

## *Distances in Space*

### **Learn about the units of length used to measure distances in our solar system and beyond.**

Because astronomers study objects over such extremely large distances, astronomers commonly use units of length that are much bigger than the ones we usually use. Two common units of distance used in astronomy are the astronomical unit (AU) and the light-year.

#### **Astronomical Unit**

The astronomical unit (AU) is the average distance from the Earth to the sun, measured to be about  $1.5 \times 10^8$  km. It is a convenient unit to use when discussing distances within our solar system.

1. Saturn has an average distance of 9.5 AU from the sun. How many centimeters is this?

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2. Pluto, the outermost planet in the solar system, is about  $6 \times 10^9$  km from the sun. How many astronomical units (AU) is this?

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#### **Light-year**

The light-year is defined as the distance that light travels in a year. (The speed of light is  $3 \times 10^5$  km/s.) For instance, Alpha Centauri, the closest star to the Earth after the sun, is 4.3 light-years from us.

3. How long does it take light from this star to reach us?

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4. The star Betelgeuse, meaning “armpit of the giant,” is 310 light-years from Earth. How many hours does light from this star take to reach Earth?

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5. How many AUs are in a light-year? (*Hint:* There are approximately 31,536,000 seconds in a year.)

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