

## GRADE 6

[C] Communication	[PS] Problem Solving
[CN] Connections	[R] Reasoning
[ME] Mental Mathematics and Estimation	[T] Technology
	[V] Visualization

### NUMBER

#### General Outcome

Develop number sense.

#### Specific Outcomes

1. Demonstrate an understanding of place value, including numbers that are:

- greater than one million
- less than one thousandth.

[C, CN, R, T]

2. Solve problems involving whole numbers and decimal numbers.

[ME, PS, T]

[ICT: C6–2.4]

#### Note:

*Through this outcome, students have the opportunity to maintain and refine previously learned:*

- *multiplication and division number facts:*

*Grade 5, Number SO 3 – Apply mental mathematics strategies and number properties in order to understand and recall basic multiplication facts (multiplication tables) to 81 and related division facts.*

[C, CN, ME, R, V]

*Understand, recall and apply multiplication and related division facts to  $9 \times 9$ .*

- *operations with whole numbers:*

*Grade 4, Number SO 3 – Demonstrate an understanding of addition of numbers with answers to 10 000 and their corresponding subtractions (limited to 3- and 4-digit numerals) by:*

- *using personal strategies for adding and subtracting*
- *estimating sums and differences*
- *solving problems involving addition and subtraction.*

[C, CN, ME, PS, R]

*Grade 5, Number SO 5 – Demonstrate, with and without concrete materials, an understanding of multiplication (2-digit by 2-digit) to solve problems.*

[C, CN, PS, V]

*Grade 5, Number SO 6 – Demonstrate, with and without concrete materials, an understanding of division (3-digit by 1-digit), and interpret remainders to solve problems.*

[C, CN, ME, PS, R, V]

## NUMBER (continued)

3. Demonstrate an understanding of factors and multiples by:
- determining multiples and factors of numbers less than 100
  - identifying prime and composite numbers
  - solving problems using multiples and factors.

[CN, PS, R, V]

*Note:*

*Through this outcome, students have the opportunity to maintain and refine previously learned multiplication and division number facts:*

*Grade 5, Number SO 3 – Apply mental mathematics strategies and number properties in order to understand and recall basic multiplication facts (multiplication tables) to 81 and related division facts.*

[C, CN, ME, R, V]

*Understand, recall and apply multiplication and related division facts to  $9 \times 9$ .*

4. Relate improper fractions to mixed numbers and mixed numbers to improper fractions.  
[CN, ME, R, V]
5. Demonstrate an understanding of ratio, concretely, pictorially and symbolically.  
[C, CN, PS, R, V]
6. Demonstrate an understanding of percent (limited to whole numbers), concretely, pictorially and symbolically.  
[C, CN, PS, R, V]
7. Demonstrate an understanding of integers, concretely, pictorially and symbolically.  
[C, CN, R, V]
8. Demonstrate an understanding of multiplication and division of decimals (1-digit whole number multipliers and 1-digit natural number divisors).  
[C, CN, ME, PS, R, V]

*Note:*

*Through this outcome, students have the opportunity to maintain and refine previously learned:*

- *multiplication and division number facts:*

*Grade 5, Number SO 3 – Apply mental mathematics strategies and number properties in order to understand and recall basic multiplication facts (multiplication tables) to 81 and related division facts.*

[C, CN, ME, R, V]

*Understand, recall and apply multiplication and related division facts to  $9 \times 9$ .*

- *operations with whole numbers:*

*Grade 4, Number SO 6 – Demonstrate an understanding of multiplication (2- or 3-digit by 1-digit) to solve problems by:*

- *using personal strategies for multiplication with and without concrete materials*
- *using arrays to represent multiplication*
- *connecting concrete representations to symbolic representations*
- *estimating products*
- *applying the distributive property.*

[C, CN, ME, PS, R, V]

*Grade 5, Number SO 6 – Demonstrate, with and without concrete materials, an understanding of division (3-digit by 1-digit), and interpret remainders to solve problems.*

[C, CN, ME, PS, R, V]

## NUMBER (continued)

9. Explain and apply the order of operations, excluding exponents, with and without technology (limited to whole numbers).

[C, CN, ME, PS, T]

[ICT: C6–2.4, C6–2.7]

*Note:*

*Through this outcome, students have the opportunity to maintain and refine previously learned:*

- *multiplication and division number facts:*

*Grade 5, Number SO 3 – Apply mental mathematics strategies and number properties in order to understand and recall basic multiplication facts (multiplication tables) to 81 and related division facts.*

[C, CN, ME, R, V]

*Understand, recall and apply multiplication and related division facts to  $9 \times 9$ .*

- *operations with whole numbers:*

*Grade 4, Number SO 3 – Demonstrate an understanding of addition of numbers with answers to 10 000 and their corresponding subtractions (limited to 3- and 4-digit numerals) by:*

- *using personal strategies for adding and subtracting*
- *estimating sums and differences*
- *solving problems involving addition and subtraction.*

[C, CN, ME, PS, R]

*Grade 5, Number SO 5 – Demonstrate, with and without concrete materials, an understanding of multiplication (2-digit by 2-digit) to solve problems.*

[C, CN, PS, V]

*Grade 5, Number SO 6 – Demonstrate, with and without concrete materials, an understanding of division (3-digit by 1-digit), and interpret remainders to solve problems.*

[C, CN, ME, PS, R, V]

## PATTERNS AND RELATIONS (Patterns)

### General Outcome

Use patterns to describe the world and to solve problems.

