

**LESA
Mathematics Curriculum
2007**

1. Number Sense and Operations

(NCTM 2000 #1; MO #5 & 9; IL #6)

A. Demonstrate knowledge and use of numbers: representations, systems, and relationships.

<u>Objective</u>	<u>Suggested Activities</u>	<u>Suggested Assessment</u>
The student will be able to: 1 - read and write standard numerals through 100 millions.	Have students record and read numerals dictated by teacher.	Teacher observation
2 - identify parts of a whole.	Use fraction bars to visualize parts of a whole.	Worksheets/daily assignments
3 - recognize simplest form in mixed and improper fractions.	Use fraction bars to help visualize parts of a whole.	Teacher observation
4 - understand exponents to the 3rd power.	Use area of squares and volume of cubes to show exponents.	Daily assignments, Testing
5 - understand the concept of greatest common factor.	List factors of a number.	In class board examples and daily activities
6 - understand the concept of least common multiple.	List multiples of a given number.	In class board examples and daily activities
7 - understand the concept of a prime number.	List multiples of prime numbers.	In class board examples and daily activities
8 - recognize numbers less than zero by extending the number line and through familiar applications.	Use real world applications such as temperature and sea level.	Student demonstration

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B. Demonstrate knowledge of operations, properties, and their relationships.

<u>Objective</u>	<u>Suggested Activities</u>	<u>Suggested Assessment</u>
<p>The student will be able to:</p> <p>1 - identify place value to hundred millions.</p>	Have students enter large numbers on the calculator and identify what numbers are in each place.	Teacher observation
2 - compare and order whole numbers to millions.	2a. Have students sequence whole numbers with at least 9 digits. 2b. Use a place value chart.	Worksheets/daily assignments, Testing
3 - write the expanded form of numbers.	Use a place value chart.	Student demonstration
4 - convert whole numbers to improper fraction.	Classroom and board practice	Teacher observation
5 - convert fractions to decimals and percentages.	Practice in groups.	Teacher observation
6 - understand decimals, fractions, and percents and how they relate.	Plot decimals, fractions, and percents on a number line.	Pre-test, Post-test
7 - recognize the commutative, associative, and identity property of addition.	Com: $35 + 250 = 250 + 35$. As: For $49 + 49 = \underline{\quad}$, use manipulatives to change it into $50 + 48$ which is 98. Id: $129 + 0 = 129$.	Student demonstration

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8 - recognize commutative, associative, distributive, zero, and identity properties of multiplication.

Com: 10 groups of 6 is the same as 6 groups of 10. As: Think of 7×8 as $[(7 \times 4) \times 2]$. Dis: For $5 \times 14 = \underline{\quad}$, say 5×10 is 50 and 5×4 is 20, $50 + 20 = 70$.
Z: $6 \times 0 = 0$. I: $6 \times 1 = 6$.

Pre-test, Post-test

9 - determine equivalent fractions.

Use Cuisenaire rods, etc. to construct equivalent fractions.

Student demonstration

C. Demonstrate fluency in computation and make appropriate estimates.

Objective

The student will be able to:

1 - add through 6-digit numbers with and without regrouping.

2 - multiply a 3-digit number by a 2-digit number.

3 - add and subtract fractions, mixed numbers, with like and unlike denominators.

Suggested Activities

Assign daily work using 6-digit numbers with and without regrouping. Use graph paper to facilitate row alignment.

Practice working problems on board and paper. Use graph paper to facilitate row alignment.

Use manipulatives and/or drawings to demonstrate operations of adding and subtracting fractions. (Must choose numbers that students can model.)

Suggested Assessment

Teacher observation

Worksheets/daily assignments

Daily assignment and/or testing

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4 - round numbers to the nearest 10 thru 100,000,000.	Practice skill using a series of numbers.	Daily assignments and/or testing
5 - master basic facts of adding (0-18), subtracting (0-9), multiplication (0-12) and division (0-9).	Play Around the World, Bingo games, or flash cards.	Timed testing
6 - estimate problems to determine if answer is logical.	Determine the relationship between the estimated and actual answers of problems.	Worksheets
7 - divide with 4-digit dividends by 2 digit divisors.	Worksheets	Teacher assessment
8 - determine the divisibility rules of 2, 5, and 10.	Worksheets	Teacher assessment

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2. Patterns, Relationships, and Algebraic Methods

(NCTM 2000 #2; MO #8; IL #8)

A. Describe numerical relationships using patterns and functions.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - create, recognize, and extend a wide variety of patterns.

