorization of polynomials

Teaching and Learning Activities

1st – 3rd hours (Solving Quadratic Polynomial Equations in the Forms $ax^2 + bx = 0$ and $ax^2 + c = 0$)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.

2. Using Example 1 to determine the value of the variable or unknown which satisfies the quadratic polynomial equation.

3. Have students try Question 1 in Test Yourself 4.1. Discuss the answers with them.

4. Guide students to find the roots of a quadratic polynomial equation by factorization using Examples 2 and 3.

5. Test students' understanding of factorization of a quadratic polynomial by asking them to do Questions 2 and 3 in Test Yourself 4.1.

6. Ask students to work on the exercises in this subtopic on pages 44 to 46 of the Workbook as their homework.

4th – 5th hours (Solving Quadratic Polynomial Equations in the Forms $px^2 - q = 0$ where p and q are Perfect Squares)

1. Understand what perfect squares are. Factorize the polynomials using Examples 4 and 5.

2. Test students' understanding by asking them to do Questions 1 and 2 in Test Yourself 4.2.

3. Ask students to work on the exercises in this subtopic on pages 46 and 47 of the Workbook as their homework.

6th – 8th hours (Solving Quadratic Polynomial Equations in the Form $ax^2 + bx + c = 0$ where a, b and $c \neq 0$)

1. Solve quadratic polynomial equations using the cross method. Refer to Examples 6 and 7.

2. Have students work on Questions 1 and 2 in Test Yourself 4.3.

3. Solve quadratic polynomial equations using the completing square method. Refer to Example 8.

4. Test students' understanding by asking them to do Question 3 in Test Yourself 4.3.

5. Ask students to work on the exercises in this subtopic on pages 47 to 49 of the Workbook as their homework.

9th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 68.

2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.

3. Revise the lesson using the Quick Revision column on page 69.
4. Encourage them to try the QR Quiz on page 69 by scanning the QR code.

5. Ask 2 students to work out the Spot the Errors on page 50 in the Workbook and discuss with them.

6. Randomly select 5 questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.

7. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Characteristics:

1. Thinking skill

2. Problem-solving skill

3. Analyzing skill

Learning Materials:

- Focus Smart Plus Mathematics Textbook Mathayom 2
- Focus Smart Plus Mathematics Workbook Mathayom 2

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Mathayom: ………………………………………………………………   **Date:** ……………………………………

Chapter 4 Solving Quadratic Polynomial Equations

Explanation: Summary of learning outcomes

Feeling after learning this chapter:
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Contents that you need for teacher to explain further:
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Knowledge gained from this chapter:
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**Chapter 4
Solving Quadratic
Polynomial Equations**

Application of knowledge from this chapter on your daily life:
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Contents that you like the most in this chapter (give your reason):
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Exercises that you like and want to be selected as the outstanding work:
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Chapter 5 – Pythagoras' Theorem (8 hours)

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 2.1: 1. Understand and apply Pythagoras' theorem and the converse of the theorem to solve mathematical problems and real-life problems.	• Relationship between the sides of a right-angled triangle • Converse of Pythagoras' theorem

Learning Objectives

Students will be taught to:

1. Understand the relationship between the sides of a right-angled triangle.
2. Understand Pythagoras' Theorem.
3. Solve problems involving converse of Pythagoras' Theorem.

Learning Outcomes

Students will be able to:

1. Identify the hypotenuse of a right-angled triangle.
2. Understand the relationship between the lengths of the sides of a right-angled triangle.
3. Find the length of the unknown side of a right-angled triangle.
4. Find the lengths of sides of geometric shapes.
5. Solve problems involving Pythagoras' Theorem.

6. Determine whether a triangle is a right-angled triangle.

7. Solve problems involving converse of Pythagoras' Theorem.

Learning Areas

- Pythagoras' Theorem

- Relationship between the sides of a right-angled triangle

- Converse of Pythagoras' Theorem

Teaching and Learning Activities

1st – 4th hours (Relationship between the Sides of a Right-angled Triangle)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.

2. Explain to students which side of a right-angled triangle is the hypotenuse.

3. Using Example 1 and Question 1 in Test Yourself 5.1, test students' understanding of hypotenuse.

4. Explain the Pythagoras' theorem to students by using Example 2.

5. Have four students try Questions 2 in Test Yourself 5.1. Discuss answers with them.

6. Guide students to find the length of unknown side of right-angled triangles and the lengths of sides of geometric shapes by using Examples 3 and 4.

