

**Virtual Learning Academy**  
**Jefferson County Educational Service Center**  
**Academic Content Standards**  
**Math 06**

**Lesson 01 - Factors, Exponents, and Order of Operations; Prime Numbers and Prime Factorization**

Math 6 Lesson 01 - Factors, Exponents, and Order of Operations; Prime Numbers and Prime Factorization

<b>Standard Benchmark and Indicator</b>
S01. Number, Number Sense and Operations
E. Use order of operations, including use of parenthesis and exponents to solve multi-step problems, and verify and interpret the results. (05-07)
06. Use the order of operations, including the use of exponents, decimals and rational numbers, to simplify numerical expressions. (06)
G. Apply and explain the use of prime factorizations, common factors, and common multiples in problem situations. (05-07)
01. Decompose and recompose whole numbers using factors and exponents (e.g., $32 = 2 \times 2 \times 2 \times 2 \times 2 = 2^5$ ) (06)
02. Find and use the prime factorization of composite numbers. For example: (06)
02. Apply the prime factorization to solve problems and explain solutions. (06)

**Lesson 02 - Rational Numbers, GCF, and LCM**

Math 6 Lesson 02 - Rational Numbers, GCF, and LCM

<b>Standard Benchmark and Indicator</b>
S01. Number, Number Sense and Operations
D. Use models and pictures to relate concepts of ratio, proportion and percent. (05-07)
03. Explain why a number is referred to as being "rational," and recognize that the expression (06)
G. Apply and explain the use of prime factorizations, common factors, and common multiples in problem situations. (05-07)
02. Use the prime factorization to recognize the greatest common factor (GCF). (06)
02. Use the prime factorization to recognize the least common multiple (LCM). (06)
02. Apply the prime factorization to solve problems and explain solutions. (06)

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**Lesson 03 - Adding and Rounding Fractions**

Math 6 Lesson 03 - Adding and Rounding Fractions

Standard Benchmark and Indicator
S01. Number, Number Sense and Operations
H. Use and analyze the steps in standard and non-standard algorithms for computing with fractions, decimals and integers. (05-07)
12. Develop and analyze algorithms for computing with fractions and decimals, and demonstrate fluency in their use. (06)
I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents. (05-07)
11. Perform fraction and decimal computations and justify their solutions; e.g., using manipulatives, diagrams, mathematical reasoning. (06)
13. Estimate reasonable solutions to problem situations involving fractions and decimals; e.g., (06)

**Lesson 04 - Adding Mixed Fractions**

Math 6 Lesson 04 - Adding Mixed Fractions

Standard Benchmark and Indicator
S01. Number, Number Sense and Operations
H. Use and analyze the steps in standard and non-standard algorithms for computing with fractions, decimals and integers. (05-07)
12. Develop and analyze algorithms for computing with fractions and decimals, and demonstrate fluency in their use. (06)
I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents. (05-07)
11. Perform fraction and decimal computations and justify their solutions; e.g., using manipulatives, diagrams, mathematical reasoning. (06)

**Lesson 05 - Subtracting Fractions and Mixed Fractions**

Math 6 Lesson 05 - Subtracting Fractions and Mixed Fractions

Standard Benchmark and Indicator
S01. Number, Number Sense and Operations
H. Use and analyze the steps in standard and non-standard algorithms for computing with fractions, decimals and integers. (05-07)
12. Develop and analyze algorithms for computing with fractions and decimals, and demonstrate fluency in their use. (06)

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I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents. (05-07)

11. Perform fraction and decimal computations and justify their solutions; e.g., using manipulatives, diagrams, mathematical reasoning. (06)

**Lesson 06 - Multiplying Fractions and Mixed Fractions; Analyzing Patterns**

Math 6 Lesson 06 - Multiplying Fractions and Mixed Fractions; Analyzing Patterns

**Standard Benchmark and Indicator**

S01. Number, Number Sense and Operations

H. Use and analyze the steps in standard and non-standard algorithms for computing with fractions, decimals and integers. (05-07)

08. Represent multiplication and division situations involving fractions and decimals with models and visual representations; e.g., show with pattern blocks what it means to take (06)

