

It is essential that these standards be addressed in contexts that promote problem solving, reasoning, communication, making connections, and designing and analyzing representations.



Core Standard

K.1 **Number and Operations and Algebra: Represent, compare, and order whole numbers, and join and separate sets.**

Content Standards

- K.1.1 Read and write whole numbers to 10.
- K.1.2 Connect numbers, including written numerals, to the quantities they represent, using various physical models and representations.
- K.1.3 Count forward by ones beginning with any number less than 30; count backward by ones beginning with any number 10 or less.
- K.1.4 Recognize the number of objects in a small set (such as the arrangements of dots on a number cube) without counting.
- K.1.5 Count objects in a set using one-to-one correspondence and produce sets of given sizes.
- K.1.6 Compare and order sets or numerals by using both cardinal and ordinal meanings.
- K.1.7 Model simple joining and separating situations and represent them with objects, pictures, and/or numerals.
- K.1.8 Choose, combine, and apply effective strategies for solving joining and separating problems.
- K.1.9 Identify, duplicate, and extend simple number patterns and sequential and growing patterns (e.g., patterns made with shapes).

Connections to the Standard

Key Connections to Prior Math Knowledge:

- Students entering kindergarten will exhibit a wide range of math abilities.
- Students who enter kindergarten with no prior experience using the English language have the same range of abilities as their English speaking classmates have. Mathematics is the one curriculum area in which Kindergarten students can prosper, regardless of whether or not they know English.
- Kindergarten parents are anxious to learn how to help their students achieve academic success in mathematics. Running frequent parent meetings and/or inviting parents into the math classroom can increase students' experiences with math in school and in the community.

Key Connections to Future Math Knowledge:

- K students read and write whole numbers to 10. (K.1.1) In grade 1 they will compare and order whole numbers to 100. (1.1.1)
- Connecting numbers to the quantities they represent (K.1.2 and K.1.5) with frequent hands on experiences prepares students for tasks they will perform in grade 1, including
 - Working with place value (1.1.3 and 1.1.4)
 - Working with pennies, nickels and dimes (1.1.5)
- Counting forward and backward (K.1.3) equips students with the skills they will need to add and subtract in grade (1.2.2 through 1.2.5).

Key Connections to Current Grade Level Math Standards:

- Practice with whole numbers from one through ten builds initial number sense. The more students use these numbers, the better chance they have to master number sense early in their school experience. (K.1.1)
- Connecting numbers to sets of objects will build students’ ability to work easily with tasks that require number sense in the future. (K.1.2, K.1.4, K.1.5, K.1.7, K.1.8)
- If students can design, develop and analyze patterns frequently, they will be equipped with the skills they need for advanced tasks that depend on mastery of patterning.

Key Connections to Other Content Areas and School Routines:

- Language arts
 - Write class book in which each student or groups of students prepares an illustrated page with a number, a number word, and a corresponding illustration.
 - Make student-produced illustration of word/corresponding object posters for display in the classroom.
 - Make and read predictable books.
- In the classroom
 - Lining up for transitions, students number off using cardinal or ordinal numbers.
 - Using students’ shirt colors, students can form patterns by making a line that described an A-B-A-B and other pattern types.
 - At the lunch table students count food items and describe in which order they consume them. “I’ll have my salad first.”

Key Connections to Real World:

- From counting toes to counting items at home and at the market, families should be encouraged to use counting as a game. At the K level making counting fun will enable students to master number/quantity relationships.
- Number play can extend to counting coins, fake or real, and age-appropriate participation in shopping and paying for goods.
- Because numbers are everywhere, parents can be encouraged to use them everywhere: “Put six spoons on the table.” “How many people are around the table?”
- Patterns excite children. Once children identify simple patterns, they begin to see them even where they do not exist. Parents should be told to encourage this exploration of patterns, because it is at this early age that students’ fascination with mathematics can be transformed into serious interest and a lifelong passion.

Vocabulary

backward	join	order
first - tenth	number cube	pattern
forward	numerals	separate
growing	one - ten	shape

Language of Math:

- The kindergarten math teacher may assume that the students will find every math term to be new, and requiring demonstration, visual representation and plenty of hands on experiences prior to effective use. Some examples:
 - The names for cardinal and ordinal numbers
 - The rhythm of a pattern when spoken
 - Visual demonstrations of separating and joining
 - Visual demonstrations of forward and backward
- Some English learners in kindergarten prefer not to speak out. Forcing speech can delay language acquisition. Students who are silent are nevertheless learning, and can be expected to demonstrate that they understand the language of math through activities. Some examples:
 - Complete a pattern using manipulatives.
 - Point to the n th member of a set.
 - Place written numbers alongside visual representations.
 - Write numbers that correspond to sets of objects.

Common Mistakes and Associated Misconceptions:

- Students do not accurately connect numbers to quantities.
Possible misconception: They either lack sufficient practice or they assume that the relationship is haphazard.
- Students count in a random manner.
Possible misconception: They either lack sufficient practice or they think that identifying numbers is the task, rather than identifying them in order.
- Students combine quantities and find a result that is smaller than either of the quantities they combined, e.g., they put three erasers together with six erasers and announce that they now have four erasers.
Possible misconception: They assign a number because they think that is what is required.
- Students extend patterns indiscriminately.
Possible misconception: They watch other students extend patterns and have not grasped the notion of patterning; they note only that the classmates announce members of the set.