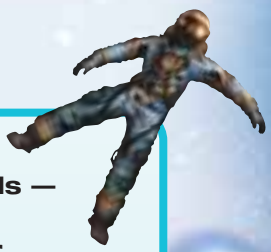
Reproducible

ACTIVITY 1

Name_____ Date_____

Lesson Background



Most meteorites are thought to be broken fragments of asteroids — small "planets" or bodies of rock or ice orbiting around the Sun. The largest asteroid is Ceres, 940 km in diameter, much smaller than our Moon (3,500 km). Ceres was the first asteroid discovered (in 1801), and about 6,000 have been discovered since then. Asteroids are so small that telescopes on Earth can see them only as points of light.

The Galileo spacecraft passed close to the asteroids Gaspra and Ida and sent us pictures of them. Both are irregular masses of rock, seemingly broken and covered with impact craters. As indicated by their colors (reflectance spectra), most asteroids are mixtures of metal and silicate minerals, possibly like chondrite meteorites. A few are made of basalt rock, just like the basalt meteorites (example: 1983RD in this lesson).

Most asteroids orbit in the asteroid belt between 2.2 and 3.2 times the Earth's distance from the Sun; their orbits are ellipses, oval-shaped curves that carry them nearer and farther from the Sun. Only a few asteroids follow orbits that get near the Earth, and these asteroids are probably the sources of some meteorites. An asteroid that crosses the Earth's orbit could collide with the Earth and cause a devastating impact explosion. About 200 of these Earth-crossing asteroids are known, and it is estimated that 20–40 percent of them will collide with the Earth over the next million years. No known asteroid will hit the Earth for at least 200 years. We will likely have many years of warning before an asteroid collision like this. The Earth is really a very small target. But when there are a million shots, over a long time, one is likely to hit.

To hunt for asteroids, astronomers photograph the night sky and look for "stars" that move, compared to real stars. A long exposure photograph would show a background of stars as spots, with a streak from an asteroid, due to the asteroid's motion across the sky. To discover the orbit of an asteroid, it is not necessary to observe the asteroid as it follows its whole orbit; knowing its location a few times, over several weeks or months, is sufficient.