

Mathematics - Pre-Kindergarten: Introduction

In Pre-Kindergarten, instructional time should focus on two critical areas: (1) developing an understanding of whole numbers using concrete materials, including concepts of correspondence, counting, cardinality, and comparison; (2) describing shapes in their environment. More learning time in Pre-Kindergarten should be devoted to developing the concept of number than to other topics.

- (1) Students develop an understanding of the meanings of whole numbers and recognize the number of objects in small groups by counting – the first and most basic mathematical algorithm. They understand that number words refer to quantity. They use one-to-one correspondence to solve problems by matching sets and comparing number amounts and in counting objects to 10. They understand that the last word that they state in counting tells “how many” and they count to determine number amounts and compare quantities (using language such as “more than” and “less than”).
- (2) Students describe their physical world using geometric ideas (e.g., shape and special relations) and vocabulary. They identify and name basic two-dimensional shapes, such as triangles, rectangles, squares, and circles. They use basic shapes and spatial reasoning to model objects in their environment.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Grade PK Overview

Counting and Cardinality

- Know number names and the count sequence.
- Count to tell the number of objects.
- Compare numbers.

Operations and Algebraic Thinking

- Understand addition as adding to, and understand subtraction as taking from.
- Understand simple patterns.

Measurement and Data

- Describe and compare measurable attributes.
- Sort objects and count the number of objects in each categories.

Geometry

- Identify and describe shapes (squares, circles, triangles, rectangles).
- Analyze, compare, and sort objects.

Counting and Cardinality

PK.CC

Know number names and the count sequence.

1. Count to 20.
2. Represent a number of objects with a written numeral 0–5 (with 0 representing a count of no objects).

Count to tell the number of objects.

3. Understand the relationship between numbers and quantities to 10; connect counting to cardinality.
 - a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
 - b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.
 - c. Understand that each successive number name refers to a quantity that is one larger.
4. Count to answer “how many?” questions about as many as 10 things arranged in a line, a rectangular array, or a circle, or as many as 5 things in a scattered configuration; given a number from 1–10, count out that many objects.

Compare numbers.

5. Identify whether the number of objects in one group is more, less, greater than, fewer, and/or equal to the number of objects in another group, e.g., by using matching and counting strategies.¹ (1: up to 5 objects)
6. Identify “first” and “last” related to order or position.

Operations & Algebraic Thinking

PK.OA

Understand addition as adding to, and understand subtraction as taking from.

1. Demonstrate an understanding of addition and subtraction by using objects, fingers, and responding to practical situations (e.g., If we have 3 apples and add two more, how many apples do we have all together?).

Understand simple patterns.

2. Duplicate and extend (eg., What comes next?) simple patterns using concrete objects.

Measurement & Data

PK.MD

Describe and compare measurable attributes.

1. Identify measurable attributes of objects, such as length, and weight. Describe them using correct vocabulary (e.g., small, big, short, tall, empty, full, heavy, and light).

Sort objects and count the number of objects in each category.

2. Sort objects into categories; count the numbers of objects in each category. 1 (limit category counts to be less than or equal to 10)

Geometry

PK.G

Identify and describe shapes (squares, circles, triangles, rectangles).

1. Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as top, bottom, up, down, in front of, behind, over, under, and next to.
2. Correctly name shapes regardless of size.

Analyze, compare, and sort objects.

3. Analyze, compare, and sort two- and three-dimensional shapes and objects, in different sizes, using informal language to describe their similarities, differences, and other attributes (e.g., color, size, and shape).
4. Create and build shapes from components (e.g., sticks and clay balls).

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