

TIMOTHY LUTHERAN SCHOOL
Teaching Objectives/Learner Outcomes

Overall Summary of Subject: Mathematics

God created an orderly world and gave people the ability to learn and apply logical thought and reason. Mathematics develops from this process. Therefore, students at Timothy Lutheran School will receive planned mathematics instruction to help them at appropriate grade levels and maturity levels to:

I. Numbers and Operations

Understand numbers, ways of representing numbers, relationships between numbers and number systems.

Understand meanings of operations and how they relate to one another.

Compute fluently and make reasonable estimates.

II. Algebraic Relationships

Understand patterns, relations and functions.

Represent and analyze mathematical situations and structures using algebraic symbols.

Use mathematical models to represent and understand quantitative relationships.

Analyze change in various contexts.

III. Geometric and Spatial Relationships

Analyze characteristics and properties for two-and three- dimensional geometric shapes and develop mathematical arguments about geometric relationships.

Specify locations and describe spatial relationships using coordinate geometry and other representational systems.

Apply transformations and use symmetry to analyze mathematical situations.

Use visualization, spatial reasoning and geometric modeling to solve problems.

IV. Measurement

Understand measurable attributes of objects and the units, systems, and processes of measurement.

Apply appropriate techniques, tools, and formulas to determine measurements.

V. Data and Probability

Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.

Select and use appropriate statistical methods to analyze data.

Develop and evaluate inferences and predictions based on data.

Understand and apply basic concepts of probability.

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Teaching Objectives/Learner Outcomes

Subject: Mathematics

Grade	Objective
Kindergarten	<p data-bbox="581 239 1029 275">I. <u>Numbers and Operations</u></p> <p data-bbox="537 310 1304 384">1. Understand numbers, ways of representing numbers, relationships among numbers, and number systems</p> <p data-bbox="561 422 1081 457">A. Read, write and compare numbers</p> <ul data-bbox="586 464 1382 951" style="list-style-type: none"> <li data-bbox="586 464 873 495">• Rote count to 100 <li data-bbox="586 499 914 531">• Count by 10's to 100 <li data-bbox="586 535 883 567">• Count by 5's to 50 <li data-bbox="586 571 883 602">• Count by 2's to 10 <li data-bbox="586 606 1373 680">• Count, recognize, represent, name and order numbers to 30 <li data-bbox="586 684 1341 793">• Compare two or more sets (up to ten objects in each group) and identify which set is equal to, more than, or less than the other <li data-bbox="586 798 1333 871">• Estimate the number of objects in a collection up to twenty with reasonable accuracy <li data-bbox="586 875 1312 951">• Understand that the next number in the counting sequence is one more than the number just named <p data-bbox="561 989 1089 1024">B. Compare and decompose numbers</p> <ul data-bbox="586 1031 1333 1104" style="list-style-type: none"> <li data-bbox="586 1031 1333 1104">• Connect number words (orally) and quantities they represent <p data-bbox="537 1142 1373 1215">2. Understand meanings of operations and how they relate to one another</p> <p data-bbox="561 1253 899 1289">A. Represent operations</p> <ul data-bbox="586 1295 1354 1404" style="list-style-type: none"> <li data-bbox="586 1295 1354 1404">• Represent story/picture problems involving addition, subtraction, multiplication, or division for quantities under 10 with manipulative and/or drawings <p data-bbox="537 1442 1256 1478">3. Compute fluently and make reasonable estimates</p> <p data-bbox="561 1516 1143 1551">A. Describe or represent mental strategies</p> <ul data-bbox="586 1558 1333 1631" style="list-style-type: none"> <li data-bbox="586 1558 1333 1631">• Invent ways to represent addition and subtraction story problems using objects, pictures, and symbols <p data-bbox="561 1669 878 1705">B. Compute problems</p> <ul data-bbox="586 1711 1349 1820" style="list-style-type: none"> <li data-bbox="586 1711 1349 1820">• Solve story/picture problems involving addition, subtraction, multiplication, or division for quantities under ten with manipulative and/or drawings <p data-bbox="773 1858 1149 1894"><u>II. Algebraic Relationships</u></p>

1. Understand patterns, relations and functions

A. Recognize and extend patterns

- Recognize or repeat sequences of sounds or shapes

B. Create and analyze patterns

- Identify, copy, extend, and create repeating patterns

C. Classify objects and representations

- Sort a collection of objects by a variety of attributes

2. Represent and analyze mathematical situations and structures using algebraic symbols

A. Represent mathematical situations

- With teacher assistance, represent a mathematical story/picture problem as an expression or number sentence

3. Use mathematical models to represent and understand quantitative relationships

A. Use mathematical models

- Model situations that involve whole numbers, using pictures, objects, or symbols

