Teacher Guide

Just How Far?

Key idea: A scale model can help us picture distances between bodies in space.

Time: 30 minutes

Objective
Students read about calculating scale and then figure out what the distances would be if they created a model at a certain scale of Earth, the Moon, and a communications satellite.

Do the activity
Give students the *Just How Far?* Student Handout and ask them to read the section about "Calculating scale." Then tell students to use the information in that section and in the table to answer the questions. The questions ask students to calculate distances in a scale model where the Earth is the size of a basketball and the Moon is the size of a tennis ball. Remind students to show their calculations.

If time permits, allow students to set up the scale model based on their calculations. Provide them with a meter stick, a basketball, a tennis ball, and a tiny object to represent the communications satellite.

Answer Key

Before you figure out the distances in your scale model, study the table, which shows some actual distances from Earth. Use the scale 1 centimeter equals 530 kilometers (or 1 inch equals 838 miles) and the information in the table to answer these questions. Be sure to show your work.

	Distance (Kilometers)	Distance (Miles)
Earth-communications satellite	35,000	22,000
Earth-Moon	384,000	239,000
Earth-Sun	150,000,000	93,000,000

1. How far away from Earth would the Moon be in centimeters and inches? *[The distance from Earth to the Moon would be 724.5 centimeters, or 285 inches. This is equivalent to 7.24 meters, or 23.75 feet.*

   (384,000 km x 1 cm/530 km = 724.5 cm.

   239,000 miles x 1 inch/838 miles = 285 inches)]

2. How far away from Earth would a communications satellite be in centimeters and inches? *[The distance between a communication satellite and Earth would be 66 centimeters, or 26 inches.*

   (35,000 km x 1 cm/530 km = 66 cm.

   21,748 miles x 1 inch/838 miles = 26 inches)]

3. How far away from Earth would the Sun be in centimeters and inches? *[The distance between Earth and the Sun would be 283 centimeters, or 111,224 inches. This is equivalent to 2.83 kilometers, or 1.76 miles.*

   (150,000,000 km x 1 cm/530 km = 283,018.9 cm.

   93,205,748 miles x 1 inch/838 miles = 111,224 inches)]

4. About how many times greater is the distance from the Earth to the Sun than the distance from Earth to the Moon? *[The Sun is 390.6 times farther away from Earth than the Moon is.*

   (150,000,000 km/384,000 km = 390.6)]