

From Earth, people can observe the long, glowing tails of comets even without using telescopes!

This close-up photo shows the center of a comet.

Wikimedia/Hans Bernhard (Schnobby)

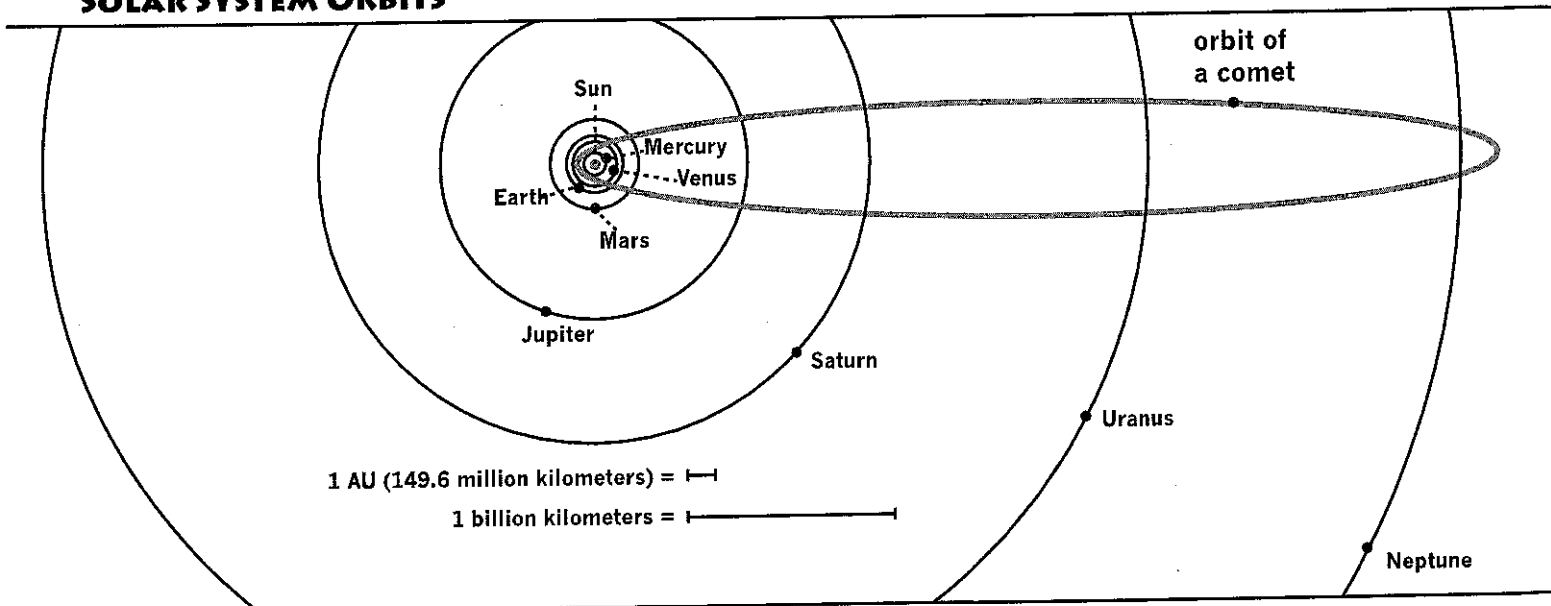
NASA/JPL-Caltech/UMD

COMETS

With their bright glow and long, streaming tails of light, comets look beautiful from Earth. However, at its heart a comet is a dirty snowball that orbits the Sun. Comets are mostly composed of frozen water, frozen carbon dioxide, and other frozen matter. They also contain dust and small chunks of rock. The solid part of a comet is usually only about 16 kilometers (10 miles) across, but its tail of gas and dust may stretch as far as 250 million kilometers! Comets only have tails some of the time, and the reason why has to do with the way comets orbit.

Comets orbit differently than planets. The planets in our Solar System have orbits that are nearly circular, with the Sun in the center. Unlike the planets, comets have orbits that are highly elliptical: their orbits are long and narrow instead of circular. Comets come close to the Sun and then swing out very far away from it—farther from the Sun than the farthest planets. It takes some comets millions of years to orbit the Sun.

