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Making Inferences

Teach students this skill so they can make accurate predictions, understand cause-and-effect relationships, and summarize information. Remind students that they make inferences when they use clues and what they already know about math processes to solve problems. Context clues such as explanations or details, along with students' background knowledge, can help students solve problems, make decisions, or answer questions.

Students make inferences in math when they do the following:

★ use their prior knowledge to understand what a problem is asking.

★ use the information given to figure out the next step of a problem.

★ complete steps of a process in the proper order.

★ sequence events to understand problems.

★ organize data for graphing.

Tips for Teaching the Skill

✪ Have students make predictions about what they think will happen when they manipulate objects.

✪ Help students use what they already know to make decisions about which strategies or math operations to use when solving problems.

✪ Demonstrate how to make predictions from data.

✪ Have students practice predicting the outcome of a series of events, such as a coin toss or the weather the next day.

✪ Have students predict the weight of objects (e.g., fruit, books, beans) and make weight comparisons.
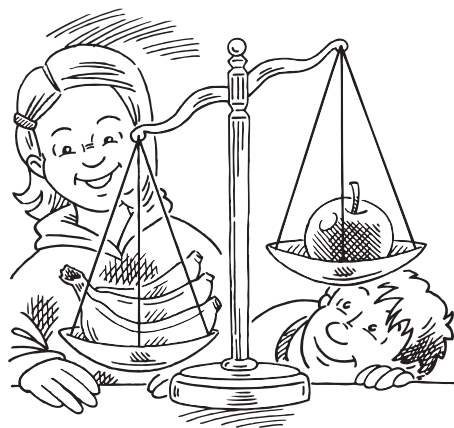
Sample Activity
Have students collect data to create graphs. Provide step-by-step instructions for students to create their graphs. Model writing inference questions using an existing graph. The graph on pg. 28 can be used as a sample. Challenge students to write their own inference questions for partners to answer about their graphs.

Math Journals

Use this strategy to help students make sense of new concepts and ideas in math. Students can use writing to think through the step-by-step process of solving particular math problems. Start by having students describe, in writing, how they solved a problem. Then progress to math-concept reflections, learning summaries, and free-writing prompts.

Ways to Use Math Journals

- Have students complete daily problems in their journals.
- Ask students to write daily journal entries, reflecting on the day's learning.
- Encourage students to ask questions they have.
- Have students complete specific assignments in their journals.
- Have students summarize a math concept in a journal entry.
- Have students use their journals for review.
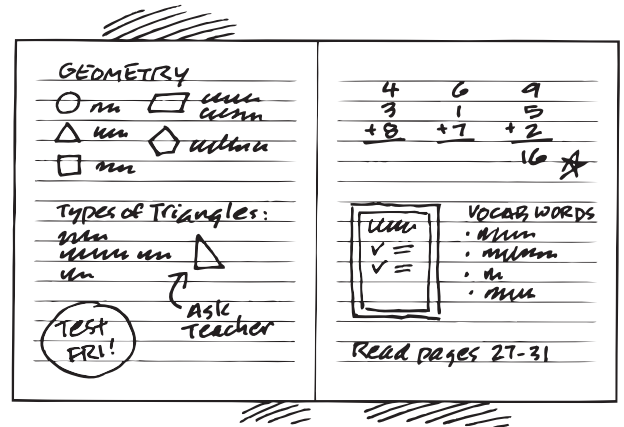
Tips for Teaching the Strategy

- ★ Communicate your expectations for how students should write in their journals.
- ★ Model how to write a math journal entry.
- ★ Give students sentence stems to help them start writing about math.
- ★ Have students verbalize a sentence or two to a teacher, aide, or classmate, then write down what they just said. Continue this process to help students feel more comfortable with writing their thoughts.
- ★ Use prompts to guide students as they reflect on what they are thinking, feeling, and doing in math class.
- ★ Use a specific journal prompt to conduct a class discussion. Writing their responses before sharing in class will help ELLs clarify their thinking in English.
- ★ Refer to words posted on a word wall to use in free-writing prompts.
- ★ As time allows, give students written feedback on selected journal entries.