7. Have students work on Questions 3 to 5 in Test Yourself 5.1.

8. Show problems involving Pythagoras' theorem using Examples 5 and 6.

9. Have students work on Questions 6 and 7 in Test Yourself 5.1. Discuss the answers with them.

10. Ask students to work on the exercises in this subtopic on pages 53 to 56 of the Workbook as their homework.

5th – 7th hours (Converse of Pythagoras' Theorem)

1. Explain what converse of Pythagoras' theorem means.

2. Using Examples 7 and 8, guide students on how to determine types of triangles with given lengths of the sides.

3. Test students' understanding by asking them to work on Questions 1 to 4 in Test Yourself 5.2. Discuss the answers with them.

4. Show students how to solve problems involving converse of Pythagoras' theorem using Example 9.

5. Have students work on Question 5 in Test Yourself 5.2.

6. Ask students to work on the exercises in this subtopic on pages 56 to 59 of the Workbook as their homework.

8th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 78.

2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.

3. Revise the lesson using the Quick Revision column on page 79.
4. Encourage them to try the QR Quiz on page 79 by scanning the QR code.

5. Ask two students to work out the Spot the Errors on page 59 in the Workbook and discuss with them.

6. Randomly select 5 questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.

7. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Characteristics:

1. Thinking skill

2. Problem-solving skill

3. Analyzing skill

Learning Materials:

- Focus Smart Plus Mathematics Textbook Mathayom 2

- Focus Smart Plus Mathematics Workbook Mathayom 2

Name-Surname: ....   **No.** ....

Mathayom: ....   **Date:** ....

Chapter 5 Pythagoras' Theorem

Explanation: Summary of learning outcomes

Feeling after learning this chapter:

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Contents that you need for teacher to explain further:

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Knowledge gained from this chapter:

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Chapter 5 Pythagoras' Theorem

Application of knowledge from this chapter on your daily life:

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Contents that you like the most in this chapter (give your reason):

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Exercises that you like and want to be selected as the outstanding work:

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Chapter 6 – Surface Areas and Volumes of Prisms and Cylinders (10 hours)

Strand 2: Measurement and Geometry

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 2.1: 1. Apply the knowledge of surface area of prisms and cylinders to solve mathematical problems and real-life problems. 2. Apply the knowledge of volume of prisms and cylinders to solve mathematical problems and real-life problems.	• Surface areas of prisms and cylinders • Volumes of prisms and cylinders

Learning Objectives

Students will be taught to:

1. Understand the characteristics and properties of prisms and cylinders.

2. Find surface areas of prisms and cylinders.

3. Calculate volumes of prisms and cylinders.

Learning Outcomes

Students will be able to:

1. Know and understand the characteristics and properties of prisms and cylinders.

2. Find surface areas of prisms and cylinders.

3. Calculate volumes of prisms and cylinders.

4. Apply the knowledge of surface area and volume to solve mathematical problems and real-life problems.

Learning Areas

- Surface areas of prisms

- Surface areas of cylinders

- Volumes of prisms

- Volumes of cylinders

Teaching and Learning Activities

1ˢᵗ – 4ᵗʰ hours (Surface Areas of Prisms and Cylinders)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.

2. Ask a volunteer to draw a prism. Ask students to describe the properties of prisms. Guide students to find the total surface area of the prism using Examples 1 and 2.

3. Test students' understanding of surfaces area of prisms by asking them to do Question 1 in Test Yourself 6.1.

4. Understand the properties of cylinders. Guide students to find the surface area of the cylinder using Example 3.

5. Guide students to solve problems involving surface area using Examples 4 to 6.

6. Have students try Questions 2 to 5 in Test Yourself 6.1. Discuss the answers with them.

7. Let students to work on the exercises in this subtopic on pages 63 to 67 of the Workbook as their homework.

5th – 9th hours (Volumes of Prisms and Cylinders)

1. Explain how we use the formula to calculate the volume of a prism.

2. Use Example 7 to further explain the formula and have two volunteers to try Question 1 in Test Yourself 6.2.

3. Calculate the volume of a cuboid by multiplying the length, breadth and height of the cuboid.

4. Guide students to find the volumes of a cube and a cuboid using Example 8.

5. Have students to try Question 2 in Test Yourself 6.2.

6. Show students to use the formula to find the volume of a right circular cylinder. Explain further about the volume of cylinders using Example 9.

7. Randomly get two students to try Question 3 in Test Yourself 6.2. Discuss the answers with them.

8. Have students work on Questions 1 to 5 on pages 68 to 69 of the Workbook as their homework.

9. Using Examples 10 and 11, explain to students how to find the height or the area of base of a prism when its volume is given.

10. Have students to try Questions 4 and 5 in Test Yourself 6.2.

11. Using Examples 12 to 14, solve problems involving volumes. Test their understanding by asking to try Questions 6 to 8 in Test Yourself 6.2. Discuss the answers with them.

12. Have students work on Questions on pages 70 to 76 of the Workbook as their homework.

10th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistake column on page 93.

2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.