12. Develop and analyze algorithms for computing with fractions and decimals, and demonstrate fluency in their use. (06)

S04. Patterns, Functions and Algebra

A. Describe, extend and determine the rule for patterns and relationships occurring in numeric patterns, computation, geometry, graphs and other applications. (05-07)

01. Represent and analyze patterns, rules and functions, using physical materials, tables and graphs. (06)

**Lesson 07 - Dividing Fractions and Mixed Fractions; Numeric and Geometric Patterns**

Math 6 Lesson 07 - Dividing Fractions and Mixed Fractions; Numeric and Geometric Patterns

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<b>S04. Patterns, Functions and Algebra</b>
A. Describe, extend and determine the rule for patterns and relationships occurring in numeric patterns, computation, geometry, graphs and other applications. (05-07)
02. Use words and symbols to describe numerical and geometric patterns, rules and functions. (06)
E. Use rules and variables to describe patterns, functions and other relationships. (05-07)
02. Use words and symbols to describe numerical and geometric patterns, rules and functions. (06)

**Lesson 08 - Decimals: Estimation, Addition, and Subtraction**

Math 6 Lesson 08 - Decimals: Estimation, Addition, and Subtraction

<b>Standard Benchmark and Indicator</b>
<b>S01. Number, Number Sense and Operations</b>
H. Use and analyze the steps in standard and non-standard algorithms for computing with fractions, decimals and integers. (05-07)
12. Develop and analyze algorithms for computing with fractions and decimals, and demonstrate fluency in their use. (06)
I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents. (05-07)
13. Estimate reasonable solutions to problem situations involving fractions and decimals; e.g., (06)

**Lesson 09 - Test Over Lessons One Through Eight**

**Lesson 10 - Decimals: Equivalence and Multiplication**

Math 6 Lesson 10 - Decimals: Equivalence and Multiplication

<b>Standard Benchmark and Indicator</b>
<b>S01. Number, Number Sense and Operations</b>
H. Use and analyze the steps in standard and non-standard algorithms for computing with fractions, decimals and integers. (05-07)
08. Represent multiplication and division situations involving fractions and decimals with models and visual representations; e.g., show with pattern blocks what it means to take (06)
12. Develop and analyze algorithms for computing with fractions and decimals, and demonstrate fluency in their use. (06)

**Lesson 11 - Decimals: Division**

Math 6 Lesson 11 - Decimals: Division

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<b>S01. Number, Number Sense and Operations</b>
H. Use and analyze the steps in standard and non-standard algorithms for computing with fractions, decimals and integers. (05-07)
08. Represent multiplication and division situations involving fractions and decimals with models and visual representations; e.g., show with pattern blocks what it means to take (06)
12. Develop and analyze algorithms for computing with fractions and decimals, and demonstrate fluency in their use. (06)

**Lesson 12 - Measuring to Nearest Eighth; Equivalent Fractions and Decimals**

Math 6 Lesson 12 - Measuring to Nearest Eighth; Equivalent Fractions and Decimals

<b>Standard Benchmark and Indicator</b>
<b>S01. Number, Number Sense and Operations</b>
H. Use and analyze the steps in standard and non-standard algorithms for computing with fractions, decimals and integers. (05-07)
12. Develop and analyze algorithms for computing with fractions and decimals, and demonstrate fluency in their use. (06)
I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents. (05-07)
11. Perform fraction and decimal computations and justify their solutions; e.g., using manipulatives, diagrams, mathematical reasoning. (06)

**Lesson 13 - Ratios & Proportions; Estimate Reasons Solutions with Fractions and Decimals**

Math 6 Lesson 13 - Ratios & Proportions; Estimate Reasons Solutions with Fractions and Decimals

<b>Standard Benchmark and Indicator</b>
09. Give examples of how ratios are used to represent comparisons; e.g., part-to-
I. Use a variety of strategies, including proportional reasoning, to estimate,
13. Estimate reasonable solutions to problem situations involving fractions and

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decimals; e.g., (06)
14. Use proportional reasoning, ratios and percents to represent problem situations and determine the reasonableness of solutions. (06)