III. Geometric and Spatial Relationships

1. Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships

A. Describe and use geometric relationships

- Sort two- and three-dimensional shapes by a variety of attributes
- Recognize, sort, and name a minimum of the following basic shapes: square, triangle, circle, rectangle, cube, and cone

2. Specify locations and describe spatial relationships using coordinate geometry and other representational systems

A. Use coordinate systems

- Describe, name, and interpret relative positions in space (above, below, front, behind)

3. Use visualization, spatial reasoning and geometric modeling to solve problems

- A. Recognize and draw three-dimensional representations**
- Identify shapes by their association with objects in the student's environment

IV. Measurement

1. Understand measurable attributes of objects and the units, systems and processes of measurement

- A. Determine unit of measurement**
- Compare and order objects according to their size or weight
- B. Tell and use units of time**
- Describe passage of time, using terms such as morning, afternoon, and evening; today, yesterday, and tomorrow
 - Name the days of the week
 - Use a calendar to tell the day and month
 - Tell time to the nearest hour
- C. Count and compute money**
- Identify penny, nickel, and dime by name and value

2. Apply appropriate techniques, tools, and formulas to determine measurements

- A. Use standard or nonstandard measurement**
- Compare lengths of similar objects (e.g., pieces of ribbon, yarn). Use the terms longer than, shorter than, and the same as
 - Use nonstandard units (unifix cubes, Popsicle sticks, paper clips, etc.) to measure length
 - Use a cup to compare the capacity of various containers. Use the terms holds more than, holds less than, holds the same amount

V. Data and Probability

1. Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them

	<p>A. Formulate questions</p> <ul style="list-style-type: none">• Pose questions and gather data about themselves and their surroundings <p>B. Classify and organize data</p> <ul style="list-style-type: none">• Sort items according to their attributes <p>C. Represent and interpret data</p> <ul style="list-style-type: none">• Represent data using physical objects• Tell what a two-column class graph is about and how many more one column has than the other• Create a simple two-column real graph by sorting a small collection of objects and then graphing the result <p>2. Select and use appropriate statistical methods to analyze data</p> <p>A. Describe and analyze data</p>
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Grade 1

I. Number and Operations

The students will be able to:

1. Orally count to 100.
2. Read and write numbers in order and isolation to 100.
3. Count, read, and write to 100 by 2's, 5's, and 10's.
4. Identify place value by 100's, 10's and 1's.
5. Pose and solve addition and subtraction problems for quantities less than ten.
6. Memorize addition and subtraction facts to ten.
7. Describe or represent the mental strategy used to compute a problem.
8. Identify and understand fractional parts.
9. Estimate and justify solutions.

II. Algebraic Relationships

The students will be able to:

1. Recognize and extend patterns.
2. Create and analyze patterns: describe how simple repeating patterns are generated.
3. Classify objects by size or number.

III. Measurement

The students will be able to:

1. Count and compute money.
 - a. Identify coins and values of penny, nickel, dime, and quarter.
 - b. Count mixed coins to 30 cents or beyond.
 - c. Do simple money word problems.
2. Tell time to the hour and half hour.
3. Compare and measure length, weight, and capacity with nonstandard and customary units.
4. Select the appropriate tool for the object being measured.
5. Know the days of the week and the months of the year in sequential order.

IV. Geometric and Spatial Relationships

The students will be able to:

1. Recognize and name two- and three-dimensional shapes using physical models (circle, trapezoid, triangle, rectangle, rhombus, sphere, a rectangular prism, a cylinder, pyramid).
2. Recognize geometric shapes and structures in the student's environment and specify the shape's location.
3. Use coordinate system.
4. Describe the name and interpret relative positions in space (left, right).
5. Understand the terms congruent and symmetry.

6. Identify congruent figures and lines of symmetry.

V. Data and Probability

The students will be able to:

- 1. Classify and organize data by sorting and classifying items according to their attributes.**
- 2. Represent and interpret data.**
- 3. Represent data using pictures and bar graphs.**

Grade 2

I. Number and Operations

The students will be able to:

1. Read and write numbers in order and isolation between 100-999.
2. Build numbers through the 100's place.
3. Add and subtract two- and three-digit numbers with and without renaming.
4. Memorize addition and subtraction facts with 85% accuracy.
5. Use a variety of strategies to solve number and word problems.
6. Be able to demonstrate fractions:
 $1/2, 1/3, 2/3, 2/4, 3/4, \text{ and } 1/4$.
7. Compare numbers.
8. Count to 100 by 1's, 2's, 5's, and 10's.
9. Recognize even and odd numbers.
10. Experiment with estimations.
11. Become familiar with multiplication facts of two and five.
12. Use a variety of strategies, such as known facts, tens or landmark numbers to solve problems.