3. Revise the lesson using the Quick Revision column on page 94.

4. Encourage them to try the QR Quiz on page 94 by scanning the QR code.

5. Ask two students to work out the Spot the Errors on page 77 in the Workbook and discuss with them.

6. Randomly select 6 questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.

7. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Characteristics:

1. Thinking skill

2. Problem-solving skill

3. Analyzing skill

Learning Materials:

- Focus Smart Plus Mathematics Textbook Mathayom 2
- Focus Smart Plus Mathematics Workbook Mathayom 2

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Mathayom: .... Date: ....

Chapter 6 Surface Areas and Volumes of Prisms and Cylinders

Explanation: Summary of learning outcomes

Feeling after learning this chapter:

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Contents that you need for teacher to explain further:

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Knowledge gained from this chapter:

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Chapter 6 Surface Areas and Volumes of Prisms and Cylinders

Application of knowledge from this chapter on your daily life:

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Contents that you like the most in this chapter (give your reason):

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Exercises that you like and want to be selected as the outstanding work:

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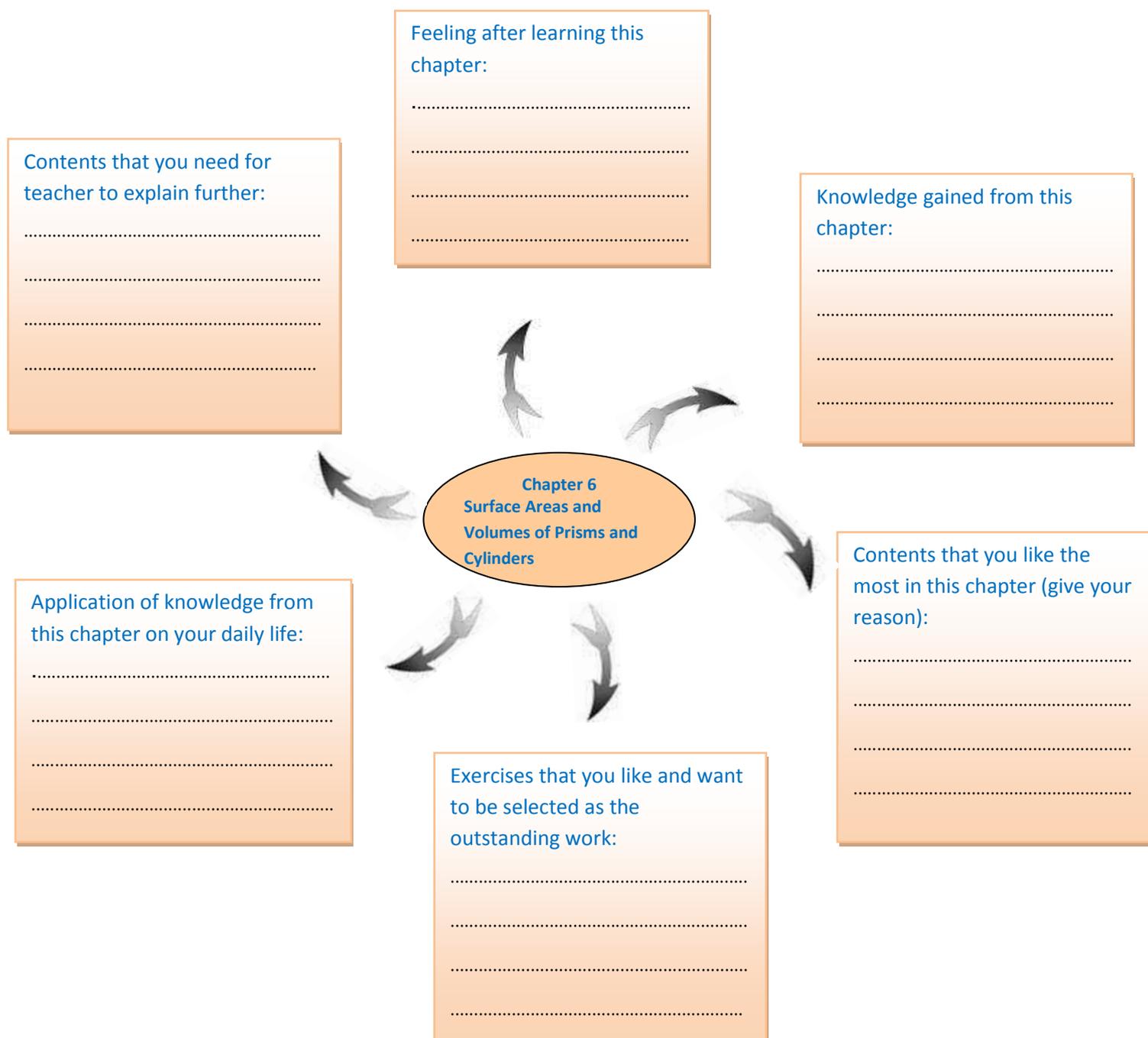
Chapter 7 – Parallel Lines and Angles (7 hours)

Strand 2: Measurement and Geometry

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 2.2: 1. Apply the knowledge of the properties of parallel lines and triangles to solve mathematical problems.	• Angles associated with transversals and parallel lines

Learning Objectives

Students will be taught to:

1. Understand what transversals and types of angles associated with parallel lines and transversals.
2. Understand the properties of the types of angles associated with parallel lines and transversals.