**Lesson 14 - Percents, Fractions, and Decimals**

Math 6 Lesson 14 - Percents, Fractions, and Decimals

<b>Standard Benchmark and Indicator</b>
S01. Number, Number Sense and Operations
C. Develop meaning for percents, including percents greater than 100 and less than 1. (05-07)
05. Use models and pictures to relate concepts of ratio, proportion and percent, including percents less than 1 and greater than 100. (06)
D. Use models and pictures to relate concepts of ratio, proportion and percent. (05-07)
05. Use models and pictures to relate concepts of ratio, proportion and percent, including percents less than 1 and greater than 100. (06)

**Lesson 15 - Percents: Finding Percent and Part; Solving Problems Using Percent**

Math 6 Lesson 15 - Percents: Finding Percent and Part; Solving Problems Using Percent

<b>Standard Benchmark and Indicator</b>
S01. Number, Number Sense and Operations
C. Develop meaning for percents, including percents greater than 100 and less than 1. (05-07)
04. Describe what it means to find a specific percent of a number, using real-life examples. (06)
I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents. (05-07)
14. Use proportional reasoning, ratios and percents to represent problem situations and determine the reasonableness of solutions. (06)
15. Determine the percent of a number and solve related problems; e.g., find the percent markdown if the original price was \$140, and the sale price is \$100. (06)

**Lesson 16 - Measuring Angles; Classifying Triangles and Triangle Properties**

Math 6 Lesson 16 - Measuring Angles; Classifying Triangles and Triangle Properties

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01. Classify and describe two-dimensional and three-dimensional geometric figures and objects by using their properties; e.g., interior angle measures, perpendicular/parallel sides, congruent angles/sides. (06)
02. Use standard language to define geometric vocabulary: vertex, face, altitude, diagonal, isosceles, equilateral, acute, obtuse, and other vocabulary as appropriate. (06)
G. Describe and use properties of triangles to solve problems involving angle measures and side lengths of right triangles. (05-07)
03. Use multiple classification criteria to classify triangles; e.g., right scalene triangle. (06)

**Lesson 17 - Geometry: Lines, Diagonals and Planes; Polygons and Quadrilaterals**

Math 6 Lesson 17 - Geometry: Lines, Diagonals and Planes; Polygons and Quadrilaterals

<b>Standard Benchmark and Indicator</b>
S03. Geometry and Spatial Sense
D. Identify, describe and classify types of line pairs, angles, two-dimensional figures and three-dimensional objects using their properties. (05-07)
01. Classify and describe two-dimensional and three-dimensional geometric figures and objects by using their properties; e.g., interior angle measures, perpendicular/parallel sides, congruent angles/sides. (06)
02. Use standard language to define geometric vocabulary: vertex, face, altitude, diagonal, isosceles, equilateral, acute, obtuse, and other vocabulary as appropriate. (06)
04. Identify and define relationships between planes; i.e., parallel, perpendicular and intersecting. (06)

**Lesson 18 - First Semester Test**

**Lesson 19 - Transformations, Tessellations, and Similar Triangles; Customary Units Conversions and Computations**

Math 6 Lesson 19 - Transformations, Tessellations, and Similar Triangles; Customary Units

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Conversions and Computations

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
F. Describe and use the concepts of congruence, similarity and symmetry to solve problems. (05-07)
06. Draw similar figures that model proportional relationships; e.g., model similar figures with a 1 to 2 relationship by sketching two of the same figure, one with corresponding sides twice the length of the other. (06)
H. Predict and describe results (size, position, orientation) of transformations of two-dimensional figures. (05-07)
05. Predict and describe sizes, positions and orientations of two-dimensional shapes after transformations such as reflections, rotations, translations and dilations. (06)
J. Apply properties of equality and proportionality to solve problems involving congruent or similar figures; e.g., create a scale drawing. (05-07)
06. Draw similar figures that model proportional relationships; e.g., model similar figures with a 1 to 2 relationship by sketching two of the same figure, one with corresponding sides twice the length of the other. (06)