Describe all patterns from a common design.

Worksheets, Board work, Daily assignments

2 - look at a mathematical pattern and correctly identify the next term(s).

2a. List a pattern of numbers or shapes with missing items. What are the missing items?
2b. Magic Squares

Student demonstration

3 - use patterns and functions to represent and solve problems.

Practice word problems for pattern determination.

Student demonstration

B. Describe numerical relationships using mathematical models.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - recognize commutative, associative, distributive, zero, and identity properties of multiplication.

Com: 10 groups of 6 is the same as 6 groups of 10. As: Think of 7×8 as $[(7 \times 4) \times 2]$. Dis: For $5 \times 14 = \underline{\quad}$, say 5×10 is 50 and 5×4 is 20, $50 + 20 = 70$.
Z: $6 \times 0 = 0$. I: $6 \times 1 = 6$

Pre-test, Post-test

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C. Analyze, interpret, and solve problems using algebraic concepts and expressions.

<u>Objective</u>	<u>Suggested Activities</u>	<u>Suggested Assessment</u>
The student will be able to: 1 - investigate the use of variables and open sentences in expressing relationships.	Have students discover the use of variables in their daily math activities. For example: You have 5 cookies. You ate 3. How many do you have left?	Teacher observation
2 - express mathematical relationships using equations.	Write equations from word problems.	Pre-test, Post-test
3 - solve equations with one variable using all operations.	Write the math equation needed to solve a word problem. Use a variable to represent the missing value.	Worksheet and quiz
4 - solve for perimeter, area, and volume using algebraic formulas.	Find perimeter of square or rectangle. Find area of a square or rectangle. Find volume of rectangular prisms, using everyday items such as textbooks, doors, playing cards, etc.	Worksheet on square and rectangle, Teacher observation
5 - solve a picture by using graphing coordinates.	Create a picture using coordinates.	Partner successfully duplicates the picture.
6 - compare and contrast equations and inequalities.	Given a number sentence, students will correctly insert $<$, $>$, $=$, using worksheets and board work.	Student demonstration

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D. Analyze change in various contexts.

Objective

The student will be able to:

1 - quantify change.

2 - investigate how change in a variable relates to a change in a second variable.

Suggested Activities

Measure students' heights at beginning and end of year and discuss differences.

Make a line graph to show changes.

Suggested Assessment

Student demonstration

Pre-test, Post-test

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3. Geometry

(NCTM 2000 #3; MO #6; IL #9)

A. Analyze characteristics and properties of geometric shapes and develop mathematical arguments about geometric relationships.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - identify, compare, and analyze attributes of two- and three-dimensional shapes and develop vocabulary to describe the attributes.

Provide models of shapes and solids for identification. Have students learn correct vocabulary for each shape.

Test vocabulary and shape sight.

2 - classify two- and three-dimensional shapes according to their properties and develop definitions of classes of shapes such as triangles and pyramids.

Same as above

Group class work with teacher observation

3 - recognize and identify various angle types and their appropriate names.

Draw and label each angle using correct vocabulary for each angle.

Test over vocabulary terms

4 - calculate a circle's radius or diameter when given the other measurement.

Provide several sizes of circles and have students measure either the diameter or the radius. Use the formula/relationship to find the other measurement.

Check homework

5 - identify lines, rays, segments, points, and planes.

Have students draw examples of each and trade with a partner who will identify them.

Teacher observation

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B. Specify locations and describe spatial relationships using representational systems.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - describe location and movement using common language and geometric vocabulary.

Relate line position with common everyday objects, i.e., parallel, railroad tracks, intersecting lines, street intersections.

Teacher observation of student correct association

2 - find the distance between points along horizontal and vertical lines of a coordinate system.

Make a picture grid, connecting points on the grid to form a particular object.

Work in groups to see if others can draw another's picture.

3 - locate points on a grid.

Play Battleship.

Teacher observation

C. Apply transformations and use symmetry to analyze mathematical situations.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - predict and describe the results of sliding, flipping, and turning two-dimensional shapes.

Use tangrams to design pictures using the results of sliding, flipping, and turning.

Display results.

2 - identify and describe line and rotational symmetry in two- and three-dimensional shapes and designs.

Construct symmetrical designs by folding and cutting.

Check duplication of design.

