

Elementary Mathematics Kindergarten

Looking within their own environment, children examine things and how they are related. How are they alike? How are they different?

Learning Opportunities

Three components of the **Mathland** program are used together: *Center activities*, *Daily tune-ups* and *lessons from the Guidebook*. Students need the opportunity to practice newly acquired skills and concepts

Basic skill practice and mental math

Calendar time and Daily Tune-ups as well as other games or sources.

Mathland Center Activities, review of skills and concepts already taught or an introduction to new skills and concepts.

Mathland center activities provide students with extra practice and opportunities to explore new concepts. Suggested centers are modified to fit the needs of individual students.

Guided Lesson, Developing a deeper understanding of a mathematical concept through hands on exploration and problem solving.

The Guidebook provides many rich opportunities for students to develop mathematical ideas. Some lessons are extended or shortened, based on the needs of the students.

Standards

Fields of Knowledge: Science, Mathematics, Technology

Mathematical Understanding

7.6 Arithmetic, Number and Operation Concepts: Students understand arithmetic in computation, and they select and use, in appropriate situations, mental arithmetic, pencil and paper, calculator and computer.

7.7 Geometric and Measurement Concepts: Students use geometric and measurement concepts.

7.8 Function and Algebra Concepts: Students use function and algebra concepts.

7.9 Statistics and Probability Concepts: Students use statistics and probability concepts.

Mathematical Problem Solving and Reasoning

7.10 Applications: Students use concrete, formal, and informal strategies to solve mathematical problems, apply the process of mathematical modeling, and extend and generalize mathematical concepts. Students apply mathematics as they solve scientific and technological problems or work with technological systems.

Vital Results: Reasoning and Problem Solving

Problem Solving

2.5 Mathematics Dimensions: Students produce solutions to mathematical problems requiring decisions about approach and presentation, so that final drafts are appropriate in terms of these dimensions.

Content Knowledge and Skills

7.6 Arithmetic, Number and Operation Concepts

- Count, compare, recognize, and write numbers
- Develop and discuss strategies for estimating quantities
- Solve problems using concrete materials, and logical thinking
- Explore addition and subtraction in various contexts

7.7 Geometric and Measurement Concepts

- Compare and order objects by length, width, height, and weight
- Estimate and use nonstandard units to measure objects
- Sort and classify objects by size and shape
- Recognize, identify, name, and draw shapes

7.8 Function and Algebra Concepts

- Find missing pattern pieces and sequencing numerals
- Link written symbols to words, objects, and numbers
- Use events and shapes to express relationships
- Recognize and complete pattern sequences

7.9 Statistics and Probability Concepts

- Collect, sort, organize, and describe data
- Construct graphs using real objects and pictures
- Develop logical thinking skills
- Use pictures to collect and analyze data to solve problems

7.10 Application of Mathematical Problem Solving and Reasoning

- Solve problems by reasoning mathematically with concepts and skills expected in kindergarten
- Determine what the question, or problem is really asking
- Create and using a variety of strategies
- Make connections between concepts in order to solve problems
- Extend concepts and generalize results to other situations
- Make sensible, reasonable estimate

Assessment Criteria:

By the end of Kindergarten, *students are able to...*

7.6 Arithmetic, Number and Operation Concepts

1. ...count objects orally when given a set of 30 ordered and unordered concrete items (uses pull away or organizing strategies)
2. ...count on starting at any number to 30
3. ...rote counts orally to 100
4. ...rote counts backward from 20
5. ...state and write the number **before** and **after** any number up to and including 10
6. ...identify, compare and order numbers and sets of 20 or fewer concrete items, using the concepts of “equal”, “more”, and “less’
7. ...find the ordinal position of first, second and third...tenth when given a set of objects
8. ...manipulate sets of objects to join 2 sets of 10 or less to find the total
9. ...divide a given number of 10 or less items into 2 groups in 2 or more ways
10. ...writes numerals and match to corresponding sets (0-10)
11. ...identify numerals 1 –30 out of order
12. ...identify quantity and name penny, nickel, dime, and quarter
13. ...sort a collection of coins into pennies, nickels, dimes, and quarters
14. ...use arithmetic, number and operation concepts above to represent, explain and solve problems
15. ...have a working vocabulary that consists of the following terms: equal, greater than, less than, more than, less, more, least, fewest, skip counting, add, subtract, plus, minus, number line, order, set, zero, first, second, third, half, whole, number combinations

7.7 Geometric and Measurement Concepts

1. ...identify and draw a triangle, square, rectangle, circle, and oval regardless of their position or orientation
2. ...understand and use words describing position such as in front of, above, behind and between
3. ...make and describe shapes using a variety of materials (e.g. pattern blocks, tiles, etc.)
4. ...compare size, shape and relationship of a triangle, rectangle, square, circle and oval
5. ...estimate and use non-standard units to measure objects

6. ...know the instruments used to measure length (ruler), weight (scale), time (clock), day, month, and season (calendar) and temperature (thermometer)
7. ...use the geometry and measurement concepts to represent, explain and solve problems
8. ...have a working vocabulary that consists of the following terms: face, solid, side, edges, corners(vertex), week, day, month, year, square, triangle, circle, oval, rectangle, above, behind, below, between, calendar, thermometer, clock, longer, shorter, weight, scale, balance

7.8 Function and Algebra Concepts

1. ...recognize and describe a simple (repeating) pattern (e.g. AB, AAB,) in a variety situations
2. ...extend a simple geometric (repeating) pattern
3. ...construct, represent and record a simple (repeating) pattern
4. ...use the patterns and algebra concepts to represent, explain and solve problems
5. ...have a working vocabulary that consists of the following terms: sort, shape, size, color, extend, repeating, predict, record, rule

7.9 Statistics and Probability Concepts

1. 1...gather, classify, record and interpret data relating to familiar experiences
2. ...read and interpret a concrete graph and pictograph
3. ...display information using a concrete graph, pictograph or table
4. ...sort and classify objects according to similar attributes
5. ...classify unlike objects into groups and give a name to the attribute of each group
6. ...use the statistics and probability concepts to represent, explain and solve problems
7. 6...have a working vocabulary that consists of the following terms: alike, different, same, equal, less, more, fewer, record, collect, sort, chart, graph, tally

7.10 Assessment to be integrated in the other standards

Reasoning and Problem Solving

2.5 Mathematics Dimensions

Approach and Reasoning	Level 3
Connections	Level 2
Solution	Level 3
Mathematical Language	Level 1
Mathematical Representation	Level 2
Documentation	Level 3

(These levels are based the Vermont State Problem Solving Rubric and standards set by Vermont teachers.)

Assessment Portfolio Requirements Scored using the Vermont State Scoring Guide and given a performance level for each problem

- One Number and operation problem 7.6
- One Geometry or Measurement problem 7.7
- One Algebra problem 7.8
- One Statistics or Probability problem 7.9

Resources

Kindergarten *Mathland*

Guidebook

Teacher's Resource manual

Daily Tune-Ups

Smart Strands

Mathland manipulative kit

Calculators