**Lesson 20 - Metric System – Units of Length, Weight, and Capacity**

Math 6 Lesson 20 - Metric System – Units of Length, Weight, and Capacity

Standard Benchmark and Indicator
S02. Measurement
C. Identify appropriate tools and apply appropriate techniques for measuring angles, perimeter or circumference and area of triangles, quadrilaterals, circles and composite shapes, and surface area and volume of prisms and cylinders. (05-07)
03. Estimate perimeter or circumference and area for circles, triangles and quadrilaterals, and surface area and volume for prisms and cylinders by: (06)
03. estimating lengths using string or links, areas using tiles or grid, and volumes using cubes; (06)
03. measuring attributes (diameter, side lengths, or heights) and using established formulas for circles, triangles, rectangles, parallelograms and rectangular prisms. (06)

**Lesson 21 - Perimeter and Area of Triangles and Quadrilaterals**

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Standard Benchmark and Indicator
S02. Measurement
C. Identify appropriate tools and apply appropriate techniques for measuring angles, perimeter or circumference and area of triangles, quadrilaterals, circles and composite shapes, and surface area and volume of prisms and cylinders. (05-07)
03. Estimate perimeter or circumference and area for circles, triangles and quadrilaterals, and surface area and volume for prisms and cylinders by: (06)
03. estimating lengths using string or links, areas using tiles or grid, and volumes using cubes; (06)
03. measuring attributes (diameter, side lengths, or heights) and using established formulas for circles, triangles, rectangles, parallelograms and rectangular prisms. (06)

**Lesson 22 - Perimeter and Area; Effects of Doubling Dimensions**

Math 6 Lesson 22 - Perimeter and Area; Effects of Doubling Dimensions

Standard Benchmark and Indicator
S02. Measurement
C. Identify appropriate tools and apply appropriate techniques for measuring angles, perimeter or circumference and area of triangles, quadrilaterals, circles and composite shapes, and surface area and volume of prisms and cylinders. (05-07)
03. Estimate perimeter or circumference and area for circles, triangles and quadrilaterals, and surface area and volume for prisms and cylinders by: (06)
03. estimating lengths using string or links, areas using tiles or grid, and volumes using cubes; (06)
03. measuring attributes (diameter, side lengths, or heights) and using established formulas for circles, triangles, rectangles, parallelograms and rectangular prisms. (06)
E. Use problem solving techniques and technology as needed to solve problems involving length, weight, perimeter, area, volume, time and temperature. (05-07)
04. Determine which measure (perimeter, area, surface area, volume) matches the context for a problem situation; e.g., perimeter is the context for fencing a garden, surface area is the context for painting a room. (06)
F. Analyze and explain what happens to area and perimeter or surface area and volume when the dimensions of an object are changed. (05-07)
06. Describe what happens to the perimeter and area of a two-dimensional shape when the measurements of the shape are changed; e.g. length of sides are doubled. (06)
G. Understand and demonstrate the independence of perimeter and area for two-dimensional shapes and of surface area and volume for three-dimensional shapes. (05-07)
05. Understand the difference between perimeter and area, and demonstrate that two shapes may have the same perimeter, but different areas or may have the same area, but different perimeters. (06)

**Lesson 23 - Circumference and Area of Circles and Circle Sectors**

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Math 6 Lesson 23 - Circumference and Area of Circles and Circle Sectors

Standard Benchmark and Indicator
S02. Measurement
C. Identify appropriate tools and apply appropriate techniques for measuring angles, perimeter or circumference and area of triangles, quadrilaterals, circles and composite shapes, and surface area and volume of prisms and cylinders. (05-07)
02. Use strategies to develop formulas for finding circumference and area of circles, and to determine the area of sectors; e.g., (06)
03. Estimate perimeter or circumference and area for circles, triangles and quadrilaterals, and surface area and volume for prisms and cylinders by: (06)
03. estimating lengths using string or links, areas using tiles or grid, and volumes using cubes; (06)
03. measuring attributes (diameter, side lengths, or heights) and using established formulas for circles, triangles, rectangles, parallelograms and rectangular prisms. (06)

