

For Creative Minds

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Meteor, Meteoroid, Meteorite: What's the Difference?

A **meteoroid** is a chunk of rock or metal moving through space. Most are tiny, like a pebble or a grain of sand. But some are as much as a mile wide.

When a meteoroid enters the Earth's atmosphere, it burns up, making a streak of light called a **meteor**.

Sometimes, a large meteoroid does not burn up completely, and it falls to Earth. When it lands, it's called a **meteorite**.

Why do meteors shoot by so suddenly?

Meteoroids move fast! They hit the Earth's atmosphere at up to 150,000 miles per hour. At that speed, it doesn't take long for a speck of space dust to burn up. To catch sight of a meteor before it's gone, leave your telescope or binoculars at home. The best meteor spotting tool is a sharp pair of eyes.

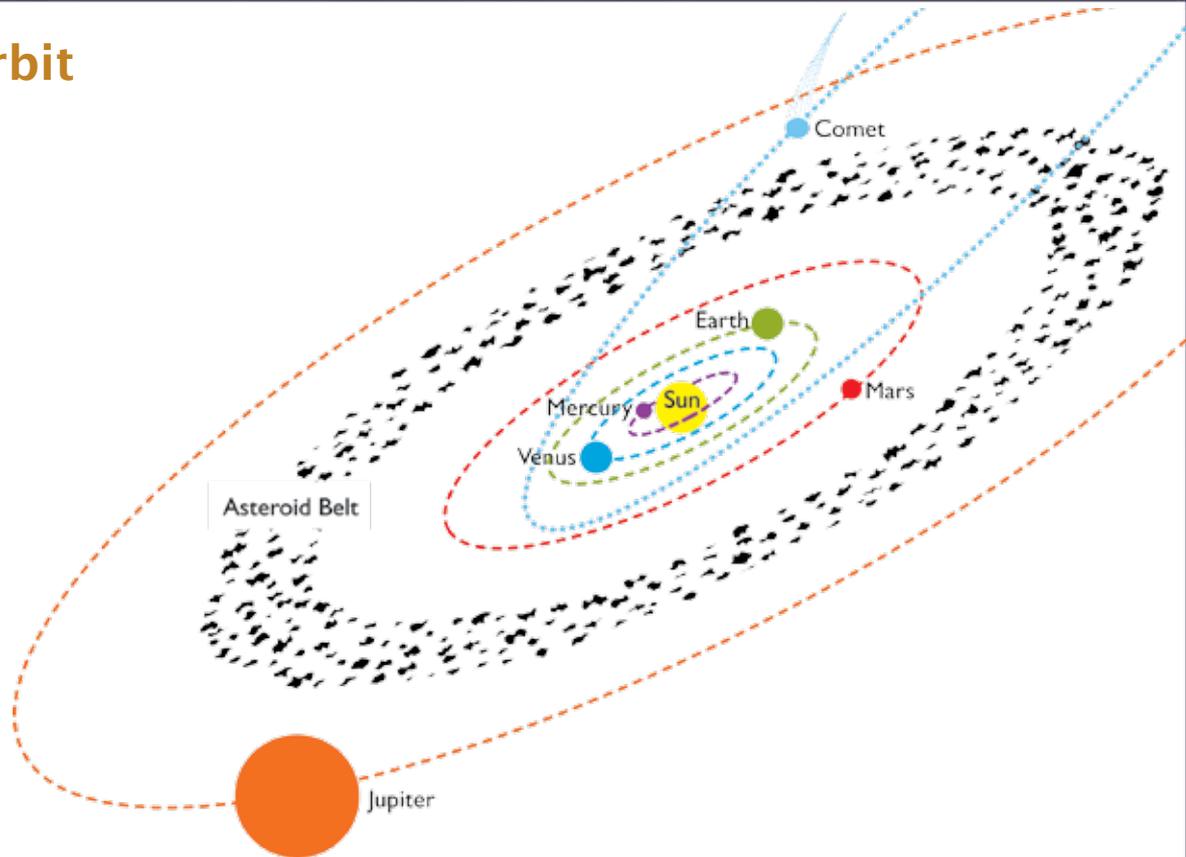
What is a meteor shower?