### Specific Outcomes

1. Represent and describe patterns and relationships, using graphs and tables.

[C, CN, ME, PS, R, V]

[ICT: C6–2.3]

2. Demonstrate an understanding of the relationships within tables of values to solve problems.

[C, CN, PS, R]

[ICT: C6–2.3]

## **PATTERNS AND RELATIONS (Variables and Equations)**

### **General Outcome**

Represent algebraic expressions in multiple ways.

### **Specific Outcomes**

3. Represent generalizations arising from number relationships, using equations with letter variables.  
[C, CN, PS, R, V]
4. Express a given problem as an equation in which a letter variable is used to represent an unknown number.  
[C, CN, PS, R]
5. Demonstrate and explain the meaning of preservation of equality, concretely and pictorially.  
[C, CN, PS, R, V]

## **SHAPE AND SPACE (Measurement)**

### **General Outcome**

Use direct and indirect measurement to solve problems.

### **Specific Outcomes**

1. Demonstrate an understanding of angles by:
  - identifying examples of angles in the environment
  - classifying angles according to their measure
  - estimating the measure of angles, using  $45^\circ$ ,  $90^\circ$  and  $180^\circ$  as reference angles
  - determining angle measures in degrees
  - drawing and labelling angles when the measure is specified.[C, CN, ME, V]
2. Demonstrate that the sum of interior angles is:
  - $180^\circ$  in a triangle
  - $360^\circ$  in a quadrilateral.[C, R]
3. Develop and apply a formula for determining the:
  - perimeter of polygons
  - area of rectangles
  - volume of right rectangular prisms.[C, CN, PS, R, V]

## SHAPE AND SPACE (3-D Objects and 2-D Shapes)

### General Outcome

Describe the characteristics of 3-D objects and 2-D shapes, and analyze the relationships among them.

### Specific Outcomes

- Construct and compare triangles, including:
  - scalene
  - isosceles
  - equilateral
  - right
  - obtuse
  - acutein different orientations.  
[C, PS, R, V]
- Describe and compare the sides and angles of regular and irregular polygons.  
[C, PS, R, V]

## SHAPE AND SPACE (Transformations)

### General Outcome

Describe and analyze position and motion of objects and shapes.

### Specific Outcomes

- Perform a combination of translations, rotations and/or reflections on a single 2-D shape, with and without technology, and draw and describe the image.  
[C, CN, PS, T, V]
- Perform a combination of successive transformations of 2-D shapes to create a design, and identify and describe the transformations.  
[C, CN, T, V]
- Identify and plot points in the first quadrant of a Cartesian plane, using whole number ordered pairs.  
[C, CN, V]
- Perform and describe single transformations of a 2-D shape in the first quadrant of a Cartesian plane (limited to whole number vertices).  
[C, CN, PS, T, V]  
[ICT: C6–2.1]

## STATISTICS AND PROBABILITY (Data Analysis)

### General Outcome

Collect, display and analyze data to solve problems.

### Specific Outcomes

- Create, label and interpret line graphs to draw conclusions.  
[C, CN, PS, R, V]
- Select, justify and use appropriate methods of collecting data, including:
  - questionnaires
  - experiments
  - databases
  - electronic media.[C, CN, PS, R, T]  
[ICT: C4–2.2, C6–2.2, C7–2.1, P2–2.1, P2–2.2]

**STATISTICS AND PROBABILITY (Data Analysis) (continued)**

3. Graph collected data, and analyze the graph to solve problems.

[C, CN, PS, R, T]

[ICT: C6–2.5, C7–2.1, P2–2.1, P2–2.2]

**STATISTICS AND PROBABILITY (Chance and Uncertainty)****General Outcome**

Use experimental or theoretical probabilities to represent and solve problems involving uncertainty.

**Specific Outcomes**

4. Demonstrate an understanding of probability by:

- identifying all possible outcomes of a probability experiment
- differentiating between experimental and theoretical probability
- determining the theoretical probability of outcomes in a probability experiment
- determining the experimental probability of outcomes in a probability experiment
- comparing experimental results with the theoretical probability for an experiment.

[C, ME, PS, T]

[ICT: C6–2.1, C6–2.4]