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3 - explore congruence and similarity.	Match and classify congruent and similar shapes.	Student demonstration
4 - recognize symmetrical and asymmetrical figures.	Do an ink blot art project.	Assess art activity.

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

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - build and draw geometric objects.	Construct geometric objects from printed patterns.	Teacher observation
2 - recognize geometric ideas and relationships and apply them to other disciplines and to problems that arise in the classroom or in everyday life.	Construct a geometric collage by tearing a selected shape, i.e., triangle, square, rectangle, etc., repeatedly, and construct a design on a large sheet of paper.	Display results.

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4. Measurement

(NCTM 2000 #4; IL #7)

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

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute.

Choose appropriate measuring tools for each item to be measured.

Group work with teacher observation

2 - use money effectively.

Create a store and purchase object with play money. Practice making change. Practice using coins to equal a dollar.

Group work with teacher observation

3 - use a calendar effectively.

Use a calendar to determine past and future dates.

Evaluate class work.

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

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - select and apply appropriate standard units and tools to measure length, area, volume, weight, time, and temperature.

Using appropriate measuring tools for each measurement needed, measure items of interest.

Observation of daily classroom work

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2 - select and use benchmarks to estimate measurements.	Consistent use of everyday objects to associate with measurement, i.e., use a paper clip to represent a gram.	Observation of daily classroom work
3 - develop, understand, and use formulas to find the area of rectangles and related triangles and parallelograms.	Memorize formulas for each. Measure an object then find the perimeter and area.	Worksheets, Testing
4 - develop strategies to determine the surface areas and volumes of rectangular solids.	Memorize formulas for each. Measure an object then find the surface area and volume.	Worksheets, Testing
5 - carry out simple unit conversions, such as from centimeters to meters, within a system of measurement.	Memorize units of conversion and practice changing one measurement to the other.	Daily assignments, Testing
6 - be able to measure the perimeter and area of a shape.	Memorize formulas for each. Measure an object then find the perimeter and area.	Group work with teacher observation

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5. Data Analysis and Probability

(NCTM 2000 #5; MO #7 ; IL #10)

A. Formulate and answer questions by collecting and organizing data and communicate findings.

<u>Objective</u>	<u>Suggested Activities</u>	<u>Suggested Assessment</u>
The student will be able to: 1 - choose the questions for a survey/experiment.	Use a class discussion.	Teacher observation
2 - collect data for chosen survey/experiment.	Use class discussion.	Teacher observation
3 - construct, read, and interpret displays of data: pictographs, bar graphs, line graphs, line plots, and circle graphs.	Make graphs representing student interest on a specific topic. Have students interpret the information.	Display results.
4 - decide which type of graph is best used to show information.	Children must decide on type of graph to use.	Have students vote on the most accurate graph.

B. Use appropriate statistical methods to analyze data properly.

<u>Objective</u>	<u>Suggested Activities</u>	<u>Suggested Assessment</u>
The student will be able to: 1 - find the mean (average), median, and range for a set of data.	Give students their grades for a certain subject and have them find the mean, median and range for their grades.	Teacher evaluation

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C. Develop and evaluate inferences and predictions that are based on data.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - justify conclusions and predictions that are based on data.

Have students write an explanation of graph results using the data provided.

Evaluate written work.

2 - solve problems involving graphs, tables, charts, and schedules.

Give examples of graphs and have students interpret the information and make a decision regarding the data.

Student demonstration

D. Understand and apply basic concepts of probability.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - test to find outcome of experiments of chance.

Roll two different colored dice or toss four different kinds of coins. List all of the possible outcomes. (Dice: 36 outcomes, Three coins: 16 outcomes)

Teacher observation

2 - find the probability of an event and make predictions.

In groups, predict from a coin toss, throw of die, or game spinner. Record prediction and outcome.

Teacher observation

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6. Discrete Math

(MO #10)

A. Apply systematic listing, counting, and reasoning.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - predict whether the set contains more or fewer of one subset than the other.

Make predictions and count items in sets.

Teacher observation

2 - explain how subsets of objects are the same or different.

Categorize objects. Give explanation for groupings.

Teacher observation

3 - apply the concept of "fair division" to real world situations.

Distribute treats to the class equally and decide what to do with the remainder.

Student demonstration

B. Apply discrete mathematical modeling using graphs and trees.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - determine a path through a maze, whether a street network could be traveled going over each street one time, and the shortest distance traveling on a network of roads or streets.