**Lesson 24 - Solids and 3-D Cube Models**

Math 6 Lesson 24 - Solids and 3-D Cube Models

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
D. Identify, describe and classify types of line pairs, angles, two-dimensional figures and three-dimensional objects using their properties. (05-07)
01. Classify and describe two-dimensional and three-dimensional geometric figures and objects by using their properties; e.g., interior angle measures, perpendicular/parallel sides, congruent angles/sides. (06)
02. Use standard language to define geometric vocabulary: vertex, face, altitude, diagonal, isosceles, equilateral, acute, obtuse, and other vocabulary as appropriate. (06)
I. Identify and draw three-dimensional objects from different views (top, side, front and perspective). (05-07)
07. Build three-dimensional objects with cubes, and sketch the two-dimensional representations of each side; i.e., projection sets. (06)

**Lesson 25 - Volume and Surface Area of Solids**

Math 6 Lesson 25 - Volume and Surface Area of Solids

Standard Benchmark and Indicator
S02. Measurement
C. Identify appropriate tools and apply appropriate techniques for measuring angles, perimeter or circumference and area of triangles, quadrilaterals, circles and composite shapes, and surface area and volume of prisms and cylinders. (05-07)
03. Estimate perimeter or circumference and area for circles, triangles and quadrilaterals, and surface area and volume for prisms and cylinders by: (06)
F. Analyze and explain what happens to area and perimeter or surface area and volume when the dimensions of an object are changed. (05-07)

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01. Understand and describe the difference between surface area and volume. (06)
G. Understand and demonstrate the independence of perimeter and area for two-dimensional shapes and of surface area and volume for three-dimensional shapes. (05-07)
01. Understand and describe the difference between surface area and volume. (06)

**Lesson 26 - Variables, Expressions, and Functions; Properties: Commutative, Associative, and Distributive**

Math 6 Lesson 26 - Variables, Expressions, and Functions; Properties: Commutative, Associative, and Distributive

<b>Standard Benchmark and Indicator</b>
S04. Patterns, Functions and Algebra
A. Describe, extend and determine the rule for patterns and relationships occurring in numeric patterns, computation, geometry, graphs and other applications. (05-07)
01. Represent and analyze patterns, rules and functions, using physical materials, tables and graphs. (06)
C. Use variables to create and solve equations and inequalities representing problem situations. (05-07)
06. Evaluate simple expressions by replacing variables with given values, and use formulas in problem-solving situations. (06)
D. Use symbolic algebra to represent and explain mathematical relationships. (05-07)
03. Recognize and generate equivalent forms of algebraic expressions, and explain how the commutative, associative and distributive properties can be used to generate equivalent forms; e.g., perimeter as $2l$ (06)
G. Write, simplify and evaluate algebraic expressions. (05-07)
06. Evaluate simple expressions by replacing variables with given values, and use formulas in problem-solving situations. (06)
J. Use formulas in problem-solving situations. (05-07)
06. Evaluate simple expressions by replacing variables with given values, and use formulas in problem-solving situations. (06)

**Lesson 27 - Test Over Lessons Nineteen Through Twenty-six**

**Lesson 28 - Negative Numbers and Graphing in the Coordinate Plane**

Math 6 Lesson 28 - Negative Numbers and Graphing in the Coordinate Plane

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e.g., if a running back loses 15 yards on the first carry but gains 8 yards on the second carry, what is the net gain/loss? (06)

S04. Patterns, Functions and Algebra

A. Describe, extend and determine the rule for patterns and relationships occurring in numeric patterns, computation, geometry, graphs and other applications. (05-07)

01. Represent and analyze patterns, rules and functions, using physical materials, tables and graphs. (06)

**Lesson 29 - Exploring Algebra through Diagrams and Pictures**

Math 6 Lesson 29 - Exploring Algebra through Diagrams and Pictures

**Standard Benchmark and Indicator**

S04. Patterns, Functions and Algebra

H. Solve linear equations and inequalities symbolically, graphically and numerically. (05-07)

04. Solve simple linear equations and inequalities using physical models, paper and pencil, tables and graphs. (06)

K. Graph linear equations and inequalities. (05-07)

04. Solve simple linear equations and inequalities using physical models, paper and pencil, tables and graphs. (06)

**Lesson 30 - Simple Equations: Addition, Subtraction, Multiplication, Division**

Math 6 Lesson 30 - Simple Equations: Addition, Subtraction, Multiplication, Division

