Grade 2

Standard 1
Number Sense and Computation

CORE STANDARD

Number Sense and Computation

Place Value

Understand and use the relationship among whole numbers, including place value, to identify and compare numbers up to 1,000.

[Standard Indicators: 2.1.1, 2.1.2, 2.1.4]

Addition and Subtraction

Add and subtract whole numbers less than 1,000 using efficient methods. Understand and show the inverse relationship between addition and subtraction.

[Standard Indicator: 2.1.6]

2.1.1 Count, read, write, compare and plot on a number line whole numbers up to at least 1,000.

Examples:

- Use base ten blocks to model 234 by using two flats, three longs and four ones; then by using 23 longs and four ones; and finally by using 234 units.
- Which is more, 850 or 805? Justify your answer.

2.1.2 Count by ones, twos, fives, tens and hundreds to at least 1,000. Show the number that is 10 more or 10 less than any number from 10 through 90.

Example: Complete a chart with missing numbers and then tell what is 10 more or 10 less than any number given.

81	82	83	84	85	86	87		89	
	92			95					100
101								109	

2.1.3 Match the ordinal numbers *first*, *second*, *third*, etc., with an ordered set of at least 100 items.

Example: Given an alphabet chart, name the seventeenth letter in the alphabet.

2.1.4 Use words, models, standard form and expanded form to represent place value and to show equivalent forms of whole numbers up to at least 1,000 as groups of hundreds, tens and ones.

Example: Using base ten blocks and a place value mat show at least two different ways that you could model the number 57. Explain why your two models represent the same number.

2.1.5 Identify numbers as even or odd by placing that number of objects in two groups of the same size and recognizing that for even numbers no object will be left over and for odd numbers one object will be left over.

Example: Two children each pick an object from the pile of 18 objects and each place it in a pile they start. They continue picking objects and placing them in their own pile. After all of the objects have been picked and placed, count to see if each pile has the same number of objects.

2.1.6 Solve problems involving addition and subtraction of whole numbers less than 1,000 fluently using a standard algorithmic approach and show the inverse relationship between addition and subtraction.

Examples:

- The students wanted to know the total number of pencils they had remaining from their supply boxes. They worked in small groups and found that group one had 54 pencils, group two had 37 pencils and group three had 15 pencils. How many pencils did the class have? Explain how you found the answer.
- Their teacher said she had ordered a box of 500 pencils at the beginning of the year. How many pencils should still be in the box? Explain how you found the number of pencils.

2.1.7 Compare data from a single set or across sets of data to address a single question.

Example: Write a statement about the most and least favorite pets from your class and the class next door.

Standard 2
Algebra and Functions

2.2.1 Write equations to solve single and multi-step addition and subtraction word problems.

Example: You and a friend have collected 352 cans to recycle. You collected 201 cans. Write an equation to show the relationship between the numbers and to find how many cans your friend collected.

2.2.2 Create, extend and give a rule for number patterns using addition and subtraction.

Example: Find the next number in the sequence 101, 99, 97, 95 … , and tell how you found the answer.

2.2.3 Show that the order in which two numbers are added (commutative property) and how the numbers are grouped in addition (associative property) will not change the sum. These properties can be used together to show that numbers can be added in any order.

Example: Add the numbers 5, 17 and 13 in this order. Now add them in the order 17, 13 and 5. Show that the results are the same.

Standard 3
Geometry and Measurement

CORE STANDARD

Geometry and Measurement

Common Shapes and Objects

Recognize, identify and describe attributes of common shapes and solids (e.g., the same size and type of shape; number of sides, edges and vertices; location in space).

[Standard Indicator: 2.3.1]

Linear Measurement

Measure lengths in standard units (e.g., inches, feet and yards) and metric units (e.g., centimeters and meters) and select appropriate units to estimate and measure lengths. Understand and use units of linear measurement and relationships within a particular system to solve problems.

[Standard Indicator: 2.3.3]

2.3.1 Recognize, identify and describe attributes of common shapes and solids (e.g., the size and type of shape; the two-dimensional faces of three-dimensional figures; the number of sides, edges and vertices; and location in space).