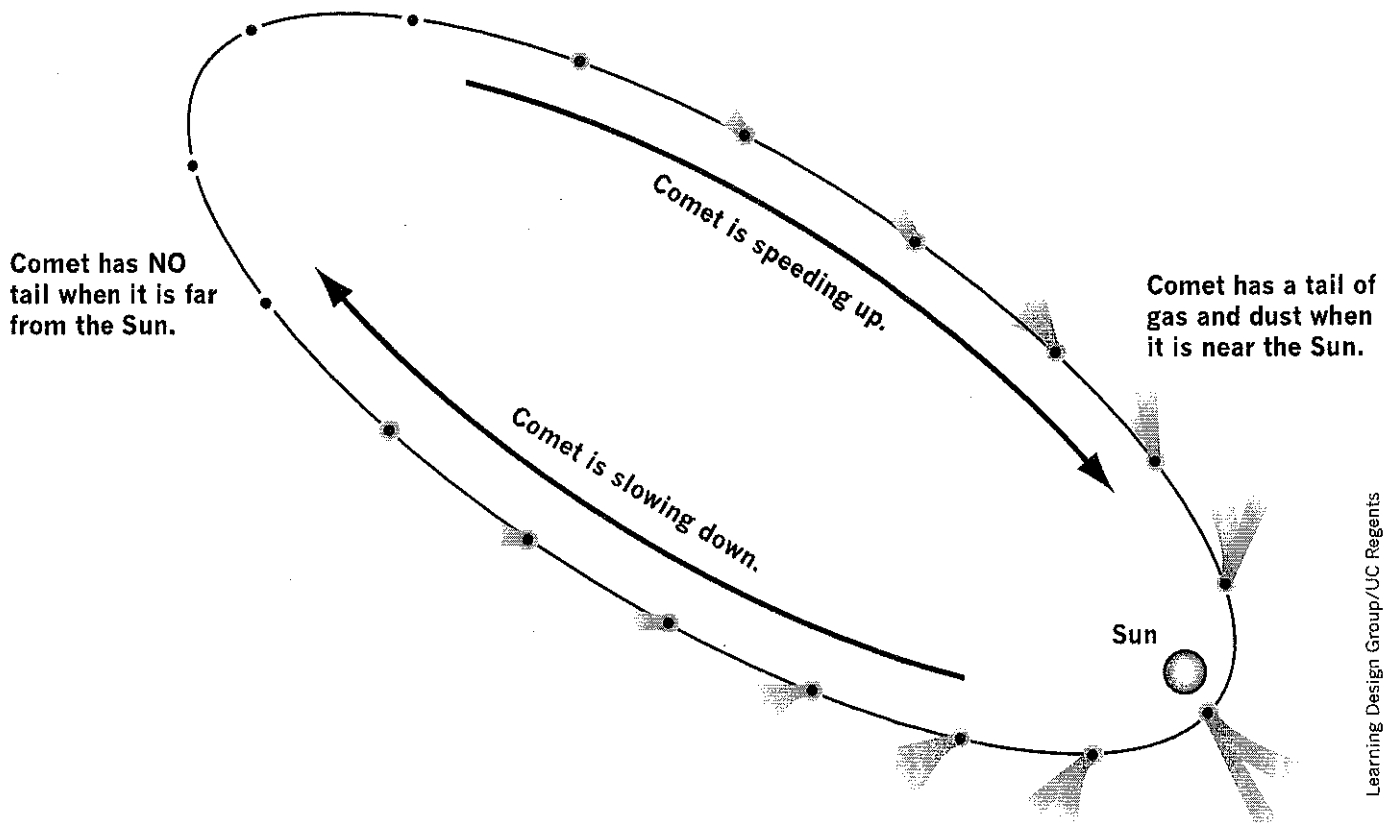
SOLAR SYSTEM ORBITS



The Sun pulls on a comet with a gravitational force, just as it does to every other object in the Solar System. An object such as a planet moves fast enough so that the pull of gravity makes it curve around the Sun, without moving closer to the Sun or farther from the Sun. A comet is different. When it is far from the Sun, it is moving slowly, and it falls toward the Sun. As it moves toward the Sun, the gravitational pull of the Sun makes the comet get faster and faster. At a certain point, the comet swoops around the Sun and starts to move away. During this time, the gravitational pull of the Sun is against the motion of the comet, and the comet gets slower and slower. When it has slowed down enough, the comet starts moving toward the Sun again, following its elliptical path.

Because of their elliptical orbits, comets experience big changes in temperature as they orbit. When they are far from the Sun, comets are extremely cold. As a comet approaches the Sun, sunlight warms up the comet. The warmed-up comet gives off lots of gas and dust, which can be seen from Earth as a glowing tail.

ORBIT OF A COMET



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