

Grade level: Second

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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.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - count and recognize "how many" in sets of objects.

Use manipulatives to join and separate sets.

Accurately join and separate sets.

2 - use multiple models to develop place value and the base-ten number system to the thousands.

Give a base of 10 blocks. Have students solve a series of +, -, and x problems.

Performance based assessment

3 - develop understanding of the relative position and magnitude of whole numbers and ordinal numbers.

Have students stand in line and point out each student's position using ordinal numbers.

Discuss various positions in the line using ordinal numbers.

4 - recognize and write over 100.

Flashcard activities for numerical recognition and sequencing

Correctly write and recognize numbers to 1000.

5 - represent commonly used fractions such as $\frac{1}{4}$, $\frac{1}{3}$, and $\frac{1}{2}$.

Draw a circle and shade various fractions of the whole.

Correctly name the shaded fractions.

6 - explore sums to 20.

Use sums of 10 and doubles strategies. Because 8 and 2 is 10, then 8 and 6 is 14. Because 8 and 8 is 16, then 8 and 9 is 17.

Written work

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

Objective

The student will be able to:

1 - add and subtract whole numbers and see the relationship between the two operations.

2 - use sums to 10 and doubles to solve 2-digit math problems, including regrouping.

3 - multiply and divide whole numbers.

4 - see the relationship between multiplying and dividing.

Suggested Activities

Students use the same three numbers to make two addition and two subtraction sentences.

For $32 - 18 = \underline{\quad}$, think shopping. I have \$32 in my pocket. If I owe the store clerk \$18, and I give her \$20, I still have \$12 in my pocket plus the \$2 change is \$14. For $49 + 49 = \underline{\quad}$, use manipulatives to change it into $50 + 48$ which is 98.

Using a pile of objects, create two equal groupings, three equal groupings, etc.

Fact families

Suggested Assessment

Students use different colors connecting cubes to model each fact.

Written work

Students draw an array to show multiplication and division sentences.

Performance based assessment

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C. Demonstrate fluency in computation and make appropriate estimates.

Objective

The student will be able to:

1 - develop and use strategies for whole number computations, with a focus on addition and subtraction.

2 - develop fluency with basic number combinations for addition and subtraction to 20.

3 - use a variety of methods and tools to compute (mental math, calculators and manipulatives).

4 - estimate to see if an answer is reasonable.

Suggested Activities

Use a number line to add or subtract.

Students use flash cards to practice addition and subtraction facts.

Use a hundreds chart to add or subtract.

Use tens to estimate the sum for a two-digit addition problem.

Suggested Assessment

Starting with the greater number, correctly solve addition and subtraction sentences.

Students take a one minute timed written test.

Students have correct answers.

Students use tens to check if answer is reasonable.

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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 - sort, classify, and order objects by size, number, and other properties.

Use pattern blocks to put like shapes together.

Students will classify pattern blocks correctly.

2 - recognize, describe, and extend patterns.

Use pattern blocks to extend patterns.

Students are able to extend patterns;

3 - skip count by 2's, 3's, 4's, 5's, 10's and 100's.

Using the number chart, skip count.

Students are able to skip count.

B. Describe numerical relationships using mathematical models.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - illustrate general principles and properties of operations, such as commutative, using specific numbers.

Use counters to show turnaround facts.

The child can model a number sentence and the turnaround fact and write the number sentences.

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

Objective

The student will be able to:

1 - model situations that involve the addition and subtraction of whole numbers, using objects, pictures, and symbols.

2 - use concrete, pictorial, and verbal representations to develop an understanding of invented and conventional symbolic notations.

Suggested Activities

Students draw pictures to represent addition and subtraction sentences.

Students draw a picture to match a math story.

Suggested Assessment

The pictures accurately represent the addition and subtraction sentences.

Students tell each other how they know where each number goes in a subtraction or addition sentence.

D. Analyze change in various contexts.

Objective

The student will be able to:

1 - describe qualitative change.

2 - describe quantitative change.

Suggested Activities

Observe that a plant grows taller over time.

Use a plant to measure growth at intervals.

Suggested Assessment

Students determine the plant grew.

Students determine the amount of plant's growth.

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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 points, lines, planes, and solids.

Use geoboard to design shapes with a line of symmetry.

Students use a colored rubber band to form line of symmetry.

2 - recognize, name, build, draw, compare, and sort two- and three-dimensional shapes.

Have students look for objects in the classroom that have the following shapes: circle, rectangle, square, triangle, cube, sphere, cylinder, cone, rectangular prism, and pyramid.

Draw the objects, trade pictures with partners, and have partners name the objects and shapes.

3 - describe attributes and parts of two- and three-dimensional shapes.

Play "What is in the Bag?" Put a model of each shape and/or solid into a different paper bag. Students pick a bag and describe the shape without looking into the bag,

Have them guess which solid is in each bag.