Learning Outcomes

Students will be able to:

1. Identify transversals.

2. Identify corresponding, alternate and interior angles.

3. Apply the properties of the types of angles associated with parallel lines and transversals.

4. Determine parallel lines.

5. Solve problems involving transversals and types of angles associated with parallel lines and transversals.

Learning Areas

- Angles associated with transversals and parallel lines

Teaching and Learning Activities

1st – 6th hours (Angles Associated with Transversals and Parallel Lines)

1. Explain what a transversal is.

2. Get two volunteers to answer Question 1 in Test Yourself 7.1. Discuss the answers with them.

3. Draw a transversal crossing a set of parallel lines. Explain what corresponding angles are and their properties.

4. Use Example 1 for further explanation.

5. Test students' understanding by asking them to try Question 2 in Test Yourself 7.1. Discuss the answers with them.

6. Draw a transversal crossing a set of parallel lines. Explain what alternate angles are and their properties.

7. Use Example 2 for further explanation.

8. Test students' understanding by asking them to try Question 3 in Test Yourself 7.1. Discuss the answers with them.

9. Draw a transversal crossing a set of parallel lines. Explain what interior angles are and their properties.

10. Use Example 3 for further explanation.

11. Test students' understanding by asking them to try Question 4 in Test Yourself 7.1. Discuss the answers with them.

12. Explain that we can determine parallel lines by applying the properties of the angles associated with parallel lines and transversals.

13. Use Example 4 for further explanation.

14. Get four students to work on Question 5 in Test Yourself 7.1. Ask them to explain their answers. Discuss with them.

15. Using Examples 5 to 7, guide students to solve problems involving angles associated with parallel lines and transversals.

16. Test students' understanding by asking them to try Questions 6 to 8 in Test Yourself 7.1. Discuss the answers with them.

17. Ask students to work on the exercises in this subtopic on pages 81 and 84 of the Workbook as their homework.

7th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 106.

2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.

3. Revise the lesson using the Quick Revision column on page 107.

4. Encourage them to try the QR Quiz on page 107 by scanning the QR code.

5. Ask a volunteer to work out the Spot the Errors on page 85 in the Workbook and discuss with them.

6. Randomly select 6 questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.

7. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Characteristics

1. Thinking skill

2. Problem-solving skill

3. Analyzing skill

Learning Materials

- Focus Smart Plus Mathematics Textbook Mathayom 2
- Focus Smart Plus Mathematics Workbook Mathayom 2

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Mathayom: .... Date: ....

Chapter 7 Parallel Lines and Angles

Explanation: Summary of learning outcomes

Feeling after learning this chapter:

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Contents that you need for teacher to explain further:

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Knowledge gained from this chapter:

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Chapter 7 Parallel Lines and Angles

Application of knowledge from this chapter on your daily life:

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Contents that you like the most in this chapter (give your reason):

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Exercises that you like and want to be selected as the outstanding work:

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Chapter 8 – Transformations (22 hours)

Strand 2: Measurement and Geometry

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 2.2: 1. Understand and apply the knowledge of geometric transformations to solve mathematical problems and real-life problems.	• Transformation • Translation • Reflection • Rotation

Learning Objectives

Students will be taught to:

1. Understand what transformations are.
2. Understand what translations, reflections and rotations are.
3. Solve problems involving translations, reflections and rotations.

Learning Outcomes

Students will be able to:

1. Identify a transformation.
2. Identify the object and its image in a transformation.
3. Identify a translation.
4. Determine the image of an object under a translation.
5. Describe a translation.
6. State the properties of a translation.

7. Determine the coordinates of the image or the object under a translation.

8. Solving problems involving translations.

9. Identify a reflection.

10. Determine the image of an object under a reflection in a given line.

11. State the properties of a reflection.

12. Determine the image of an image or the axis of a reflection.

13. Determine the coordinates of the images or the object under a reflection.

14. Describe a reflection.

15. Solve problems involving reflections.

16. Identify a rotation.

17. Determine the image of an object under a rotation.

18. State the properties of a rotation.

19. Determine the image or the centre, angle and direction of a rotation.

20. Determine the coordinates of the image or the object under a rotation.

21. Describe a rotation.

22. Solve problems involving rotations.

Learning Areas

- Transformation
- Translation
- Reflection
- Rotation

Teaching and Learning Activities

1st – 3rd hours (Transformation)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.

