Earth Science Teacher Guide: About Meteors

(Formation of the Earth, Learning Segment 03)

The MBER Living Earth resources commonly use the term "space rock" to refer to extraterrestrial rocks moving around the solar system and those that fall to earth. However, you may choose different language that you and your students find most useful. Just be certain you are using terms correctly.



A meteor, known colloquially as a shooting star or falling star, is the visible passage of a glowing space rock (meteoroid, micrometeoroid, comet, or asteroid) through Earth's atmosphere. The streak of light is caused by the meteor hitting air molecules in the upper atmosphere at high speeds and heating to temperatures which cause the rock to melt and glow (incandescence). Sometimes the meteor also sheds the glowing material in a trail as pieces break off.

Millions of meteors occur in Earth's atmosphere daily, but most can't be clearly seen, particularly in the daytime. Several visible meteors per hour can usually be seen on any given night. More can be seen during a "meteor shower". Most visible meteors are relatively high in the atmosphere (47 to 62 miles).

Most meteoroids that cause meteors are about the size of a grain of sand, i.e. they are usually millimeter-sized or smaller. Most space rocks smaller than a football field will break apart in Earth's atmosphere. Traveling at tens of thousands of miles per hour, the object disintegrates as pressure exceeds the strength of the object, resulting a bright flare. Typically, less than 5 percent of the original object will ever make it down to the ground. These meteorites, pieces of meteors that are found, typically range between the size of a pebble and a fist.

From the book *The Life and Death of Planet Earth*:

"Earth gains about **80 million lbs of rock/metal from space each year**, mostly from dust & some meteors."

Checking this claim against information available from NASA: (https://www.nasa.gov/mission_pages/asteroids/overview/fastfacts.html)

Every day, Earth is bombarded with more than 100 tons of dust and sand-sized particles. 1 ton = 2000 lbs. Therefore, daily = 200,000 lbs. Per year (x365days) = 73,000,000 lbs. That is relatively close to the figure from the book.

Millions of meteors hit the earth's atmosphere each day, but they are mostly sand-sized particles.

Definitions:

An asteroid is large space rock in orbit around the sun.

A meteoroid is a smaller space rock in orbit around the sun.

A micrometeoroid is an even smaller space rock in orbit around the sun.

A comet is a large conglomeration of rock, dust and ice in orbit around the sun.

A meteor is a meteoroid that enters the Earth's atmosphere and vaporizes, becoming a "shooting star".

A meteorite is a meteor or piece of a meteor that makes it to the ground and survives impact.

A bolide is a meteor that explodes in the atmosphere, sometimes called a "fireball".

Sources:

https://en.wikipedia.org/wiki/Meteoroid#Meteors https://solarsystem.nasa.gov/asteroids-comets-and-meteors/meteors-and-meteorites/in-depth/ Book: The Life and Death of Planet Earth