Examples:

- Describe the difference between a circle and a triangle using the terms *sides*, *edges* and *vertices*.
- Describe the difference between a cube and a sphere using the terms *sides*, *edges* and *vertices*.

2.3.2 Identify and draw congruent two-dimensional shapes in any position. Describe and compare properties of simple and compound figures composed of triangles, rectangles and squares.

Example: Given a shape on a geoboard, create a congruent shape somewhere else on the geoboard.

2.3.3 Measure length in standard units (inch, foot and yard) and metric units (centimeter and meter) and select appropriate units to estimate and measure lengths. Use the relationships between the units to express answers in different units. Use units of linear measurements and relationships within a particular system to solve problems.

Example: Estimate how many meter sticks would lie end to end across the classroom and then measure the length of your classroom to the nearest meter. Also report the result in centimeters.

2.3.4 Describe relationships of time (seconds in a minute, minutes in an hour, hours in a day, days in a week and days in a year) and tell time on an analog clock to the nearest five-minute intervals.

Example:

- How long is your school day in hours?
- How many minutes do you work on math?

- Read an analog clock to help your teacher know when lunch and recess are over.

2.3.5 Find the value of a collection of pennies, nickels, dimes, quarters and dollars.

Example: You empty your bank and find the following: three pennies, four nickels and two dimes. Do you have enough money to buy a $0.50 pencil?

PROCESS STANDARDS

Indiana's Academic Standards for Mathematics describe the key content of each grade level and course, and students must develop conceptual understanding of this content. The American Diploma Project noted that, "beyond acquiring procedural mathematical skills with their clear methods and boundaries, students need to master the more subjective skills of reading, interpreting, representing and 'mathematicizing' a problem" (p. 55).

The National Council of Teachers of Mathematics has described five Process Standards that "highlight ways of acquiring and using content knowledge" (p. 29). The following Process Standards must be addressed throughout the learning and teaching of Indiana's Academic Standards for Mathematics in all grade levels in mathematics.

Problem Solving

- Build new mathematical knowledge through problem solving.
- Solve problems that arise in mathematics and in other contexts.
- Apply and adapt a variety of appropriate strategies to solve problems.
- Monitor and reflect on the process of mathematical problem solving.

Reasoning and Proof

- Recognize reasoning and proof as fundamental aspects of mathematics.
- Make and investigate mathematical conjectures.
- Develop and evaluate mathematical arguments and proofs.
- Select and use various types of reasoning and methods of proof.

Communication

- Organize and consolidate mathematical thinking through communication.
- Communicate mathematical thinking coherently and clearly to peers, teachers and others.
- Analyze and evaluate the mathematical thinking and strategies of others.
- Use the language of mathematics to express mathematical ideas precisely.

Connections

- Recognize and use connections among mathematical ideas.
- Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
- Recognize and apply mathematics in contexts outside of mathematics.

Representation

- Create and use representations to organize, record and communicate mathematical ideas.
- Select, apply and translate among mathematical representations to solve problems.
- Use representations to model and interpret physical, social and mathematical phenomena.

In addition, estimation, mental computation and technology are areas that need to be addressed at all grade levels in mathematics.

Estimation and Mental Computation

- Know and apply appropriate methods for estimating the results of computations.
- Round numbers to a specified place value.
- Use estimation to decide whether answers are reasonable.
- Decide when estimation is an appropriate strategy for solving a problem.
- Determine appropriate accuracy and precision of measurements in problem situations.
- Use properties of numbers and operations to perform mental computation.
- Recognize when the numbers involved in a computation allow for a mental computation strategy.

Technology

- Technology should be used as a tool in mathematics education to support and extend the mathematics curriculum.
- Technology can contribute to concept development, simulation, representation, communication and problem solving.
- The challenge is to ensure that technology supports, but is not a substitute for, the development of skills with basic operations, quantitative reasoning and problem-solving skills.
    - Elementary students should learn how to perform thoroughly the basic arithmetic operations independent of the use of a calculator.
    - The focus must be on learning mathematics and using technology as a tool rather than as an end unto itself.

References

American Diploma Project (2004). *Ready or not: Creating a high school diploma that counts.* Washington, DC: Achieve, Inc.

National Council of Teachers of Mathematics (2000). *Principles and Standards for School Mathematics.* Reston VA: author.