Sample Activities

Challenge students to create their own math puzzles and provide written instructions or descriptions for classmates.

Have students write on the same prompt and then share their journal entries with classmates for discussion or evaluation.

Math has its own jargon—a vocabulary that can be tricky for struggling ELLs who are still learning the fundamentals of English. ELLs may confuse the word meanings of multiple-meaning words (e.g., *mean*, *power*) or become frustrated when more than one math term is used in a sentence. (e.g., **Plot** the **ordered pairs** and **connect** the **points** in order.) To help them overcome these obstacles, copy the following glossary pages for each student in your class. Consider adding the "Glossary: Math Verbs" on pp. 73–74 for additional vocabulary help. Your students will feel more comfortable with this challenging subject if they have a math resource to consult.

absolute value: how far a number is from zero (Example: The number 5 is 5 away from zero, but the number -5 is also 5 away from zero; so the absolute value of 5 is 5 and the absolute value of -5 is also 5.)

acute angle: an angle that is less than 90 degrees

algorithm: a step-by-step solution to a problem

area: the amount of space inside the boundary of a flat (two-dimensional) shape, measured in square units

associative property: When adding or multiplying more than two numbers, it does not matter how you group the numbers. (Example: [3 + 4] + 5 = 3 + [4 + 5])

base (numeration): a number that is going to be raised to a power (Example: In 4^2, 4 is the base.)

capacity: the amount that something (e.g., a bucket, classroom) can hold

circumference: the distance around the edge of a circle

*closed figure:* a shape that begins and ends at the same point

coefficient: a number used to multiply a variable (Example: In 6x – 8 = 10, 6 is the coefficient.)

commutative property: When adding or multiplying, you can change the placement of the numbers and still get the same answer. (Example: 2 x 6 = 6 x 2)

compass (directions): an instrument that shows direction (north, south, east, west); its small, magnetic needle points north/south.
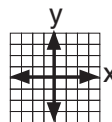
compass (drawing): an instrument with two arms, one with a sharp point and one with a pencil, that is used to draw circles
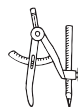
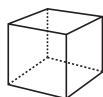*congruent:* having the same shape and size

coordinate plane: the plane containing the x-axis and the y-axis

coordinates: a set of numbers used to show the position of a point on a plane

cube: a solid shape with six identical square faces

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Objective

Given a sample story, students will learn the context of vocabulary related to coordinate planes and create simple coordinate planes.

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Vocabulary

coordinate plane: the plane containing the x-axis and the y-axis

coordinates: a set of numbers used to show the position of a point on a plane

distance: the amount of space between two places; the length of a line between two points

grid: a pattern of horizontal and vertical lines spaced out evenly

intersect: to meet or cross something; intersecting lines meet or cross each other.

locate: to find

negative number: a number less than zero

ordered pair: a pair of numbers that shows the position of a point on a coordinate grid

point: an exact location; it shows position but not size.

positive number: a number greater than zero

scale: the relationship between distances on maps and actual distances; a machine used to weigh people or objects

vertical: upright, or straight up and down

x-axis: the line on a graph that runs horizontally (side-to-side) through zero

y-axis: the line on a graph that runs vertically (straight up and down) through zero

Materials

- ✪ "Find It!—Word List" and "Find It!—Story" (pg. 92), one copy for class display
- ✪ "The Map—Word List" (pg. 93), halve each copy, one half for class display and one half per student
- ✪ "The Map—Story" (pg. 94), one copy for class display and one copy per student
- ✪ plain graph or grid paper (optional for closing activity)

Preparation

Prepare the sample story for classroom display—cover the story part and show only the word list.

Opening

1. Explain the concept behind a Mad Libs-type story.

2. Display "Find It!—Word List." As a class, choose math words that match the description provided (e.g. verb, noun).

3. Reveal the "Find It!—Story" part of the page. Substitute the words missing from the story with the words the students have chosen.

4. Read the complete story aloud. Then discuss which words would have been more appropriate for each space. (Possible answers are provided at the bottom of the page.)