4 - investigate and predict results of putting together and taking apart two- and three-dimensional shapes.

Students design a geometric shape picture using pattern blocks.

Students share their pictures relating what shapes were used.

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

<u>Objective</u>	<u>Suggested Activities</u>	<u>Suggested Assessment</u>
The student will be able to: 1 - find and name locations with simple relationships such as "near to" and in coordinate systems such as maps.	Give students a set of pictures with directions to draw objects "above, below, over, under, next to," etc.	Student is able to follow directions.
2 - describe, name, and interpret direction and distance, navigate space, and apply ideas about direction and distance.	Have student draw a box on grid paper, and describe to partner how far it is above and to the right of the "origin" (lower left corner). Partner has to draw box on his/her own grid paper.	Find the perimeter of a rectangle by measuring its sides with a ruler.

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

<u>Objective</u>	<u>Suggested Activities</u>	<u>Suggested Assessment</u>
The student will be able to: 1 - recognize and apply slides, flips, and turns.	Use pattern blocks and drawing materials to move shapes in different ways. Have students place the shapes on their desks so that they represent slide, flip, or turn.	One student demonstrates slides, flips, and turns while another student identifies the movement of the shape as a slide, flip, or turn.
2 - recognize and create shapes that have symmetry.	Have students fold a piece of paper in half. While the paper is still folded, students cut a shape.	Students recognize the fold as the line of symmetry and both halves are equal.

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3 - identify and create congruent shapes.

Using graph paper create shapes that are congruent.

Students create congruent shapes.

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

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - create mental images of geometric shapes using spatial memory and spatial visualization.

Using centimeter dot paper, one partner draws two-dimensional figures. The other partner draws from memory figures that are the same size and shape.

The student is able to draw congruent shapes.

2 - recognize and represent shapes from different perspectives.

One student traces a pattern block. The student partner traces an identical pattern block in different positions.

The student recognizes the same shape pattern block in different positions.

3 - relate ideas in geometry to ideas in number and measurement.

Show children pictures of flags. Each child makes a flag from another country.

Student is able to measure the perimeter and area of the flag.

4 - recognize geometric shapes and structures in the environment and specify their location.

Use the geometric names for the solids (sphere, cylinder, cone, rectangular prism, cube) as the basis for word play throughout the day. For example, instead of playing kickball use "kick-sphere" or pass the "tissue-cube."

Create a class chart for new geometric-friendly words created by class.

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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 - measure with multiple copies of units of the same size, such as paper clips laid end-to-end.

Students will measure books, desks, etc., using paper clips laid end-to-end.

Performance assessment

2 - use repetition of a single unit to measure something larger than the unit, for instance, measuring the length of a room with a single meter stick.

Use a meter stick to measure the length of a room.

Performance assessment

3 - develop common referents for measuring to make comparisons and estimates.

Snap cubes will be used to measure objects in the classroom.

Performance assessment

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

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - measure length using standard and nonstandard units.

Measure the distance around a pumpkin using twine and tape measure.

Performance assessment

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2 - measure volume using standard and nonstandard units.	Students fill a container with peas, using an 8 ounce cup. Students fill the same container with peas using the teacher's pencil holder.	Performance assessment
3 - measure weight/mass using standard and nonstandard units.	Estimate how many mini pumpkins will weigh the same as a larger pumpkin. Weigh the pumpkin.	Performance assessment
4 - measure units of time to the hour, 1/2 hour and "half past", to the nearest minute, and "quarter after/till" as well as elapsed time using analog and digital time.	Hang large sheets of paper on the wall. Construct a clock face. The middle of the clock should be about shoulder-high. Call out a time and have the student use his or her arms to show the time. Other students will write the digital time. Students will make up oral elapsed time stories and demonstrate on the "wall clock."	Performance assessment
5 - identify and describe the relative values and relationships among coins and solve addition and subtraction problems using currency.	Use coins to buy items and make change at a classroom store model. Prices will be labeled and a digital cash register will be used. Students will take turns being the customer or clerk.	The student pays the correct number of coins as customer and makes the correct change as clerk.

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6 - read temperatures to the nearest degree from Celsius and Fahrenheit thermometers.

Explore temperatures in foreign cities during a given month of the year using Celsius and Fahrenheit thermometers. Use thermometer to measure current local temperature and compare to temperatures in other places around the world.

Students will accurately record local temperature in Celsius and Fahrenheit degrees.

7 - identify months, days, and year on a calendar.

Students fill in a blank calendar sheet with the month, year, days, and numbers for each day.

Students will correctly answer questions about the calendar.

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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.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - pose questions and gather data about themselves and their surroundings.

Students will gather data about the shirt colors of the students in the class and put the data into a bar graph.

