

The Comet's Tale (key)

Name: _____

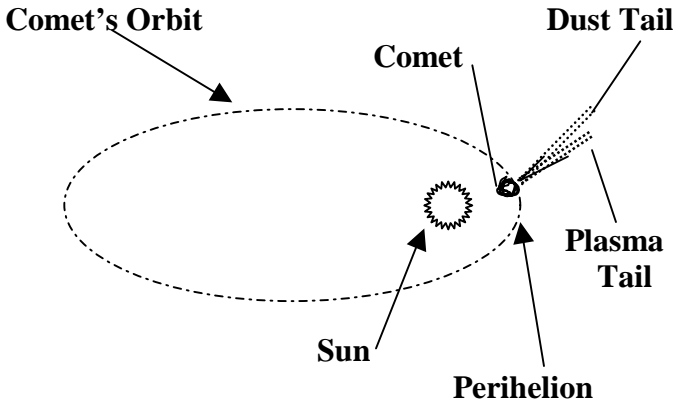
Astronomer's Review III

Characteristics

1. What happens to a comet when it gets near the sun?

As a comet approaches the sun, it grows warmer and some of the ices heat up and become gas (sublimating), releasing the dust grains that were trapped in the ice. This dusty gas coming from the nucleus is heated by the sun and forms a glowing hot cloud around the comet called the coma. Even though the nucleus might only be a couple of kilometers across, the cloud (or coma) can grow significantly (up to 100,000 kilometers across) during perihelion (its closest point to the sun). Comets also develop dust and gas tails.

2. Draw a comet at its perihelion, and include the tail.

	<p>Note: The comet's plasma and dust tail should <u>always</u> point away from the sun.</p> <p>(The dust and plasma tail details are for extra credit.)</p>
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3. Comets are usually seen only in the night sky. How is it that we see the effect of the sun's light on a comet, after the sun has set? (Hint: what makes the moon shine?)

Comets are visible at night because the sun's light is shining on them, just as the moon can be illuminated in the night sky - even though the part of the Earth that we are on has rotated away from the sun and is in the dark (as the earth spins on its axis). Furthermore, it is important to think about the earth and the comet, and their relative positions to each other as they orbit the sun. Also, the comet we see may be on the far side of the sun from the earth, and thus visible at early evening or early morning.

4. A comet can lose hundreds, or even thousands of kilograms of material each second as it passes by the sun and forms a dust tail. Does this mean that comets could eventually disappear? What do you think, and why?

Yes. Eventually (it may take millions of years) comets will lose all of their material through sublimation from passing near the sun during perihelion and disappear. It is also possible that a comet will get trapped in the gravitational pull of a large planet like Jupiter or the sun and breakup or smash into the surface with a tremendous impact like Comet Shoemaker-Levy in 1994 or Comet LINEAR in 2000.

5. Do you think there could be life on a comet? Why or why not?

Probably not. Comets do not have enough chemical evolution, have no unfrozen water, go through extreme temperature changes (their large elliptical orbits take them too far from the sun, and then too close during perihelion – unlike Earth which has an almost circular orbit around the sun which keeps it a relatively stable temperatures in the range known for producing life). Thus, it is highly unlikely life could develop under the extreme environmental conditions known to comets.