2. Using Example 1, explain what transformation is.

3. Test students' understanding of transformation by asking them to try Question 1 in Test Yourself 8.1.

4. Explain what object and its image are in a transformation using Example 2.

5. Test students' understanding by asking them to do Question 2 in Test Yourself 8.1.

6. Ask students to work on the exercises in this subtopic on page 91 of the Workbook as their homework.

4th – 9th hours (Translation)

1. Using Example 3, explain what translation is.

2. Have four students determine translation in Question 1 in Test Yourself 8.2.

3. Guide students to determine the image of an object under a translation by using Example 4.

4. Have four volunteers try Question 2 in Test Yourself 8.2.

5. Emphasize that to describe a translation always starts with a horizontal movement and follows by the vertical movement.

6. Using Example 5, further explain how to describe a translation.

7. Have four volunteers describe the translations in Question 3 in Test Yourself 8.2.

8. Explain the properties of a translation.

9. Ask students to do Question 4 in Test Yourself 8.2.

10. Using Examples 6 and 7, guide students on how to determine the coordinates of the image or object under a translation.

11. Have students try Questions 5 and 6 in Test Yourself 8.2.

12. Show students how to solve problems involving translations by using Examples 8 and 9.

13. Ask students to answer Questions 7 to 9 in Test Yourself 8.2.

14. Ask students to work on the exercises in this subtopic on pages 91 to 93 of the Workbook as their homework.

10th - 15th hours (Reflection)

1. Explain what reflection is.

2. Use Example 10 and have four students try Question 1 in Test Yourself 8.3.

3. Guide students to determine the image of an object under a reflection in a given time by using Example 11. Emphasize the steps taken.

4. Have a volunteer try Question 2 in Test Yourself 8.3. Discuss the answers with them.

5. Explain the properties of a reflection to students and go through Question 3 in Test Yourself 8.3 with them.

6. Using Examples 12 to 14, guide students how to determine the image of an object or the axis of reflection.

7. Have students work on Questions 4 and 5 in Test Yourself 8.3. Discuss the answers with them.

8. Show students how to determine the coordinates of the image or the object under a reflection by using Examples 15 and 16.

9. Work out Questions 6 and 7 in Test Yourself 8.3 with students.

10. Emphasize that in order to describe a reflection, the axis of reflection should be stated. Use Example 17.

11. Have four volunteers work on Question 8 in Test Yourself 8.3.

12. Using Example 18, guide students to solve problems involving reflections.

13. Have students work on Questions 9 and 10 in Test Yourself 8.3. Discuss the answers with them.

14. Ask students to work on the exercises in this subtopic on pages 94 to 96 of the Workbook as their homework.

16th – 21st hours (Rotation)

1. Explain what rotation and centre of rotation are.

2. Use Example 19 to further explain rotation.

3. Ask students to try Question 1 in Test Yourself 8.4.

4. Guide students to determine the image of an object under a rotation by using Example 20.

5. Ask four students to try out Question 2 in Test Yourself 8.4.

6. Explain the properties of a rotation and use Question 3 in Test Yourself 8.4 to test their understanding.

7. Using Examples 21 to 23, guide students to determine the image, angle and direction of a rotation.

8. Have students work on Questions 4 and 5 in Test Yourself 8.4. Discuss the answers with them.

9. Show students on how to determine the coordinates of the image or the object under a rotation using Examples 24 and 25.

10. Have students try Questions 6 and 7 in Test Yourself 8.4.

11. Emphasize that in order to describe a rotation, the angle, direction and centre of rotation must be stated.

12. Use Example 26 to explain further.

13. Get students to try Questions 8 and 9 in Test Yourself 8.4.

14. Guide students to solve problems involving rotations using Example 27.

15. Have a volunteer try Question 10 in Test Yourself 8.4. Discuss the answers with them.

16. Ask students to work on the exercises in this subtopic on pages 97 to 100 of the Workbook as their homework.

22nd hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 142.

2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.

3. Revise the lesson using the Quick Revision column on pages 143 and 144.

4. Encourage them to try the QR Quiz on page 144 by scanning the QR code.

5. Ask a student to work out the Spot the Errors on page 101 in the Workbook and discuss with them.

6. Randomly select 5 questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.

7. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Characteristics

1. Thinking skill

2. Problem-solving skill

3. Analyzing skill

Learning Materials

- Focus Smart Plus Mathematics Textbook Mathayom 2

- Focus Smart Plus Mathematics Workbook Mathayom 2

- Grid paper

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Mathayom: .... **Date:** ....

