

## \* Meteoroid, Meteor, Or Meteorite?

One piece of interstellar debris, three different names that tell you something about the "state" of the object (1) as it exists in space, (2) as it slams into our atmosphere, and (3) as it hits the ground if it's big enough to survive entry. Definitions from [dictionary.reference.com](http://dictionary.reference.com).

**Meteoroid (1860):** any of the small bodies, often remnants of comets, traveling through space.

**Meteor (1570):** a meteoroid that has entered the earth's atmosphere; a transient fiery streak in the sky produced by a meteoroid passing through the earth's atmosphere; a shooting star or bolide.

**Meteorite (1815):** a mass of stone or metal that has reached the earth from outer space; a fallen meteoroid.

## \* A Lot From All Over - And Very Fast

Meteor showers are the most predictable times to see debris falling from space, but an estimated 40 tons\* of space dust falls on Earth EVERY DAY. You can see these as random shooting stars at night during almost any observing session (if you're lucky enough to be looking that way). The speeds at which meteors fall varies from about 10 to 70 km/sec.

\* Value from: Leinert C.; Gruen E. (1990). "Interplanetary Dust". *Physics and Chemistry in Space* (R. Schwenn and E. Marsch eds.). Springer-Verlag, pp. 204-275. This reported value varies widely depending on where you find the data, from 5 to 300 tons/day (research continues).

## \* Meteor Showers Vs. Random Meteors

A **Meteor Shower** is a predictable event when the Earth passes through the debris field of a comet or asteroid each year in its orbit around the Sun. As such, we know where it appears to come from in the sky (its **radiant**) and the direction it should race across the sky.

The 40 tons of **random debris** that falls to Earth may appear to fall from any direction in the sky. They are not associated with a specific debris field like Meteor Showers, so there is no way to predict where they came from. As you can't predict their location or direction, you simply have to be looking at the right place at the right time!

## \* The Year's Notable Meteor Showers

Shower	When It Peaks	Body Of Origin
Radiant And Significant Shower Details		Max. Count
<b>Quadrantids</b>	Early January	<b>Comet/Asteroid 2003EH1</b>
Boötes, Near The Big Dipper; Narrow Peak Window		<b>40/hr</b>
<b>Lyrids</b>	Mid-April	<b>Comet C/Thatcher</b>
Lyra, Near Vega And Hercules; Bright With Dust Trails		<b>15/hr</b>
<b>Eta Aquarids</b>	Early May	<b>Halley's Comet</b>
Aquarius, Water Urn Asterism; Best In Pre-Dawn South		<b>10/hr</b>
<b>June Lyrids</b>	Mid-June	<b>Comet Mellish/1915 II (?)</b>
Lyra, Near Vega; A "Nearly Extinct" Shower		<b>&lt;10/hr</b>
<b>Delta Aquarids</b>	Late July	<b>Comet 96P Machholz (?)</b>
Aquarius, Northern & Southern Showers At Horizon		<b>10/hr</b>
<b>Capricornids</b>	Late July	<b>Comet 169P/NEAT</b>
Capricornus; Bright, Yellow-Colored Meteors		<b>15/hr</b>
<b>Perseids</b>	Mid-August	<b>Comet 109P/Swift-Tuttle</b>
Perseus; "Best Of Year" Bright Meteor Shower		<b>&gt;100/hr</b>
<b>Draconids</b>	Early October	<b>Comet 21P/Giacobini-Zinner</b>
Draco, Near Head; Once Called The "Giacobinids"		<b>10/hr</b>
<b>Orionids</b>	Mid-October	<b>Halley's Comet</b>
Orion, Near Betelgeuse; Brightly Colored Fireballs		<b>20/hr</b>
<b>Taurids</b>	Early November	<b>Comet Encke</b>
Taurus, Near The Pleiades; North And South Showers		<b>10/hr</b>
<b>Leonids</b>	Mid-November	<b>Comet 55P/Temple-Tuttle</b>
Leo; 33-Year Cycle From "Good" To "Amazing"		<b>&gt;20/hr</b>
<b>Geminids</b>	Mid-December	<b>Asteroid 3200 Phaethon</b>
Gemini, Near Castor And Pollux; Multi-Colored Show		<b>70/hr</b>

From: [wikipedia.org/wiki/Meteor\\_shower](http://wikipedia.org/wiki/Meteor_shower), [meteorshowersonline.com](http://meteorshowersonline.com), [earthsky.org](http://earthsky.org), [stardate.org](http://stardate.org), [theskyscrapers.org](http://theskyscrapers.org), [amsmeteors.org](http://amsmeteors.org)



Promoting Amateur Astronomy & Space Science In Central New York

[www.cnyo.org](http://www.cnyo.org) - [info@cnyo.org](mailto:info@cnyo.org) - [facebook](https://www.facebook.com/cnyobs)  
[google+](https://www.google.com/+cnyobs) - [twitter @cnyobs](https://twitter.com/cnyobs) - [meetup.com/observe](https://www.meetup.com/observe)

