

# More Models

enVisionMATH Common Core uses bar diagram models to help students make sense of the problem and become better problem solvers.

“Model **bar diagrams** on a regular basis; not just in special lessons but frequently when word problems are encountered.”

Dr. Randall Charles



**Lesson 1-10 Common Core**

**Problem Solving**

### Draw a Picture and Write an Equation

A stegosaurus was 5 times as long as a velociraptor. If a velociraptor was 6 feet long, how long was a stegosaurus?

Velociraptor: 6 feet long  
Stegosaurus: 5 times as long

**Read and Understand**

What do I know?  
A velociraptor was 6 feet long. A stegosaurus was 5 times as long as a velociraptor.

What am I asked to find?  
The length of a stegosaurus

**Plan**

Draw a picture.

? feet in all

Stegosaurus: 6 6 6 6 6 (5 times as long)  
Velociraptor: 6

Write a number sentence.  
Multiply:  $5 \times 6 = 30$   
A stegosaurus was 30 feet long.

## Problem Solving Recording Sheets

Students use bar diagrams as strategic tools to demonstrate mathematical reasoning.

Name \_\_\_\_\_ Teaching Tool 1

### Problem-Solving Recording Sheet

**Problem:**

<b>Find?</b>	<b>Know?</b>	<b>Strategies?</b> Show the Problem <input type="checkbox"/> Draw a Picture <input type="checkbox"/> Make an Organized List <input type="checkbox"/> Make a Table <input type="checkbox"/> Make a Graph <input type="checkbox"/> Act It Out/Use Objects <input type="checkbox"/> Look for a Pattern <input type="checkbox"/> Try, Check, Revise <input type="checkbox"/> Write an Equation <input type="checkbox"/> Use Reasoning <input type="checkbox"/> Work Backwards <input type="checkbox"/> Solve a Simpler Problem
<b>Show the Problem?</b>	<b>Solution?</b>	
<b>Answer?</b>	<b>Check? Reasonable?</b>	

## Bar Diagrams

Bar diagrams show quantitative relationships visually, making the math easier to understand.

**Plan**

Draw a picture.

? feet in all

Stegosaurus: 6 6 6 6 6 (5 times as long)  
Velociraptor: 6

Write a number sentence.  
Multiply:  $5 \times 6 = 30$   
A stegosaurus was 30 feet long.

**Guided Practice\***

**Do you know HOW?**  
Solve. Write an equation to help you.

- Manuel has a collection of coins, all of which are nickels and quarters. He has 8 nickels and three times as many quarters.
  - How many quarters does he have?  
**24 quarters**
  - How many coins does Manuel have in all?  
**32 coins**
- Use Tools** How did the picture in the example above help you to write an equation? *See margin.*
- A ceratosaurus was 5 times the length of a microvenator. A microvenator was 4 feet long. Use this information to write a problem you can solve by writing an equation. Then solve.  
**Check students' answers.**

**Independent Practice**

**4. Science** For the science fair, Joe made a model of a microraptor, one of the smallest dinosaurs ever discovered. He made his model 8 inches long. The actual dinosaur was 3 times the length of Joe's model. How long was the microraptor?  
**24 in.**

Micro-raptor: 8 8 8 (3 times as long)  
Model: 8

**Applying Math Practices**

- What am I asked to find?
- What else can I try?
- How are quantities related?
- How can I explain my work?
- How can I use math to model the problem?
- Can I use tools to help?
- Is my work precise?
- Why does this work?
- How can I generalize?

**5. Reason** Carmen's recipe calls for three times as many carrots as peas. If Carmen uses 2 cups of peas, how many cups of carrots,  $c$ , will she use?  
**6 cups**

Carrots: 2 2 2 (3 times as many)  
Peas: 2

**6. Rae's recipe calls for twice as many tomatoes as peppers. She uses 2 cups of peppers. How many cups of tomatoes,  $x$ , will she use in all?  
**4 cups****

Tomatoes: 2 2 (2 times as many)  
Peppers: 2

**7. Persevere** Marley, Jon, and Bart swim a relay race. Jon swims two more laps than Marley. Bart swims twice as many laps as Marley. If Marley swims 3 laps, how many laps do they swim all together? Explain.  
**14 laps;  $3 + 5 + 6 = 14$**

**8. Be Precise** Jack's dog has a rectangular pen. The length is two feet longer than the width. The width is 6 feet. Write an equation to find the perimeter of the pen?  
 **$6 + 6 + 8 + 8 = 28$  feet**

**9. Matilda is 9 years old. Her mother is 4 times as old as she is. Use the model below to find the age of Matilda's mother,  $y$ .  
**36 years old****

Matilda's Mother: 9 9 (4 times as old)  
Matilda: 9

**10. Think About the Structure** Four relay team members run an equal part of an 8-mile race. Which equation could you use to find  $n$ , the number of miles each relay team member runs?  
A  $4 + n = 8$   
B  $4 \times n = 8$   
C  $4 + 4 + 4 + 4 = n$   
D  $2 \times 2 = n$