SMALLER CELESTIAL BODIES

We usually think of our solar system as the sun and the eight planets that orbit it. Comets, asteroids, and meteoroids also belong to our solar system.

Comets

A comet is an icy body that orbits the sun. The center of a comet is called the nucleus. It is a small, solid ball surrounded by gases, water, and dust. These things are frozen into a kind of dirty snowball. The nucleus can be a few kilometers or a few miles in diameter. The cloud of dust and gases around the nucleus is called the coma. Together, the nucleus and the coma form the comet's head. The third part of the comet is called the tail. Comets only have tails when they are close to the sun.

Comets travel in large orbits around the sun. When they are far from the sun, they travel about 2,000 miles per hour. As they get closer to the sun, they speed up. They may go as fast as 100,000 miles per hour! As a comet approaches the sun, its icy body begins to melt. This releases gas and dust. The solar winds push against the coma, making a tail that streams from the nucleus. The tail of a comet may be millions of kilometers long. It is usually curved because of the movement of the comet.

The tail of a comet is blown outward by the solar wind, so the tail always points away from the sun. As the comet nears the sun, the tail is behind it. When the comet moves away from the sun, the tail is in front of it. The tails of some comets are visible from Earth. As the comet continues its orbit and gets farther from the sun, its tail disappears.

Some comets make many revolutions around the sun. The most famous is Halley's Comet. Edmund Halley discovered it in 1682. It revolves around the sun once every 76 years. The tail of Halley's Comet has been measured at about 93 million miles, the same distance from the Earth to the sun. Halley's Comet last came near Earth in 1986 and will return in 2062. Other comets make only one orbit before disappearing into outer space.

Meteor showers sometimes occur when the Earth passes through the dusty orbit of a comet. Meteor showers are seen when the dust from the comet passes into Earth's atmosphere. The dust may have been left there in space for hundreds of years. Then we can see hundreds of meteors in one night. Once a year in August and in November, Earth passes through the spots where a comet left its dust. In August, the Perseid meteor shower is seen on Earth. The Leonid meteor shower happens in November.

As comets pass through the solar system, they can be broken into pieces. In 1994, comet Shoemaker-Levy 9 was broken into 20 pieces by Jupiter's gravity. Scientists watched as the pieces crashed into Jupiter's atmosphere.

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Meteors, Meteoroids, and Meteorites

A meteor is a bright streak of light we see in the sky. It only lasts for a few seconds. People often call meteors falling stars or shooting stars because they look like stars falling from the sky. The brightest meteors are called fireballs.

While it is in space, it is called a meteoroid. Meteoroids that reach the Earth are called meteorites. It is a meteor when it is passing through the atmosphere.

A meteoroid is a chunk of metallic or stony matter. Some of these may have been pieces of asteroids. When it enters the Earth's atmosphere from outer space, air friction heats the meteoroid so that it glows. It creates a shining trail of gases and melted particles. Most meteoroids burn up before reaching the Earth. Some leave a trail that lasts several seconds. Millions of meteors occur in the Earth's atmosphere every day. Most meteoroids that cause meteors are about the size of a pebble.

Meteoroids travel around the sun in different orbits and at different speeds. The fastest ones move at about 26 miles per second. When it enters the Earth's atmosphere, its speed combines with the speed of Earth's movements and can reach 264 miles per hour!

There are three kinds of meteorites. They are stony, iron, and stony-iron. Meteorites are the oldest rocks ever found. They date back to the beginning of the solar system. Thousands of small meteorites have been found in Antarctica. Scientists study meteorites for clues to the types of material that formed the planets.

Asteroids

Asteroids are large chunks of rocky material with some metals in it. There is large group of asteroids orbiting the sun between the orbits of Mars and Jupiter. This is called the asteroid belt. Most of the asteroids in our solar system are found there. They orbit the sun just as the planets do. They are too small to be planets. Astronomers think that the asteroid belt is made up of material that was never able to form into a planet, or it could be parts of a planet that broke apart long ago. The asteroid belt contains millions of asteroids. The largest asteroid is about one-fourth the size of our moon.

Task 1. Choose the letter of the best answer.

1. What are the three parts of a comet?

   a) the head, body, and tail

   b) the nucleus, coma, and tail

   c) the nucleus, protons, and electrons

2. Why does the tail always point away from the Sun?

   a) because of opposite magnetic forces

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b) because of the solar wind

c) because you can't see it pointing toward the Sun

3. What is a comet made of?

a) ice made from frozen gases, water, and dust

b) moon dust

c) fire and ice

4. In what year will Halley's Comet be seen again?

a) 2086

b) 2076

c) 2062

5. How long is the tail on Halley's Comet?

a) the same length as from Venus to Earth

b) the same length as from Earth to the Moon

c) the same length as from the Sun to Earth

6. What causes a meteor shower?

a) large asteroids entering Earth's atmosphere

b) the tiny pieces of dust left behind by a comet

c) stars

7. What causes the light of a meteor?

a) It's the same as the Sun.

b) It's the same as a comet.

c) It's caused by friction with Earth's atmosphere.

8. What are asteroids?

a) pieces of stars

b) small planets

c) large rock-like chunks with some metals that orbit the Sun

9. What is the asteroid belt?

a) an area between the orbits of Mars and Jupiter where most asteroids are found

b) a belt of rocks across a planet

c) a belt of rocks crossing the Sun

10. Why do scientists think these asteroids are there?

a) They broke off Mars and just stayed there.

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b) They were pieces that couldn't form into a planet.

c) They are smaller planets.

Task 2. Choose the correct word or phrase that matches each description.

1. The solid center of a comet, made of frozen gases, water, and dust.
   a) nucleus b) tail c) coma
2. The event that happens when Earth passes through the dusty orbit of a comet.
   a) solar eclipse b) meteor shower c) Lunar eclipse
3. The continent where many small meteorites have been discovered and studied.
   a) Africa b) Asia c) Antarctica
4. The region beyond Earth's atmosphere, where comets and other space objects move freely.
   a) the galaxy b) outer space c) the ozone layer
5. The planets in our solar system originally formed from
   a) gas and dust b) ice and rock c) molten lava.
6. What happens to a comet's speed as it approaches the Sun.
   a) It slows down b) It speeds up c) It stops

Task 3. Choose the correct option.

1. A comet's tail always points (toward / away from / around) the Sun.
2. Meteor showers occur when Earth passes through a comet's (orbit / layer / belt).
3. Asteroids are too (large / small / bright) to be planets.
4. Most meteors burn up before (reaching / orbiting / melting) the Earth's surface.
5. A comet travels faster as it moves (above / farther from /closer to) the Sun.
6. The nucleus of a comet is often described as a (dirty snowball / frozen planet / molten rock).
7. The asteroid belt lies between the orbits of (Mars and Jupiter / Earth and Mars / Jupiter and Saturn).
8. Scientists study meteorites to learn about the (oceans / atmosphere materials) that formed the planets.
9. The tail of a comet disappears when it moves (away from / toward / beyond) the Sun.

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