

# Elementary Mathematics

## Grade 1

In describing their own world, children communicate quantitative ideas, first through informal recordings and later through more formalized recordings.

### Learning Opportunities

Three main components of Mathland are used together. Students need the opportunity to practice skills and concepts taught in previous grades and to have an introduction to new skills and concepts.

#### **Basic skill practice and mental math**

(Daily Tune-ups and other games and resources)

#### **Mini Lesson, review of skills and concepts already taught or an introduction to new skills and concepts.**

(Skill Power does a great job of keeping students working on skills taught in previous grades. Skill Power also provides new skills and concepts that can be introduced as a mini lesson. There may be times when teachers substitute for some Skill Power pages based on the needs of their students and the quality of the page.)

#### **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 may be 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, recognize, write, order, and compare numbers
- Describe numbers using number pairs
- Understand number relationships such as more than, less than
- Solve addition and subtraction problems
- Model place value for two-digit numbers

### **7.7 Geometric and Measurement Concepts**

- Recognize shapes in different orientations
- Estimate and use nonstandard and standard units to compare and order objects
- Determine time accrued (days, weeks, months, years, hours, half hours)

### **7.8 Function and Algebra Concepts**

- Make predictions by using patterns
- Create and extend patterns
- Explore how addition and subtraction relate

### **7.9 Statistics and Probability Concepts**

- Use diagrams (pictures) and symbols to characterize and group objects
- Collect, displaying, and interpreting data in
- Make predictions
- Record and discuss the results of the activities related to chance

### **7.10 Application of Mathematical Problem Solving and Reasoning**

- Solve problems by reasoning mathematically with concepts and skills excepted in grade one
- Determine what the question, or problem is really asking
- Create and use a variety of strategies
- Make connections between concepts in order to solve problems
- Extend concepts and generalizing results to other situations
- Make sensible, reasonable estimates

## Assessment Criteria

By the end of grade one, *students will be able to...*

### **7.6 Arithmetic, Number and Operation Concepts**

1. ...recognize and write numbers from 1 to 100
2. ...count orally by 1s , 5's and 10's to 100 and recognize a pattern (growing pattern and ones digit repeat pattern)
3. ...count orally by 2's to 30 and recognize a pattern (growing pattern and ones digit repeat pattern)
4. ...recognize odd and even numbers
5. ...state and write the number before and after a given number to 100
6. ...represent numbers to 100 in a variety of ways (e.g. tallies, multi-link cubes, groups)
7. ...read and find ordinal numbers first through tenth
8. ...compare numbers using language of “more”, “less”, “equal”, “greater than”, “less than” and “equal to”
9. ...mentally adds and subtracts facts involving two numbers with sums up to 10
10. ...add three single digit numbers
11. ...create and solve story and picture problems to illustrate addition and subtraction equations
12. ...add and subtract 2-digit numbers with no regrouping
13. ...demonstrate understanding of the value of digits in the ones and tens place in a variety of ways
14. ...identify and represent the concepts of whole and part including fractions  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$
15. ...know the name and value of penny, nickel, dime, and quarter
16. ...adds coins to equal \$1.00 or less
17. ...use the arithmetic, number and operations concepts above to represent, explain and solve problems
18. ...have a working vocabulary that consists of the following terms: equal to, greater than, less than, more than, smaller than, least, greatest, in order, number pair, number combinations, compare, equation, sum, addition fact, subtraction fact, equivalent name, digit, equal, two-digit number, place value, tens place, ones place, hundreds place, ordinal number whole, part, half, fraction, penny, nickel, dime, quarter, dollar

### 7.7 Geometric and Measurement Concepts

1. ...identify, classify and name geometric shapes (triangle, rectangle, circle, oval, square, trapezoid, rhombus, and hexagon) by specific attributes and properties
2. ...draw and construct 2- dimensional shapes and models preserving their significant features such as number of sides.
3. ...create and extend geometric patterns
4. ...differentiate shapes by one property/attribute at a time (e.g. one way a rectangle and a triangle are different is they have a different number of sides)
5. ...estimate measure to the nearest inch
6. ...tell, write and set time on an analog clock to the hour and half hour
7. ...identify the days of the week and tell what comes before and after a given day of the week
8. ...name the months of the year in order and know the cycle of the seasons by there characteristics
9. name the months of the year in order and know the seasons
10. ...use a balance scale to find the weight of an object using non-standard measures
11. ...estimate and measure using standard and non-standard measures
12. ...use liquids to explore the measurement of volume
13. ...
14. ...use geometric and measurement concepts above to represent, explain and solve problems
15. ...have a working vocabulary that consists of the following terms: attribute, sort, triangle, oval, circle, rectangle, square, rhombus, hexagon, trapezoid, face, side, corner, angle, estimate, calendar, date, time, hour hand, minute, hand, thermometer, degree, length, width, inch, foot, centimeter, meter, scale

### 7.8 Function and Algebra Concepts

1. ...demonstrate the beginning concept of missing addends or variable (e.g.  $2+n=7$ ;  $\_+5=9$ )
2. ...recognize, describe, extend and create a wide variety of patterns ( repeating and growing)
3. ...translate patterns from one medium to another by identifying the **basic pattern units** and creating a new representation (e.g. red, blue, red, blue... to ... sit, stand, sit, and stand)
4. ...use the patterns and algebra concepts above to represent, explain, and solve problems
5. ...have a working vocabulary that consists of the following tem: pattern, even number, odd number, function machine, rule, extend, predict

### **7.9 Statistics and Probability Concepts**

1. ...interpret information displayed in a picture, bar, or concrete (real objects) graph using the vocabulary: more, less, fewer, greater than, less than
2. ...conduct a simple survey
3. ...display data using tallies, pictographs, bar graphs and concrete graphs (real objects)
4. ...sort, classify, count, and arrange real and/ or pictorial objects
5. .... Display items sorted on a Venn diagram
6. ... explain of the overlap in a Venn diagram
7. ...perform, record and describe the results of experiments related to chance (e.g. heads and tails)
8. ...use the statistic and probability concepts to represent, explain and solve problems
9. ...have a working vocabulary of the following terms: compare, equal, more, most, less, least, fewer, bar graph, picture graph, alike, different, data, collect, organize, sort, chart, graph, tally, survey, fair, likely, unlikely, never

### **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 2
Mathematical Representation	Level 3
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

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## **Resources**

Grade one Mathland

    Guidebook

    Teacher's Resource manual

    Daily Tune-Ups

    Skill power

    Arithmetwists

    Smart Strands

Mathland materials kit

Calculators