**Standard Benchmark and Indicator**

S04. Patterns, Functions and Algebra

H. Solve linear equations and inequalities symbolically, graphically and numerically. (05-07)

04. Solve simple linear equations and inequalities using physical models, paper and pencil, tables and graphs. (06)

K. Graph linear equations and inequalities. (05-07)

04. Solve simple linear equations and inequalities using physical models, paper and pencil, tables and graphs. (06)

**Lesson 31 - Rate of Change; Inequalities**

Math 6 Lesson 31 - Rate of Change; Inequalities

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<b>S04. Patterns, Functions and Algebra</b>
C. Use variables to create and solve equations and inequalities representing problem situations. (05-07)
05. Produce and interpret graphs that represent the relationship between two variables. (06)
H. Solve linear equations and inequalities symbolically, graphically and numerically. (05-07)
04. Solve simple linear equations and inequalities using physical models, paper and pencil, tables and graphs. (06)
K. Graph linear equations and inequalities. (05-07)
04. Solve simple linear equations and inequalities using physical models, paper and pencil, tables and graphs. (06)
05. Produce and interpret graphs that represent the relationship between two variables. (06)
L. Analyze functional relationships, and explain how a change in one quantity results in a change in the other. (05-07)
07. Identify and describe situations with constant or varying rates of change, and compare them. (06)
M. Approximate and interpret rates of change from graphical and numerical data. (05-07)
08. Use technology to analyze change; e.g., use computer applications or graphing calculators to display and interpret rate of change. (06)

**Lesson 32 - Constructing Line Graphs, Circle Graphs, and Histograms**

Math 6 Lesson 32 - Constructing Line Graphs, Circle Graphs, and Histograms

<b>Standard Benchmark and Indicator</b>
<b>S05. Data Analysis and Probability</b>
A. Read, create and use line graphs, histograms, circle graphs, box-and-whisker plots, stem-and-leaf plots, and other representations when appropriate. (05-07)
01. Read, construct and interpret line graphs, circle graphs and histograms. (06)

**Lesson 33 - Statistics and Histograms**

Math 6 Lesson 33 - Statistics and Histograms

<b>Standard Benchmark and Indicator</b>
<b>S05. Data Analysis and Probability</b>
B. Interpret data by looking for patterns and relationships, draw and justify conclusions, and answer related questions. (05-07)
05. Describe the frequency distribution of a set of data, as shown in a histogram or frequency table, by general appearance or shape; e.g., number of modes, middle of data, level of symmetry, outliers. (06)
F. Determine and use the range, mean, median and mode to analyze and compare data, and explain what each indicates about the data. (05-07)
04. Understand the different information provided by measures of center (mean, mode and median) and measures of spread (range). (06)

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**Lesson 34 - Displaying Data in Appropriate Graphs**

Math 6 Lesson 34 - Displaying Data in Appropriate Graphs

<b>Standard Benchmark and Indicator</b>
S05. Data Analysis and Probability
D. Compare increasingly complex displays of data, such as multiple sets of data on the same graph. (05-07)
03. Compare representations of the same data in different types of graphs, such as a bar graph and circle graph. (06)
E. Collect, organize, display and interpret data for a specific purpose or need. (05-07)
02. Select, create and use graphical representations that are appropriate for the type of data collected. (06)
G. Evaluate conjectures and predictions based upon data presented in tables and graphs, and identify misuses of statistical data and displays. (05-07)
06. Make logical inferences from statistical data. (06)

**Lesson 35 - Probability: Theoretical and Actual**

Math 6 Lesson 35 - Probability: Theoretical and Actual

<b>Standard Benchmark and Indicator</b>
S05. Data Analysis and Probability
K. Make and justify predictions based on experimental and theoretical probabilities. (05-07)
07. Design an experiment to test a theoretical probability and explain how the results may vary. (06)

**Lesson 36 - Second Semester Test**