

# How Far Away Is the Sun?



Imagine a basketball represents the Sun. A seed, about 100 times smaller than the diameter of the basketball, represents the Earth. About how far away from the basketball should you place the “seed Earth” to show its distance from the Sun in this model? Circle the answer you think is closest to the relative distance between the “basketball Sun” and the “seed Earth.”

- A** about 3 feet (or about 1 meter) away
- B** about 15 feet (or about 5 meters) away
- C** about 50 feet (or about 15 meters) away
- D** about 100 feet (or about 31 meters) away
- E** about 500 feet (or about 152 meters) away
- F** about 1,000 feet (or about 305 meters) away

Explain your thinking. Describe how you decided on your answer.

---

---

# How Far Away Is the Sun?

## Teacher Notes



### Purpose

The purpose of this assessment probe is to elicit students' ideas about relative distance. The probe is designed to find out if students can apply the same scale used to represent the difference in sizes between the Earth and Sun to also represent the approximate distance between them.

### Related Concepts

Apparent vs. actual size

Sun: distance, location relative to Earth

### Explanation

The best answer is D: "About 100 feet (or 31 meters) away." More precisely, the ratio of the Sun's diameter at the equator to its average distance from Earth is 107.4. A very rough estimate can be made by taking the viewpoint of the seed that represents the Earth and backing away from the basketball until it appears to be about the same size as the Sun in the sky.

Another way is to recall that the Sun is about 800,000 miles in diameter and 93,000,000 miles from Earth, a ratio of about 1:100.

### Administering the Probe

This probe can be used with students in upper elementary grades through high school. It can be used to find out students' preconceptions related to the relative distance between the Sun and Earth, or it can be used following instruction about the solar system to see whether students developed a sense of scale size as a result of their instructional experiences. Make sure students know they are using the same scale to represent the sizes of the Earth and the Sun and the distance between them. To make the probe more interactive, use an actual basketball and a seed. Take the students into a long corridor, or go outside, and have them pace off in "feet" the distance they think represents the relative distance between the Earth and Sun at this scale and then commit to a written answer on the probe.