Meteors, also known as shooting stars, are bits of material that fall from space through Earth’s atmosphere. The friction of the atmosphere causes them to heat up and glow brightly for a brief time.

As these objects fly through space, they are called meteoroids. They become meteors for the few seconds they streak across the sky, creating glowing trails.

Scientists estimate that about 48.5 tons (44,000 kilograms) of meteoritic material falls on the Earth each day. Every night, several meteors flash across our sky each hour. Sometimes, there are many more, in events are called meteor showers. Some meteor showers occur annually or on a regular basis as the Earth passes through the trail of dusty material left by a comet.
Constellations Are Inspiration For Meteor Shower Names

Meteor showers are usually named after a star or constellation that is close to where the meteors appear in the sky. Perhaps the most famous are the Perseids, which peak around Aug. 12 every year. Every Perseid meteor is a tiny piece of the comet Swift-Tuttle, which passes by the Sun every 135 years.

Other meteor showers have their own associated comets, too. The Leonids come from Tempel-Tuttle, the Aquarids and Orionids come from Halley and the Taurids come from Encke. Most comet dust in meteor showers burns up in the atmosphere before reaching the ground, but some is captured by high-altitude aircraft and analyzed in NASA laboratories.

Some chunks of rock and metal from asteroids and other planetary bodies survive their journey through the atmosphere and fall to the ground. These are called meteorites. Most meteorites found on Earth are small, ranging from the size of pebble to the size of a fist, but some are larger than a building. Early Earth was hit by many large meteorites, which caused much destruction.

Some of these large meteorites left huge cavities where they hit the ground. These points of impact are known as craters. One well-preserved impact crater is the Barringer Meteorite Crater in Arizona, which is 0.6 miles wide. It was formed by the impact of an iron-nickel
meteorite that had a diameter of about 164 feet. The crater is 50,000 years old, and it is so well-preserved that it has been used to study meteor impacts. About 170 impact craters have been found on Earth.

One of these is the Chicxulub crater on the Yucatan Peninsula in southeastern Mexico. This crater was formed when a very large asteroid hit the Earth 65 million years ago, leaving a 180-mile-wide hole in the ground. This impact is thought to have contributed to the extinction of about 75 percent of marine and land animals on Earth at the time, including the dinosaurs.

**Meteor-Caused Injuries Are Rare**

Well-documented cases of people injured or killed by meteorites are rare. The first known case happened in 1954 in the United States when Ann Hodges of Sylacauga, Alabama, was severely bruised by an 8-pound stony meteorite that crashed through her roof.

Meteorites resemble Earth rocks, but they usually have a burned exterior, known as a "fusion crust." This crust is formed as the meteorite is melted by friction when it passes through the atmosphere.

There are three major types of meteorites: the "irons," the "stones" and the stony-irons. The majority of meteorites that fall to Earth are stony, but these look much like Earth rocks, which makes it difficult to identify them. Iron meteorites are found more frequently, because they look very different from Earth rocks.

**Meteorites Fall On Other Planets, Too**

Meteorites don’t just fall on Earth; they land on other planets, as well. The Mars Exploration Rover Opportunity found the first meteorite of any type on another planet when it discovered an iron-nickel meteorite about the size of a basketball on Mars in 2005. The Rover also found a much larger and heavier iron-nickel meteorite in 2009 in the same region. In all, Opportunity has discovered six meteorites during its travels on Mars.

More than 50,000 meteorites have been found on Earth, and 99.8 percent of these come from asteroids. Scientists know the origin of meteorites because they can use photos of the falling meteorite to track its orbit in reverse back to the asteroid belt, an asteroid-packed disc located between the orbits of Mars and Jupiter. Scientists have also analyzed meteorites and found them to be very old — about 4.5 billion years old — which is the age of asteroids, as well.

Asteroids and the meteorites that fall to Earth are not pieces of a planet that broke apart. They are the original, diverse materials from which the planets formed.
Meteorites Help Us Understand Early History Of Solar System

The study of meteorites tells us much about the conditions and processes during the formation and early history of the solar system. Scientists have studied meteorites to learn more about the age and composition of solids, the temperatures reached at the surface and interiors of asteroids and how greatly different materials are affected by impacts.

