

## Objects Resulting from Formation of Our Solar System

Many children think that our solar system contains only the sun, the planets, and Earth's moon. Although the Our Solar System lessons don't directly mention the "minor" objects in the solar system, your familiarity will help the children understand that other objects exist and are occasionally visible to the unaided eye. Likewise, the lessons do not address how our solar system was formed. The following information may give you some understanding of the origins of the solar system, even though this topic is appropriate only for children in much later grades.

About 4.6 billion years ago, a cloud of dust and hydrogen gas generated our solar system. Nuclear reactions in the thickest part of the cloud created a proto-sun, and, in the rest of the cloud, particles collided and stuck together to form bodies. Going outward from the sun these objects still exist in a range of size and materials.

- The four large bodies closest to the sun's heat—Mercury, Venus, Earth, and Mars—became rocky planets. Among these, Earth and Mars have moons, which are smaller bodies orbiting the planet.
- Other remnants of the solar system's birth are millions of **asteroids** that orbit the sun in a belt between Mars and Jupiter. Asteroids are made of rock or metal fragments like the rocky planets, but are much smaller in size. (There's one dwarf planet—Ceres—in the asteroid belt, massive enough that its own gravity pulls it into a round shape.)
- The four large bodies farther from the sun's heat formed into the "gas giant" planets—Jupiter, Saturn, Uranus, and Neptune. Each of these planets has multiple moons.
- Beyond Neptune, where the sun's heat barely reaches, ice mixed with dust collided to form the dwarf planet Pluto and other icy objects of various sizes in the Kuiper belt—including other dwarf planets classified as "plutoids."
- Other icy objects became **comets**, which usually occupy the farthest parts of the solar system, but sometimes pass close to Earth on their elliptical orbits. Some comets return to Earth's neighborhood at regular intervals; others are flung out of the solar system.

Other objects in our solar system include **meteoroids**, bodies smaller than asteroids that move through space. Some of these enter Earth's atmosphere from space at high speeds and usually burn up—becoming **meteors**. Single meteors can be seen throughout the year and are often called "shooting stars," based on their appearance. When a meteor lands on Earth, it is called a **meteorite**. The biggest meteorite yet found is called the Hoba meteorite in Namibia. Discovered in 1920, this iron meteorite weighs 65 tons and is almost 10 feet (3 m) long.

The best time to see meteors in the nighttime sky is during a meteor shower. These occur when Earth is traveling through a meteoroid stream left by comets that return at regular intervals. Because of Earth's annual orbit around the sun, meteor showers can be predicted to occur on an annual basis. The following table lists the most easily visible annual meteor showers and their approximate annual dates. The "constellation of origin" indicates the location in the sky from which the meteors appear to start.

## Annual Meteor Showers

Annual Dates to Watch	Average Meteors Per Hour	Shower Name	Constellation of Origin	Parent Object
<b>Oct. 16-27</b>	25	Orionids	Orion	comet Halley
<b>Nov. 15-20</b>	15	Leonids	Leo	comet Tempel-Tuttle
<b>Dec. 7-15</b>	50	Geminids	Gemini	asteroid 3200 Phaethon
<b>Jan. 1-6</b>	40	Quadrantids	Bootes	unknown
<b>Apr. 19-24</b>	15	Lyrids	Lyra	comet Thatcher
<b>May 1-8</b>	20	Eta Aquarids	Aquarius	comet Halley
<b>July 15-Aug. 15</b>	20	Delta Aquarids	Aquarius	unknown
<b>July 25-Aug. 18</b>	50	Perseids	Perseus	comet Swift-Tuttle