Gazing up into the sky on a typical night, you might see one or two meteors in an hour. But during an average meteor shower, you might see a meteor a minute!

Why all the extra meteors?

The Earth is passing through a trail of space debris left behind by a comet. A comet is a giant "dirty snowball" orbiting (going around) the sun. As the comet nears the sun, it starts to thaw, letting off a bright tail of gas and bits of dust and rock, which leaves behind a trail. When the Earth's own orbit takes us where the comet has been, we get a meteor shower.

A Comet's Orbit



Note: Distances and sizes of the planets are not drawn to scale.

Meteor Math

One of the greatest meteor showers ever was the Leonid storm in 1966, when meteors rained down at a rate of 40 per second.

- If you had been watching, how many would you have seen in 10 seconds?
- How high can you count in 10 seconds? Is that more or less than how many meteors you would have seen during the storm?
- How many meteors would you have seen in one minute?
- How many meteors would you have seen in one hour?

Comet Cookies

Note for classroom teachers: Store-bought chocolate chip cookies will work for this, but try to put some of the “space dust” on top of the cookies.



12-oz. package semi-sweet chocolate chips

12-oz. package miniature chocolate chips

12-oz. package miniature candies, such as M&Ms Mini Baking Bits

18-oz. roll of chocolate chip cookie dough

Mix the chocolate chips and candies in a bowl.

Follow the package directions to prepare the cookies for baking.

Press one tablespoon of candy/chip mix into the top of each cookie.

Bake and cool.

Lay one cookie on a paper plate. The cookie is the comet’s head—think of the dough as ice and the candies and chips as bits of “space dust.” So what’s missing? The tail! You can make a tail with leftover candy/chip mix—about three tablespoons for each comet.

To model a meteor shower, set a lamp in the middle of a table to be the sun. Carefully, “orbit” your comet cookie in an ellipse—long, flat oval—around the lamp. (Watch out for the cord!) As you orbit, shake off bits of candy/chip mix, so that you leave a trail.

Now, set down the plate, then take an orange or small ball—the “Earth”—and roll it slowly around the lamp. A meteor shower results when the Earth passes through the comet’s trail.

If you scatter a spoonful of candy/chip mix around the table, you’ll see how the Earth crosses paths with a smaller number of meteorites on ordinary nights.

And now, for the final step: eat your comet!

Five Steps to a Fantastic Meteor Watching Party

- 1 Plan ahead.** You can see meteors any night, but you'll see most during one of the big yearly meteor showers, such as the Perseids (August) or Leonids (November).
- 2 Set your alarm.** The ideal time to spot meteors is in the very early morning—around 4 a.m. If you have a choice, pick a night close to a new moon or when the moon sets before 4 a.m. That will give you better visibility.
- 3 Keep it dark.** Get away from street and house lights if you can. If you must use a flashlight, cover the light with red cellophane to keep from spoiling your night vision.
- 4 Pack smart.** Bring a blanket, sleeping bag, or folding lawn chair. Dress warmly, even in summer. And don't forget the hot chocolate and Comet Cookies.
- 5 Invite your friends.** Telling jokes and singing songs helps to pass the time between meteors. Or, just lie back quietly and listen to the sounds of the night.



Look! Up in the Sky!

Not every moving object or bright light in the sky is a meteor. Check this list of common night sights:

- **Meteors** are bright streaks that shoot by in an instant. Meteors come in many colors: mostly white, but you may also see streaks of yellow, orange-yellow, red, green, blue-green or violet.
- **Airplanes** move fast across the sky and have red blinking lights.
- **Satellites** move more slowly than meteors and can be seen for several minutes.
- **Stars** stay in one place and twinkle.
- **Planets** appear to stay in one place, unless you watch for weeks!