# A Guide To Meteor Showers (v4)

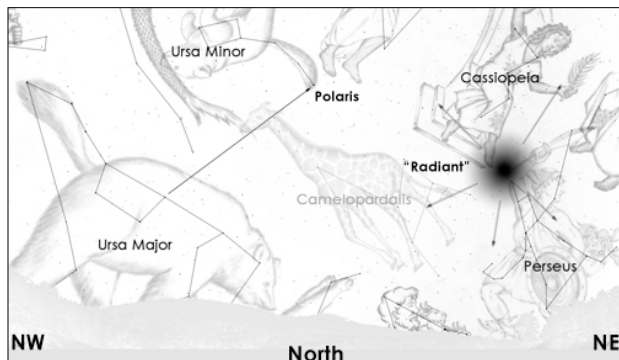
- \* The Year's Notable Meteor Showers
- \* Meteoroid, Meteor, Or Meteorite?
- \* A Lot From All Over - And Very Fast
- \* Meteor Showers Vs. Random Meteors
  - \* What's In A Name?
  - \* Clash Of The Tinsy
- \* A Snapshot Of A Meteor Shower
- \* Preparing For A Meteor Shower
- \* For Much More Information...

Tiny particles no larger than grains of sand race into the Earth's atmosphere at unbelievable speeds, burning the sky around them as they vaporize, producing long tails with brilliant colors. Sounds good! This brochure describes how to prepare for these yearly (and sometimes random) events.

## \* What's In A Name?

We refer to a meteor shower as the "Perseids" or the "Leonids" because the meteors for each appear to streak across the sky from a point (known as a **radiant**) originating in the direction of Perseus, Leo, or whichever constellation is associated.

The meteor shower itself has nothing to do with the constellation or the stars, only the part of the sky that the constellation occupies on the late nights and early mornings when the meteor shower is visible. The Perseids (shown below) appear to radiate from Perseus. If you know where the constellation is, you know how to **orient** yourself for seeing shooting stars.



**What Do You Mean "Orient?"** - The best way to see meteors is not to stare at the radiant, but rather to orient yourself so that your feet point at the radiant, your head is opposite your feet (so for the Perseids, your feet are oriented NE and your head is oriented SW), and you're staring straight up. The meteors will then appear to streak directly above you. A blanket or reclining chair will make your observing session much more comfortable!

## \* Clash Of The Tinys

It is the Earth, revolving around the Sun at a dizzying 110,000 km/hour (that's 30 km/second!), that powers the meteor shower we see on the ground. As the Earth rushes through the debris field of a comet or asteroid, these tiny grains come into contact with our atmosphere at speeds so great that they ignite the air around them, causing brilliant streaks of light as these tiny grains are vaporized.

## \* A Snapshot Of A Meteor Shower

The image below summarizes all the important pieces of a Meteor Shower puzzle:

1. A Meteor Shower comes from a debris field of a comet or asteroid.
2. It is the Earth passing through the debris field that produces meteors. They don't rush towards us. We rush towards them!
3. The denser the debris field is, the better the Meteor Shower will be.
4. The name of the Meteor Shower comes from (with exceptions) the constellation that the shower appears to radiate from.
5. **Solar-Powered** - debris fields are produced by comets or asteroids being heated as they approach the Sun. What we see as a meteor shower is actually surface material from a larger Solar System body!
6. **Meteor Showers Day And Night** - the whole planet passes through the debris field during a meteor shower. As such, there are daytime meteors one **cannot see** because of the Sun. One **can still listen** to them using radio equipment.
7. **Some Good, Some Bad** - our path through a debris field can vary each year. The same meteor shower may be good or poor from year to year.

## \* Preparing For A Meteor Shower

1. **Dress accordingly!** Bring more layers than you expect to need. If it's a fall or winter shower, consider hand and foot warmers as well.
2. **A reclining chair or blanket** - the best view is straight up, so save your back and clothes.
3. **Bug spray** - as you lay motionless on the ground, the summer buzz can sound like a roar in your ear.

## \* For Much More Information...

The peak times given in this brochure are only general estimates, as the best times for each shower vary by one or more days each year. To find out the exact times and locations for each shower, see the CNYO website or one of the following excellent meteor shower websites (links in the PDF are active):

- \* [www.theskyscrapers.org/meteor-showers](http://www.theskyscrapers.org/meteor-showers)
- \* [meteorshersonline.com/calendar.html](http://meteorshersonline.com/calendar.html)
- \* [earthsky.org/astronomy-essentials](http://earthsky.org/astronomy-essentials)
- \* [en.wikipedia.org/wiki/Meteor\\_shower](http://en.wikipedia.org/wiki/Meteor_shower)
- \* [stardate.org/nightsky/meteors](http://stardate.org/nightsky/meteors)
- \* [www.imo.net/calendar](http://www.imo.net/calendar)