Performance assessment

2 - sort and classify objects according to their attributes and organize data about the objects.

Students will sort and classify markers according to their colors.

Performance assessment

3 - represent data using concrete objects, pictures, and graphs.

Students will sort and classify animals using magazine pictures, organizing them to create a pictograph.

Performance assessment

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B. Use appropriate statistical methods to analyze data properly.

Objective

The student will be able to:

1 - describe parts of the data as a whole to determine what the data shows.

2 - answer questions relating to "more than" or "less than" or "equal to".

3 - discuss median, mode, and range.

Suggested Activities

Use daily class schedule to simulate the class clock and ask questions about the schedule.

Students use the mathematical terms to create problems or questions for partners to solve.

Collect data and figure out median, mode, and range.

Suggested Assessment

Performance assessment

Performance assessment

Written assessment

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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:

(Many second grade students are not developmentally ready for this goal.)

D. Understand and apply basic concepts of probability.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - discuss certain, probable, and impossible outcomes in a prediction activity.

Students will make a spinner with two or three colors and discuss whether it is certain, probable, or impossible to get one of the colors. (Be sure to ask for the likelihood of a color which is not on the spinner.)

Performance assessment

2 - predict and discuss events related to students' experiences as likely or unlikely.

Students will either flip a coin or roll the dice, 5 times and record outcomes. Students predict outcome of the next coin flip/dice roll.

Performance assessment

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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 - determine what should be counted as a set of objects and actually count objects.

Use doubles to create repeated addition situations. Tell children that ladybugs have the same number of dots on each wing. Have children draw a ladybug shape, then put the same number of dots on each wing. Have children write an addition sentence about their picture, such as $5 + 5 = 10$.

Students will correctly draw the number of dots on each wing and write an addition sentence.

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

Put a set of red and blue cubes into two clear plastic bags according to color. Determine which bag has more or fewer cubes.

Performance based

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

Play "Oddball" at <http://www.funbrain.com/oddball/index.html>.

Instant assessment or correction

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

Share your favorite snack between two or more children so that each child receives the same amount.

Performance based

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B. Apply discrete mathematical modeling using graphs and trees.

Objective

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.

Suggested Activities

Students will do magnet maze, pencil maze, or an obstacle course on playground or in gym.

Suggested Assessment

Performance based

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

Students will use pattern blocks in two colors to design a pattern.

Suggested Assessment

Performance based

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D. Organize and process information.

Objective

The student will be able to:

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

Suggested Activities

Class will compare shapes and discuss what the shape in the center has in common with the elements in the other parts of the circles.

Suggested Assessment

Performance based

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

Give the students story problems to solve.

Suggested Assessment

Students will correctly answer story problems.

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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 - solve problems through list making.

Students perform "real life" problem solving using a list: order from a menu, grocery shopping list with a set amount of money to spend, and "weather" chart to determine how they should "get dressed" each day.

Observation and written assessment

2 - use counting to compute answers.

Students are given a set of base 10 blocks. Have students solve a series of +, -, and x problems.

Performance based

3 - obtain relevant data from pictures, graphs, etc.

Pair students and have them measure how tall and how wide (finger tip to finger tip with arms spread) they are. Record the data using a chart to determine who is a "square", a "short rectangle" and a "tall rectangle".

Performance based

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

Objective

The student will be able to:

1 - choose the appropriate operation to solve problems (+, -, x).

Suggested Activities

Give students a simple problem to solve by determining the appropriate operation.

Suggested Assessment

Written assessment

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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 - play games that involve two players.

Play addition or subtraction bingo.

Observation

2 - solve problems in groups.

Give students story problems to complete together.

Performance based

3 - complete a task individually.

Homework sheet

Performance based

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 - demonstrate the ability to select and apply strategies such as reading, writing, listening, representing, discussing, and using technology in mathematics.

In a journal, have students choose one problem and write a paragraph on how they solved it.

Create a rubric to score the paragraph and correctness of the answer.

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

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - relate their everyday language to mathematical language and symbols.

Put students in groups of two and give them a menu from a restaurant. Have one student place an order and the other student determine the cost.

Observation

2 - justify their answers.

Use a writing activity to describe how they solved their problem.

Performance based

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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 calculators and computers to solve problems.

During computer time have the students use a website that has math games that are at their grade level.
<http://www.iknowthat.com/com/L3?Area=MoneyCatch>

Computer based

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 - use mathematics in other subjects such as science, reading, and social studies.

Make a garden and measure plants and their surroundings.

Keep a log of the garden.

2 - understand that mathematics is all around them.

2a. Make a store in your classroom.
2b. Design a weekly graph based on temperature.

Observation

3 - connect God's orderly plan to mathematics.

"Noah's Ark - Two by Two's" game

Performance based