Chapter 8 Transformations

Explanation: Summary of learning outcomes

Feeling after learning this chapter:
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Contents that you need for teacher to explain further:
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Knowledge gained from this chapter:
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Chapter 8 Transformation

Application of knowledge from this chapter on your daily life:
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Contents that you like the most in this chapter (give your reason):
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Exercises that you like and want to be selected as the outstanding work:
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Chapter 9 – Congruence (6 hours)

Strand 2: Measurement and Geometry

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 2.2: 1. Understand and apply the properties of congruent triangles to solve mathematical problems and real-life problems.	• Congruence • Congruence Triangles

Learning Objectives

Students will be taught to:

1. Understand the concept of congruence.
2. Understand congruent triangles.
3. Test for congruent triangles.

Learning Outcomes

Students will be able to:

1. Apply the concept of congruence.
2. Identify two figures that are congruent.
3. Solve problems involving congruence.
4. Understand what congruent triangles means.
5. Identify congruent triangles by applying

   (a) 'Side-Side-Side' test (SSS)

   (b) 'Side-Angle-Side' test (SAS)

   (c) 'Angle-Side-Angle' test (ASA)

- Congruence
- Congruent triangles

Teaching and Learning Activities

1st – 2nd hours (Congruence)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.

2. Using Question 1 in Test Yourself 9.1, guide students to understand congruence either by using tracing paper or measuring the sides or angles of the figures.

3. Using Examples 1 and 2, guide students to solve problems involving congruence.

4. Have three volunteers try Questions 2 to 4 in Test Yourself 9.1. Discuss answers with them.

5. Ask students to work on the exercises in this subtopic on page 105 of the Workbook as their homework.

3rd – 5th hours (Congruent Triangles)

1. Explain to students the meaning of congruence triangles and its symbol.

2. Explain how we denote a pair of congruent triangles. Emphasize the order of the corresponding sides or angles.

3. Using Example 3, show students how to find values of a pair of congruent triangles.

4. Test students' understanding by asking them to answer Question 1 in Test Yourself 9.2.

5. Guide students on how to test and confirm if a pair of triangles is congruent by using 'Side-Side-Side' test, 'Side-Angle-Side' test and 'Angle-Side-Angle' test. Using Examples 4 to 6.

6. Have six students determine if the triangles are congruent in Questions 2 to 4 in Test Yourself 9.2. Discuss the answers with them.

7. Ask students to work on the exercises in this subtopic on pages 105 to 108 of the Workbook as their homework.

6th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 156.

2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.

3. Revise the lesson using the Quick Revision column on page 157.
4. Encourage them to try the QR Quiz on page 111 by scanning the QR code.

5. Ask a student to work out the Spot the Errors on page 109 in the Workbook and discuss with them.

6. Randomly select 5 questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.

7. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Characteristics

1. Thinking skill

2. Problem-solving skill

3. Analyzing skill

Learning Materials

- Focus Smart Plus Mathematics Textbook Mathayom 2
- Focus Smart Plus Mathematics Workbook Mathayom 2

Learning Outcome Form

Name-Surname: …………………………………………………………… **No.** ……………………………

Mathayom: …………………………………………………………… **Date:** …………………………

Chapter 9 Congruence

Explanation: Summary of learning outcomes

Feeling after learning this chapter:
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Contents that you need for teacher to explain further:
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Knowledge gained from this chapter:
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Chapter 9 Congruence

Application of knowledge from this chapter on your daily life:
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Contents that you like the most in this chapter (give your reason):
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Exercises that you like and want to be selected as the outstanding work:
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Chapter 10 – Mean and Data Presentation (11 hours)

Strand 3: Statistics and Probability

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 3.1: 1. Understand and use the knowledge of statistics in presenting and analyzing data from point plot, stem and leaf plot, histogram, mean and also apply statistics into real life with appropriate technology.	• Mean • Data Presentation

Learning Objectives

Students will be taught to:

1. Understand the concept of mean.
2. Use the concept of mean to solve problems.
3. Understand the uses of dot plots, stem-and-leaf plots and histograms.
4. Construct dot plots, stem-and-leaf plots and histograms.
5. Analyze dot plots, stem-and-leaf plots and histograms.

Learning Outcomes

Students will be able to:

1. Understand the concept of mean.
2. Find the mean of a set of data.
3. Find the mean of data in a frequency table.
4. Understand the uses of dot plots, stem-and-leaf plots and histograms.

5. Construct dot plots, stem-and-leaf plots and histograms.

6. Analyze dot plots, stem-and-leaf plots and histograms.

Learning Areas

- Mean
- Dot plots
- Stem-and-leaf plots
- Histograms

Teaching and Learning Activities

1st – 3rd hours (Mean)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.