II. Algebraic Relationships

The students will be able to:

1. Describe and extend simple numeric patterns and change from one representation to another.
2. Describe how simple growing patterns are generated.
3. Classify objects by size, number or other attributes.
4. Investigate the commutative property with whole numbers.
5. Model situations that involve addition and subtraction of whole numbers, using pictures, objects, or symbols.
6. Describe qualitative change, such as students growing taller.

III. Measurement

The students will be able to:

1. Select an appropriate tool and unit for the attribute being measured.
2. Identify and use standard measurement.
3. Identify coins and values of penny, nickel, dime, quarter, half-dollar, and dollar.
4. Count mixed coins to \$1.00 and beyond.
5. Make change.
6. Solve money word problems.
7. Tell time to the hour, half-hour, and the quarter-hour.

8. Introduce concept of elapsed time.

IV. Geometric and Spatial Relationships

The students will be able to:

- 1. Describe attributes and parts of two- and three-dimensional shapes, circles, triangles, trapezoid, rectangle, rhombus, sphere, rectangular prism, cylinder, pyramid).**
- 2. Find and name locations with simple relationships on a coordinate system.**
- 3. Use manipulative to model flips.**
- 4. Recognize and create shapes that have symmetry.**
- 5. Recognize and represent shapes from different perspectives.**

V. Data and Probability

The students will be able to:

- 1. Pose questions and gather data about themselves and their surroundings.**
- 2. Sort and classify items according to their attributes and organize data about the items.**
- 3. Represent data using pictures and bar graphs.**

Grade 3

I. Number and Operations

The students will be able to...

1. Count by 1's to any whole number and skip count by 2's, 3's, 5's, and 10's.
2. Read, write, and compare whole numbers up to 999,000 and decimals to the hundredths.
3. Represent commonly used fractions: $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$.
4. Compare and order fractions and mixed numbers.
5. Model different equivalent fractions for a given fraction.
6. Recognize equivalent representations for the same number and generate them by decomposing and composing numbers.
7. Classify numbers by odd and even.
8. Represent a given situation involving multiplication.
9. Write a number sentence that describes the relationship between any pair of whole numbers.
10. Apply commutative and identity properties of addition of whole numbers.
11. Identify the place value of any numeral up to six spaces to the left of the decimal point and two spaces to the right of the decimal point.
12. Round a number to the nearest ten, hundred, or thousand.
13. Develop fluency of basic number relationships (12×12) of multiplication and division.
14. Apply and describe the strategy used to compute a three-digit addition or subtraction problem.
15. Estimate and find the sum of three or more whole numbers and sum or differences of two-, three-, or four-digit numbers.
16. Find the product of two one-digit whole numbers and a one-digit number multiplied by a two-digit number.
17. Use a calculator to make mathematical discoveries.

II. Measurement

The students will be able to...

1. Identify, justify, and use the appropriate unit of measure (linear, time, weight.)
2. Tell time of the nearest five minutes.
3. Determine elapsed time.
4. Find the area and perimeter of two-dimensional figures.
5. Convert linear measurement from centimeter to meters, inches to feet, and vice versa.
6. Determine change from \$5.00 and add and subtract

money values to \$5.00.

III. Algebraic Relationships

The students will be able to...

1. Represent patterns using words, tables, or graphs.
2. Represent a mathematical situation as an expression.
3. Model multiplication problems with objects or drawings.

IV. Geometric and Spatial Relationships

The students will be able to...

1. Identify, describe, and compare two- and three-dimensional figures (circle, rectangle, rhombus, trapezoid, triangle, rectangular prism, cylinder, pyramid, and sphere).
2. Predict the results of putting together or taking apart two- and three-dimensional shapes.
3. Describe location using geometric vocabulary (forward, back, left, right, north, south, east, west).
4. Identify congruent and symmetrical figures.
5. Identify lines of symmetry in polygons.

V. Data and Probability

The students will be able to...

1. Collect and display data in the form of tables, bar graphs, and pictographs.
2. Formulate questions and make predictions based on organized data.
3. Locate or name ordered pairs on a coordinate grid.

