

ISPS Math Standards & Benchmarks

(Adapted from AERO standards)

Pre-Kindergarten

(Revised October, 2009)

Process Standards

1. Problem Solving
2. Reasoning, Proof, and Connection
3. Communication and Representation
4. Technology

Strands

1. Number Sense
2. Measurement and Geometry
3. Algebra
4. Data Analysis and Probability

Process Standards

Problem Solving:

Standard 1 - Students will apply a wide variety of mathematical concepts, processes, and skills to solve a broad range of problems in various content areas and everyday situations.

Benchmarks - By the end of Pre-Kindergarten, students will:

- 1 – 1 Formulate a problem, determine information required to solve the problem choose methods for obtaining this information, and set limits for acceptable solutions.
- 1 – 2 Demonstrate that there may be multiple ways to solve a problem and explain why this is so.
- 1 – 3 Understand that there is no one right way to solve mathematical problems but that different methods (e.g.,

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Reasoning, Proof and Connection:

Standard 2 - Students will apply mathematical reasoning skills to investigate, evaluate, justify, and connect approaches and solutions to situations in mathematics and in other disciplines.

Benchmarks - By the end of Pre-Kindergarten, students will:

- 2 – 1 Make, check, and verify predictions about the quantity, size, and shape of objects and groups of objects.
- 2 – 2 Explain why a prediction, estimation, or solution is reasonable.
- 2 – 3 Make and describe connections linking conceptual and procedural knowledge using a variety of strategies (manipulative, pictorial, symbolic).

Communication and Representation:

Standard 3 - Students will understand mathematical information presented and obtained in a variety of ways and will accurately and clearly present and justify mathematical ideas in diverse formats.

Benchmarks - By the end of Pre-Kindergarten, students will:

- 3 – 1 Listen to and read about mathematical strategies and solutions, and communicate them to others using everyday language and correct mathematical terms (e.g., sum,) and symbols (e.g., +, =).
- 3 – 2 Recognize that certain words give clues to specific operations (e.g., sum means addition, take away means subtraction).
- 3 – 3 Communicate mathematical ideas using concrete, pictorial and symbolic representations.
- 3 – 4 Understand and demonstrate that some ways of representing a problem are more helpful than others.
- 3-5 Explain how numbers are used in various ways, including counting, ordering, representing quantities, measuring and labeling.

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Technology

Standard 4 - Students will select and use a wide variety of tools and technology to support and validate mathematical results, when appropriate.

Benchmarks - By the end of Pre- Kindergarten, students will:

4 – 1 Represent and examine mathematical situations using manipulatives.

STRAND1- NUMBER SENSE and OPERATIONS

Standard 5 - Students will understand and apply numbers, ways of representing numbers, relationships among numbers, and number systems.

Benchmarks - By the end of Pre-Kindergarten, students will:

5 – 1 Model and connect physical, verbal, and symbolic representations of whole numbers to 10

5 – 2 Understands that a whole objects can be separated into parts.

5 – 4 Knows the common language of comparing quantities of objects to 10 (eg. More than, less than)

5-5 Use concrete objects to count, order, group, and demonstrate one-to-one correspondence with whole numbers to 10

5-7 Read, write, and order numbers to 10.

Standard 6 - Students will estimate, compute, and assess reasonableness of solutions.

Benchmarks - By the end of Pre-Kindergarten, students will:

6-1 Add and subtract groups of objects.

6-2 Apply addition and subtraction to 10 in a variety of situations (such as working out a problem based question)

6-3 Understand and appropriately use the vocabulary of estimation (less than, more than)

6-4 Use estimation skills to find solutions.

STRAND 2- MEASUREMENT and GEOMETRY

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Standard 7 - Students will estimate and measure to a required degree of accuracy and precision by selecting and using appropriate units, tools, and technologies.

Benchmarks - By the end of Pre-Kindergarten, students will:

- 7 – 1 Estimate before measuring to determine the reasonableness of a solution using non-standard units.
- 7 – 2 Estimate and measure length, capacity and mass to the nearest unit using nonstandard measurement.
- 7 – 3 Compare and order measurable characteristics (for example, , length, mass capacity,) of different objects
- 7 – 4 Tell time to the hour

Standard 8 - Students will use spatial reasoning and apply the properties and relationships of geometric figures to represent, investigate, analyze, and solve problems.

Benchmarks - By the end of Pre-Kindergarten, students will:

- 8– 1 Use directional and positional words (such as before, between, after, over, under, above).
- 8– 2 Describe, name, geometric two- dimensional shapes (circle,square, rectangle , triangle and hexagon).
- 8-3 Identify and describe geometric figures in the environment.

STRAND 3- ALGEBRA

Standard 9 - Students will use algebraic methods to represent, analyze, and solve abstract and practical mathematical situations involving patterns and functional relationships.

Benchmarks - By the end of Pre-Kindergarten, students will:

- 9– 1 Recognize, reproduce, and create, repeating patterns using color and shape.

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- 9-2 Generate and solve simple functions by identifying and applying patterns.
- 9-3 Generate, write, and solve open sentences using informal methods (such as using manipulatives, drawing, or acting out the solution).

STRAND 4- DATA ANALYSIS and PROBABILITY

Standard 10 - Students will pose a question, collect, organize, analyze, and represent data in order to make decisions and predictions.

Benchmarks – By the end of Pre-Kindergarten, students will:

- 10 – 1 Pose a question and collect data by observing, measuring, surveying, and counting.
- 10 – 2 Construct, read, and interpret, pictographs and simple bar charts.
- 10 – 3 Interpret data by looking for patterns and relationships (such as most, least and same). .