2. Explain what mean is and how to determine the mean of a set of data. Use Examples 1 and 2 for further explanation.

3. Have four students try Questions 1 and 2 in Test Yourself 10.1. Discuss the answers with them.

4. Using Example 3, use the formula to guide students on how to determine the mean of data presented in frequency tables.

5. Get two volunteers to try Question 3 in Test Yourself 10.1. Discuss the answers with them.

6. Have students work on Questions on pages 112 and 113 of the Workbook as their homework.

4th – 10th hours (Data Presentation)

1. Explain on how to present the collected data.

2. Explain what dot plot is and show steps to construct a dot plot. Use Example 4 for explanation.

3. Using Example 5, guide students on how to answer the questions based on the given dot plot.

4. Have students try Questions 1 to 3 in Test Yourself 10.2. Discuss the answers with them.

5. Explain on how we use stem-and-leaf plot to present data and give steps to construct a stem-and-leaf plot. Refer to Example 6.

6. Have two volunteers try Question 4 in Test Yourself 10.2. Discuss the answers with them.

7. Using Example 7, guide students to answer the questions based on the given stem-and-leaf plot.

8. Have students try Questions 5 and 6 in Test Yourself 10.2.

9. Explain about histograms. Guide students to identify the range, lower limit, upper limit, lower boundary, upper boundary and the size of each class interval using Example 8.

10. Have students try Question 7 in Test Yourself 10.2. Discuss the answers with them.

11. Using Example 9, guide students on how to draw a histogram. Have students try Question 8 in Test Yourself 10.2.

12. Guide students to answer the questions based on the given histogram using Example 10. Have students to try Questions 9 and 10 in Test Yourself 10.2.

13. Have students work on Questions on pages 114 to 125 of the Workbook as their homework.

11th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 173.

2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.

3. Revise the lesson using the Quick Revision column on pages 174 and 175.

4. Encourage them to try the QR Quiz on page 175 by scanning the QR code.

5. Ask a student to work out the Spot the Errors on page 125 in the Workbook and discuss with them.

6. Randomly select 5 questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.

7. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Characteristics

1. Thinking skill

2. Problem-solving skill

3. Analyzing skill

4. Accurately organize, analyze, and interpret data

Learning Materials

- Focus Smart Plus Mathematics Textbook Mathayom 2
- Focus Smart Plus Mathematics Workbook Mathayom 2

Name-Surname: ……………………………………………………… No. ………………………………

Mathayom: …………………………………………………………… Date: …………………………

Chapter 10 Mean and Data Presentation

Explanation: Summary of learning outcomes

Feeling after learning this chapter:

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Contents that you need for teacher to explain further:

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Knowledge gained from this chapter:

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Chapter 10 Mean and Data Presentation

Application of knowledge from this chapter on your daily life:

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Contents that you like the most in this chapter (give your reason):

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Exercises that you like and want to be selected as the outstanding work:

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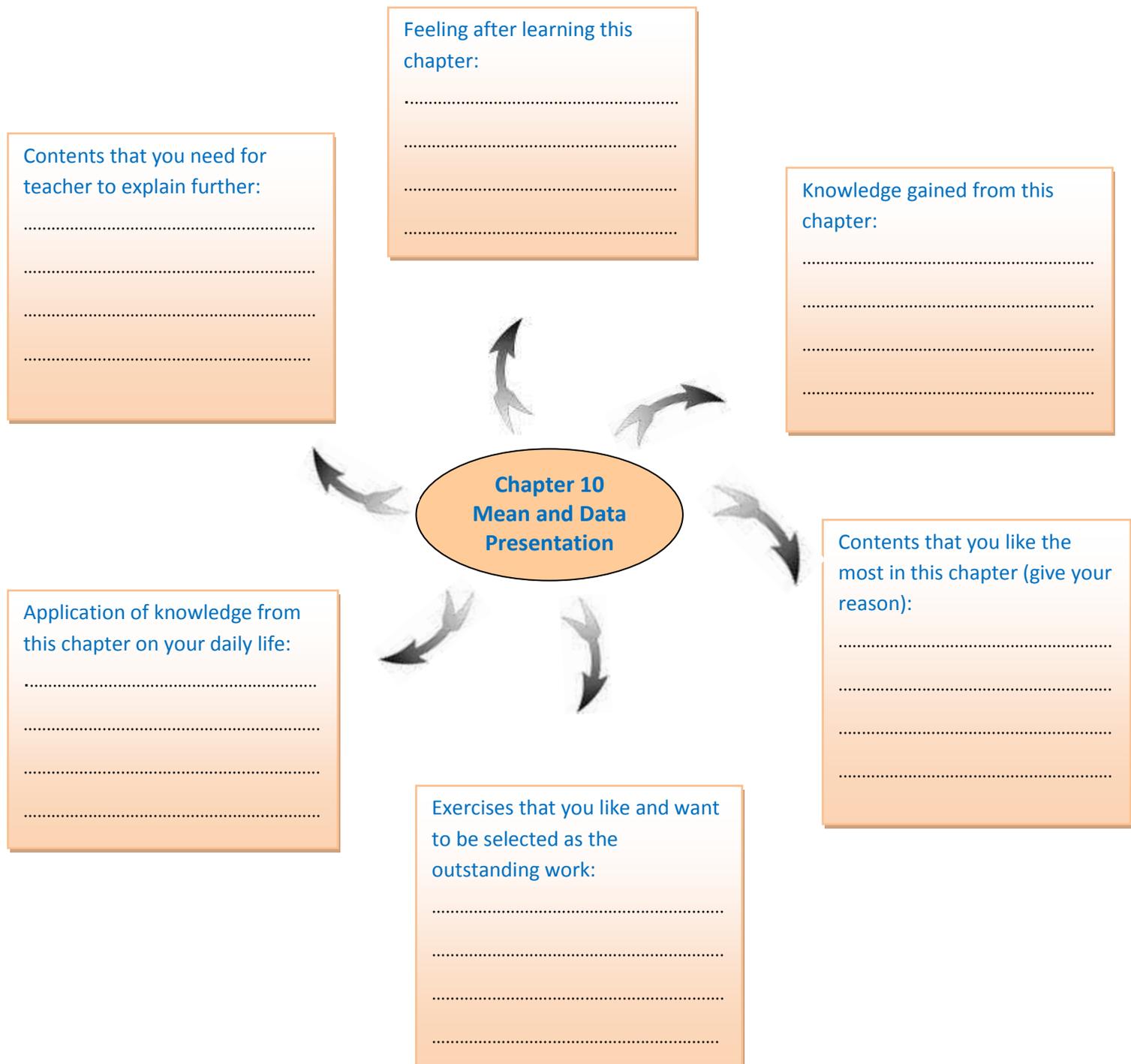
Chapter 11 – Geometrical Constructions (15 hours)