Grade 4

The students will be able to:

- 1. Read, write and compare decimals to the hundredths place and whole numbers up to six digits.**
- 2. Use models, benchmarks and equivalent forms to judge the size of fractions.**
- 3. Recognize equivalent representations for the same number and generate them by decomposing and composing numbers.**
- 4. Classify and describe numbers by their characteristics, including odd, even and multiples.**
- 5. Represent and recognize multiplication, using various models, including sets and arrays.**
- 6. Apply commutative and identity properties of multiplication to whole numbers.**
- 7. Represent a mental strategy used to compute a given multiplication problem (up to two-digit by two-digit multiple of).**
- 8. Demonstrate fluency with basic number relationships (12 X 12) of multiplication and division.**
- 9. Apply and describe the strategy used to compute a given**
 - multiplication problem up to a two-digit by two-digit.**
 - division problem up to a three-digit by one-digit.**
- 10. Estimate and justify the results of multiplication of whole numbers.**
- 11. Describe geometric and numeric patterns.**
- 12. Analyze patterns using words, tables and graphs.**
- 13. Represent a mathematical situation as an expression or number sentence.**
- 14. Apply the commutative property of multiplication to whole numbers.**
- 15. Model problem situations, using representations such as graphs, tables or number sentences.**
- 16. Describe mathematical relationships in terms of constant rates of change.**
- 17. Identify and describe the attributes of two- and three-dimensional shapes (prisms, cones, parallelism, perpendicularity).**
- 18. Describe the results of subdividing, combining and transforming shapes.**
- 19. Describe movement using common language and geometric vocabulary (forward, back, left, right, north, south, east, west).**
- 20. Predict the results of sliding/ translating, flipping/reflecting or turning/ rotating around the center point of a polygon.**
- 21. Construct a figure with multiple lines of symmetry and**

identify the lines of symmetry.

22. Given the picture of a prism, identify the shapes of the faces.

23. Identify and justify the unit of linear measure, including perimeter and customary metric.

24. Identify equivalent linear measures within a system of measurement.

25. Tell time to the nearest minute.

26. Determine change from \$10.00 and add and subtract money values to \$10.00.

27. Select and use benchmarks to estimate measurements (linear, capacity, weight).

28. Select and use benchmarks to estimate measurements of 0-, 45-, 90- degree angles.

29. Determine the area of a polygon on a rectangular grid.

30. Collect data using observations, surveys and experiments.

31. Create tables or graphs to represent categorical and numerical data (including line plots).

32. Describe important features of the data set.

33. Given a set of data, propose and justify conclusions that are based on the data.

Grade 5

The students will be able to:

- 1. Read, write, compare and order unit fractions and decimals to thousandths.**
- 2. Recognize and generate equivalent forms of commonly used fractions, decimals and percents.**
- 3. Recognize equivalent representations for the same number and generate them by decomposing and composing numbers.**
- 4. Describe numbers according to their characteristics, including whole number factors, prime or composite, odd or even and square numbers.**
- 5. Represent and recognize division, using various models, including quotative and partitive.**
- 6. Describe the effects of multiplying and dividing whole numbers as well as the relationship between the two operations.**
- 7. Apply the distributive and associative properties to whole numbers.**
- 8. Describe a mental strategy used to compute a given division problem, where the quotient is a multiple of ten and the divisor is a one-digit number (e.g., $350 \div 7$).**
- 9. Apply and describe the strategy used to compute a given division problem up to a 3- digit by 2-digit.**
- 10. Estimate and justify the results of division of whole numbers.**
- 11. Make and describe generalizations about geometric and numeric patterns.**
- 12. Represent and analyze patterns, using words, tables and graphs.**
- 13. Represent a mathematical situation as an expression or number sentence, using a letter or symbol.**
- 14. Apply the distributive and associative properties to whole numbers.**
- 15. Model problem situations and draw conclusions, using representations such as graphs, tables or number sentence.**
- 16. Identify, model and describe situations with constant or varying rates of change.**
- 17. Analyze 2- and 3-dimensional shapes by describing the attributes.**
- 18. Predict and justify the results of subdividing, combining and transforming shapes.**
- 19. Use coordinate systems to specify locations, describe paths and find the distance between points along horizontal and vertical lines.**
- 20. Predict, draw and describe the results of sliding/translating, flipping/reflecting and turning/ rotating**

around a center point of a polygon.

21. Identify polygons and designs with rotational symmetry given a net of a prism or cylinder; identify the three-dimensional shape.

22. Identify and justify the unit of measure for area (customary and metric).

23. Identify the equivalent weights and equivalent capacities within a system of measurement.

24. Solve problems involving elapsed time (hours).

25. Describe how to solve problems involving the area of polygons and non-polygonal regions imposed on a rectangular grid.

26. Convert from one unit to another within a system of measurement (linear).

27. Evaluate data collection methods.

28. Describe methods to collect, organize and represent categorical and numerical data.

29. Compare related data sets.

30. Compare different representations of the same data and evaluate how well each representation shows important aspects of the data.

31. Given a set of data, make and justify prediction(s).

32. Describe the degree of likelihood of events, using such words as certain, equally likely and impossible.