Provide a map of the city and determine shortest or most effective route to certain point from a given point.

View work.

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C. Use iterative (repetitive) patterns and processes.

Objective

The student will be able to:

1 - determine and continue a pattern using inductive reasoning.

Suggested Activities

Continue pattern using manipulatives.

Suggested Assessment

Teacher observation

D. Organize and process information.

Objective

The student will be able to:

1 - identify and discuss overlapping subsets of objects (Venn diagrams).

2 - solve problems involving graphs, tables, charts, and schedules.

Suggested Activities

Construct a Venn diagram or web.

Give examples of graphs and have students interpret the information.

Suggested Assessment

Teacher observation

Evaluate class work.

E. Find the best solution to the problems using algorithms.

Objective

The student will be able to:

1 - create algorithms based on constructing meaning from explorations.

Suggested Activities

Perform mathematical computations.

Suggested Assessment

Test for accuracy.

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7. Problem Solving and Reasoning

(NCTM 2000 #6 & 7a; MO #1 & 3; IL #1)

A. Apply and adapt appropriate strategies to solve problems.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - build new mathematical knowledge through problem solving.

After explanation of a new concept in mathematics, the student will work problems in the new concept.

Homework, Testing

2 - identify the problem and choose the correct basic operation.

Read, listen, and write your own story problem.

Student demonstration

3 - recognize unnecessary information from necessary information in a word problem.

Make list of necessary and unnecessary information in a word problem.

Teacher evaluation

4 - solve multi-step problems.

Homework sheet of multi-step problems

Teacher evaluation

5 - use different strategies to solve problems.

Practice using multiple strategies, i.e., pictures, working backwards, etc.

Teacher evaluation

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B. Use reasoning to build new mathematical knowledge through problem solving.

<u>Objective</u>	<u>Suggested Activities</u>	<u>Suggested Assessment</u>
The student will be able to: 1 - explain why an operation would give a correct answer.	Oral explanation after completing a problem - connect the procedure used to the concept of the operation.	Teacher/student interaction
2 - recognize the practicality of estimation.	Determine through estimation if you have enough money to make a purchase.	Teacher/student interaction
3 - locate errors in incorrectly worked problems.	Teacher will put incorrect computations on board and have class analyze what is wrong.	Corrected work

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8. Communication

(NCTM 2000 #7b, 8, & 10; MO #2; IL #2, 3, & 4)

A. Work both cooperatively and individually.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - work productively as an individual.

Complete developmentally-appropriate mathematical task without help.

Teacher observation

2 - work productively in groups.

2a. Pair students to help one another on problems.

Observe how students work together.

2b. Allow pairs of students to play games that teach math vocabulary or that reinforce facts or skills.

B. Represent mathematical data and concepts using a variety of media, including technology.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - use computer software to connect to other curricular areas.

Use a website to obtain data from other academic areas.

Observe effective application

2 - use a calculator properly.

Students grade homework papers using a calculator.

Teacher observation

3 - use paper/pencil, chalk/white board effectively.

Students perform seat and board work.

Teacher observation

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C. Analyze, evaluate, and communicate mathematical thinking using the language of mathematics coherently and clearly.

<u>Objective</u>	<u>Suggested Activities</u>	<u>Suggested Assessment</u>
The student will be able to: 1 - organize and consolidate their mathematical thinking through communication.	Working at the board, the student will explain the process of problem solving.	Teacher evaluation
2 - communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	Working in groups, the students will work problems together, explaining to each how the problem is solved.	Teacher observation
3 - write word problems to express a mathematical situation.	Design a set of word problems around a specific topic.	Teacher evaluation

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9. Connections

(NCTM 2000 #9; MO #4 ; IL #5)

A. Use technology to access and process information.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - use the computer to access information about a specified subject.

Using the computer and a specified website, the student will gather information about a topic.

Teacher assessment

B. Understand how mathematical ideas connect internally, among other disciplines, and in daily life to build on one another and produce a coherent whole.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - read and create a time line in social studies and reading.

Students will choose a time period in history and create a timeline.

Teacher observation

2 - use measurements in science.

Students perform a teacher-determined science experiment.

Teacher checks the results of the experiment.

3 - relate math to everyday life experiences.

Use a recipe to create a measurement lesson.

Enjoy eating outcome.

4 - use outline in language arts.

Correct use of Roman and Arabic numerals.

Teacher checks the outline for accuracy.