Strand 2: Measurement and Geometry

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 2.2: 1. Use the knowledge of geometry and geometric tools such as compass, straightedge including The Geometer's Sketchpad or other dynamic geometry programs to construct geometric figures and also apply the knowledge of this construction to solve real-life problems.	• Constructions

Objectives

Students will be taught to:

1. Construct basic geometric construction.

2. Construct two-dimensional geometric figures using basic geometric construction.

3. Explain the steps taken.

Learning Outcomes

Students will be able to:

1. Construct
   a. line segments
   b. triangles of given sides
   c. perpendicular lines
   d. angles and angle bisectors

e. triangles of given sides and angles

f. parallel lines

2. Use the knowledge of geometry and geometry tools.

3. Explain the steps taken.

Learning Areas

- Constructions

Teaching and Learning Activities

1st – 14th hours (Constructions)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.

2. Guide students on how to use the Geometer's Sketchpad to construct geometric figures.

3. Teach and guide students on how to construct

   a. line segments (refer to Examples 1 and 2)

   b. triangles of given sides (refer to Example 3)

   c. perpendicular lines (refer to Examples 4 and 5)

   d. angles and angle bisectors (refer to Examples 6 and 7)

   e. triangles of given sides and angles (refer to Examples 8 to 10)

   f. parallel lines (refer to Examples 11 and 12)

4. Explain each step to construct the geometrical figures as students carry out the steps accordingly.

5. Have students try out the questions in Test Yourself 11.1 as they progress.

6. Ask students to do the exercises of this subtopic on pages 130 to 137 of the Workbook as their homework.

15th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 203.

2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.

3. Revise the lesson using the Quick Revision column on pages 203 and 204.

4. Encourage them to try the QR Quiz on page 204 by scanning the QR code.

5. Ask a student to work out the Spot the Errors on page 137 in the Workbook and discuss with them.

6. Randomly select 4 questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.

7. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Characteristics

1. Thinking skill

2. Problem-solving skill

3. Critical thinking skill

4. Analyzing skill

5. Drawing and geometric construction skills

Learning Materials

- Focus Smart Plus Mathematics Textbook Mathayom 2

- Focus Smart Plus Mathematics Workbook Mathayom 2

- Geometer's Sketchpad

Learning Outcome Form

Name-Surname: ………………………………………………… **No.** ………………………………

Mathayom: ………………………………………………………… **Date:** …………………………

Chapter 11 Geometrical Constructions

Explanation: Summary of learning outcomes

Feeling after learning this chapter:

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Contents that you need for teacher to explain further:

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Knowledge gained from this chapter:

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Chapter 11 Geometrical Constructions

Application of knowledge from this chapter on your daily life:

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Contents that you like the most in this chapter (give your reason):

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Exercises that you like and want to be selected as the outstanding work:

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