



Just How Far?

How far apart would Earth and the Moon be in a scale model where Earth is as big as a basketball and the Moon is as big as a tennis ball?

Calculating scale

Even though the Moon is our nearest neighbor in space, the distance separating Earth and the Moon is enormous. Scientists often use scale models to help them picture such distances better. To build a scale model of Earth and the Moon, you first need to know the actual distance that separates them. Luckily, astronomers have already measured it.

Next you must decide on a model scale. That means you must calculate how much to shrink the distance—that is, every distance by the same amount. Look at a plastic airplane model. It looks like the real thing, only smaller. Model airplanes are often built one forty-eighth as large as a real plane. So the ratio of a model airplane to the real airplane is 1:48. Every length is 48 times larger on the real plane than on the scale model.

That scale wouldn't work for your model. Why not? If you put Earth in your schoolyard, you would need to put the Moon about 8,000 kilometers (5,000 miles) away! So keep downsizing.

If Earth were the size of a basketball, the Moon would be about as big as a tennis ball. That's a scale model, too. At that scale, 1 centimeter equals about 530 kilometers (or 1 inch equals 838 miles). That is, every 530 kilometers in the real world translates to 1 centimeter (or 838 miles to 1 inch) in the model. You can use that scale to illustrate the distance between Earth and the Moon.

Do the activity

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.

1. How far away from Earth would the Moon be in centimeters and inches?

2. How far away from Earth would a communications satellite be in centimeters and inches?



	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

3. How far away from Earth would the Sun be in centimeters and inches?

4. About how many times greater is the distance from the Earth to the Sun than the distance from Earth to the Moon?
