

The Mystery Beetle: What's Multiplying?

by John Perritano

Math Objective

On the trail of a mystery insect, children learn ways to solve multiplication problems. Children understand that they can make a model, use a number line and repeated addition, skip count, or use an array to find a product. They also fluently write multiplication problems.

iMath Discover Activity

In this activity, children find and group like objects. Then, they choose the best way to find out how many objects they have in all.

► Objectives

Children will:

- use observation skills.
- learn how to use a model, a number line, and an array.
- understand how skip counting relates to multiplication.
- learn how to write multiplication problems.
- understand how to test their answers.

Materials

- a set of objects, such as paper clips or pebbles used in a fish tank
- paper and pencil

Lesson Plan

Before Reading

Investigation

Ask children to look at the picture on pp. 4–5. Read the text. Ask: *Why is observation so important to our understanding of nature?* Record children's answers on the board.

Math Concepts

Connecting to what they know helps children engage in the topic.

Print out photographs of several different kinds of insects. Use some of the insects

Accessing prior knowledge gets children to think about and engage with

from the book. Group students and provide each group with one labeled photograph. Ask: *What do you observe about the insect? Make a diagram of your insect and label all the parts of the insect you see using descriptive words, number of parts, etc.*

Give students computer time to research their insect. Have them add a paragraph of description to their insect diagram.

Children learn different ways to find a product in a multiplication problem. They make a model, use a number line and repeated addition, skip count, or use an array to find a product. They also practice writing multiplication problems.

During Reading

Investigation

pp. 6–9: Keep students in small groups. Assign one of the five Ideas in this section to each group. Let students read the pages silently. Then, have them discuss their Idea and design a presentation of that Idea to the class. As you reread the pages aloud, let each group give their presentation.

pp. 12–13: Have volunteers read these pages aloud. Then, say and ask: *Think back about the different ways you just learned to find a product. What do you think would be the best way to find the number of ladybird beetles in the array?* Record children’s answers on the board. Then allow volunteers to demonstrate the different methods.

pp. 14–15: Read these pages aloud. Ask a volunteer to draw a number line from 0 to 40 on the board. (Have children refer back to p. 7.) Invite a volunteer to show repeated addition on the number line to solve the problem on p. 15.

Math Concepts

Teaching the material to fellow students helps children understand and engage with the topic.

Children use multiplication within 100 to solve word problems in situations involving equal groups or arrays.

Children use a number line and repeated addition to find the total number of objects arranged in arrays with rows and columns; they write an equation to express the total as a sum of equal addends. Children apply properties of operations (such as addition) as strategies to multiply.

During Reading (continued)

Investigation	Math Concepts
<p>pp. 16–17: Display a Hundred Chart. Read pp. 16–17 aloud. Work the problem by demonstrating how to skip count by fifteen using the chart. Ask: <i>How could we show this problem in a model? How could we write this problem as a repeated addition problem? How could we write this as a multiplication problem?</i> Let volunteers show the different ways the product can be found. Ask: <i>What if there were twelve beetles in four rows?</i> Invite a volunteer to skip count using the Hundred Chart to find the answer.</p>	<p>Children use a Hundred Chart to accurately skip count. Children use repeated addition to find the total number of objects arranged in arrays with rows and columns. Children fluently write the problem as a multiplication equation.</p>
<p>pp. 18–19: Read the pages aloud. Let the children answer the questions on these pages. Ask: <i>How could we write the problem on p. 19 as a multiplication problem? How could we use repeated addition?</i> Let volunteers demonstrate these different ways to find the product.</p>	<p>Children determine the unknown whole number in a multiplication problem. They interpret products of whole numbers, e.g., interpret 11×9 as the total number of objects in 11 groups of 9 objects each. Children use skip counting to multiply. They fluently write the problem as a multiplication equation.</p>
<p>pp. 20–21: Read the pages aloud. Let children answer the questions on these pages. Ask: <i>How would you show the problem on p. 21 in an array?</i> Have a volunteer draw an array on the board.</p>	<p>Children use multiplication to solve word problems in situations involving equal groups, arrays, or models.</p>
<p>pp. 22–23: Read p. 22 aloud. Ask: What would be the easiest way to find the number of whirligig beetles? Let children answer the question and solve the problem in their own way. Ask: <i>How does a Hundred Chart help when you skip count?</i> Record children’s answers on the board.</p>	<p>Children use a Hundred Chart to accurately skip count. Children use repeated addition to find the total number of objects arranged in arrays with rows and columns.</p>

During Reading (continued)

Investigation

pp. 24–25: Read p. 24 aloud. Ask: *How would you feel about wearing beetle wings on your clothes? Or how would you feel about wearing a live beetle on a chain? Can you think of any of today's fashions that may seem odd in the future?* Tell children that crushed cochineal insects and fish scales are still used in some lipsticks and nail polishes. Read p. 25 aloud. Ask: *If the entomologist finds 24 ants on the first day and 30 ants on the second day, about how many ants live in the hole?* Work the problem with the class.

pp. 26–28: Read these pages aloud. Invite volunteers to try different methods to solve the problem on p. 27. Have children explain why they think certain multiplication strategies work better than others (build a model, use a number line to do repeated addition, draw an array and skip count, or write and solve a multiplication problem). Encourage children to support their conclusions.

p. 29: Read p. 29 together. Work with children to research the presence of the Asian longhorned beetle in your area. Discuss and plan what an awareness group might do.

Math Concepts

Children connect to art and history and gain perspective. They learn what entomologists do. And they see how entomologists use math in their work. Children use multiplication to solve word problems in situations involving equal groups or arrays.

Children reason and weigh the value of different methods of finding a product.

Children research and make a plan of action.

After Reading

Ask children to restate the key ideas in the book.

Investigation

Invite your local agricultural agent to speak to children about invasive species in your area. Gather numbers of animal or insect populations from the agent to use in creating multiplication problems.

Take a nature walk. Have children log time and date, draw insects they find, count body parts, and describe and label features of the insects.

Understanding Math

Children connect with their local environment and community.

Observation and scientific study help children relate math and science concepts to their interests.