The 0.2 percent of meteorites that do not come from asteroids instead come from Mars and the moon. More than 60 meteorites have come to us from Mars. These martian meteorites were blasted off Mars by meteoroid impacts. Almost 80 meteorites have come to us from the moon. These are similar in composition to Apollo mission moon rocks, but are distinct enough to show that they came from other parts of the moon.

Meteors In History

4.55 billion years ago: Most meteorites form – they are as old as the solar system.

65 million years ago: The Chicxulub impact kills off 75 percent of the animals on Earth, including the dinosaurs.

50,000 years: Age of Barringer Meteorite Crater in Arizona.

1478 B.C.: First recorded observation of meteors.

1794: Ernst Friedrich Chladni publishes the first book on meteorites, proposing that they come from space.

1969: Discovery of meteorites in a small area of Antarctica leads to annual expeditions by U.S. and Japanese teams.

1982-1983: Meteorites from the moon and Mars are identified in Antarctic collections.


2009: Opportunity finds another iron-nickel meteorite on Mars.
<table>
<thead>
<tr>
<th>Major Meteor Streams</th>
<th>Peak Night (may vary by +/- 1 day)</th>
<th>Time to Watch*Maximum Rate**</th>
<th>Parent Body (Asteroid or Comet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadrantids</td>
<td>January 3-4</td>
<td>23:00 to dawn 60-200</td>
<td>(196256) 2003 EH1</td>
</tr>
<tr>
<td>Lyrids</td>
<td>April 21-22</td>
<td>21:30 to dawn 10-15 typical</td>
<td>Comet C/1861 G1</td>
</tr>
<tr>
<td>Eta Aquarids</td>
<td>May 5-6</td>
<td>01:30 to dawn 40-85</td>
<td>Comet 1P/Halley</td>
</tr>
<tr>
<td>Delta Aquarids</td>
<td>July 27-28</td>
<td>21:30 to dawn 15-20</td>
<td>Unknown sungrazing comet</td>
</tr>
<tr>
<td>Perseids</td>
<td>August 11-12</td>
<td>dusk to dawn 60-100</td>
<td>Comet 109P/Swift-Tuttle</td>
</tr>
<tr>
<td>Orionids</td>
<td>October 20-21</td>
<td>22:00 to dawn 25</td>
<td>Comet 1P/Halley</td>
</tr>
<tr>
<td>Leonids</td>
<td>November 17-18</td>
<td>23:30 to dawn 10-15</td>
<td>Comet 55P/Tempel-Tuttle</td>
</tr>
<tr>
<td>Geminids</td>
<td>December 13-14</td>
<td>19:00 to dawn 60-120</td>
<td>(3200) Phaethon</td>
</tr>
</tbody>
</table>

* For observers in the northern hemisphere.

** Under perfect conditions
Quiz

1 Which section highlights the idea that meteoritic materials strike the Earth more often than one might assume?
(A) Introduction [paragraphs 1-3]
(B) Constellations Are Inspiration For Meteor Shower Names
(C) Meteor-Caused Injuries Are Rare
(D) Meteorites Fall On Other Planets, Too

2 Read the selection from the section "Meteorites Fall On Other Planets, Too."

Scientists know the origin of meteorites because they can use photos of the falling meteorite to track its orbit in reverse back to the asteroid belt, an asteroid-packed disc located between the orbits of Mars and Jupiter.

Which of the following can be inferred from the selection above?
(A) Asteroids are more dangerous than meteors.
(B) Asteroids are made of a combination of ice and rock.
(C) Meteors take thousands of years to reach Earth.
(D) Asteroids are probably made of the same materials as meteors.

3 Read the following two sentences from different sections of the article.

Some chunks of rock and metal from asteroids and other planetary bodies survive their journey through the atmosphere and fall to the ground.

This impact is thought to have contributed to the extinction of about 75 percent of marine and land animals on Earth at the time, including the dinosaurs.

Which option BEST describes the relationship between the two sentences?
(A) The first one describes a problem and the second one explains its solution.
(B) The first one describes a cause and the second one describes its effect.
(C) The first one states a reaction and the second one explains the action that came first.
(D) The first one is an effect and the second one describes its cause.
Read the last section of the article, "Meteors In History."

Why does the author choose to conclude the article with this section?

(A) to summarize key concepts presented in the article
(B) to provide evidence for details mentioned earlier in the article
(C) to recap important events related to meteor observation
(D) to summarize the main ideas of the article