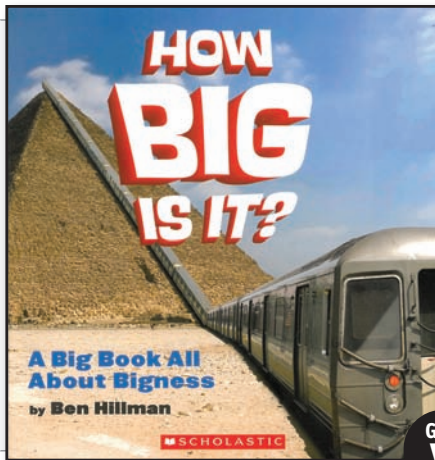
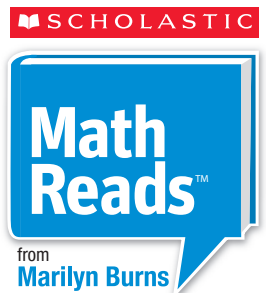


# How Big Is It?

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## TOPICS

Measurement

Problem Solving

This book is filled with captivating photographs that focus on the comparative sizes of natural and manmade things. On one page, a dinosaur-killing asteroid hovers over the New York City skyline; on another, a polar bear on its hind legs is “playing” basketball with a team of normal-sized players. The author provides background information and interesting data that entices students to visually and numerically compare the length, height, and/or breadth of one thing to another.

### Standards for Mathematical Practice

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.

### Standards for Mathematical Content

- Operations & Algebraic Thinking
- Measurement & Data

### Objectives

- Solve problems involving measurement.
- Use the four operations with whole numbers to solve problems.

## Getting Started

Show the cover and read the title aloud. Ask the students how they know how big something is. Provide a few examples: *A grownup is bigger than a 10-year-old when we compare their heights. A baseball is bigger than a tennis ball when we compare their weights. A python is bigger than a worm when we compare their lengths.*

Point out that the cover photo has been altered to show how a subway train compares to the Great Pyramid at Giza. Show two or three other photos in the book and read a few entries from the Contents to give students an idea about the information in the book. Explain that instead of reading the entire book at once, you will look only at the page that shows the photo on the cover. Then use the following lesson ideas in the order they appear.

## LESSON IDEAS

### Introduce a Problem

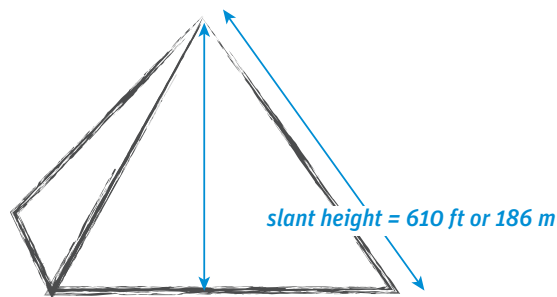
- Turn to page 13 and read the text aloud. Show the photo and ask: *What shape is the base of the pyramid? What shape are its sides?*
- Define its height: *Imagine a vertical line going from the middle of the pyramid’s base straight to its tip. That is the height of the pyramid. It is shorter than the slant height of the pyramid.*
- Run your finger along the train from the ground to the tip. Say: *Talk to a partner about how you could figure out the length of one subway car.*

## Discuss Strategies

- When everyone is ready, have students share their ideas with the class. As students report, record their ideas on the board. They will serve as a reference for students to use when they solve the problem. Then add to the list any of the following strategies that weren't suggested.
  - ▶ Guess the length of a train car and multiply by the number of cars. Then compare it to the height and adjust the number.
  - ▶ Guess the slant height by comparing it to the vertical height. Halve the slant height to get the length of four cars, then halve it twice more.

## Solve the Problem

- Tell students that the slant height of the Great Pyramid is 610 feet or 186 meters. Remind them the vertical height is 449 feet or 137 meters. Sketch a pyramid on the board and indicate the measurements.



- Explain that feet are a *height = 449 ft or 137 m* in the U.S. Customary system and that meters are a measurement of length in the metric system. Say: *Work in pairs to figure out the length of one subway car. Use either feet or meters, whichever you like. Show your work with words, numbers, and pictures.*
- When all pairs are ready, ask students to present their solutions and strategies to the class. Point out that their solutions are as accurate as they can be, but that they are estimates because measurement is never exact.

## Solve and Discuss Another Problem

- Organize students into five groups and give each a copy of the book. Have them look through the book to locate three photographs that they like. Say: *For each photograph, create a problem that compares the objects shown. Your problem should describe the objects you are comparing, contain the measurements, and end in a question. You can include a drawing, if you want. Write each problem on a separate piece of paper.*
- Collect the problems and redistribute them, giving one to each pair of students. Have students solve the problem on a different piece of paper.
- Collect the problems again and repeat the activity on another day.

## SUPPORTING INSTRUCTION

To help students become more familiar with both the U.S. Customary system and the metric system, give them rulers, yardsticks, and meter sticks and a list of items to measure in the classroom.

## Vocabulary

### Math Vocabulary

ENGLISH	SPANISH*
compare	<i>comparar</i>
halve	<i>dividir por dos</i>
length	<i>longitud</i>
slant height	<i>altura de inclinación</i>
vertical height	<i>altura vertical</i>

### Context Vocabulary

ENGLISH	SPANISH*
reticulated	<i>reticulado</i>
tsunami	<i>maremoto</i>



## HOME CONNECTION

Have students compare the lengths or heights of two things at home and draw a picture to show the comparison. Compile their drawings into a class book.

\*Pointing out Spanish cognates will help students make meaning-based connections.