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Name _____

Date _____ Period _____ Exercise# _____

Comets (Demonstration)
Student Worksheet

Purpose: To demonstrate the physical characteristics of a comet.

Background Information:
Comets are sometimes called dirty snowballs or "icy mudballs". They are a mixture of ices (both water and frozen gases) and dust that for some reason didn't get incorporated into planets when the solar system was formed. This makes them very interesting as samples of the early history of the solar system.

When they are near the Sun and active, comets have several distinct parts:
- **Nucleus**: Relatively solid and stable, mostly ice and gas with a small amount of dust and other solids.
- **Coma**: Dense cloud of water, carbon dioxide and other neutral gases sublimed from the nucleus.
- **Hydrogen cloud**: Huge (millions of km in diameter) but very sparse envelope of neutral hydrogen.
- **Dust tail**: Up to 10 million km long composed of smoke-sized dust particles driven off the nucleus by escaping gases; this is the most prominent part of a comet to the unaided eye.
- **Ion tail**: As much as several hundred million km long composed of plasma and laced with rays and streamers caused by interactions with the solar wind.

Comets are invisible except when they are near the Sun. Most comets have highly elliptical orbits that take them far beyond the orbit of Pluto; these are seen once and then disappear for millennia. Only the short- and intermediate-period comets (like Comet Halley), stay within the orbit of Pluto for a significant fraction of their orbits.

Your teacher will mix together the following ingredients, which are rather similar to the composition of real comets:
2 cups of water
2 heaping spoonfuls of dirt
Dash of ammonia
Dash of alcohol (represents frozen gases)
Dash of corn syrup (represents organic substances)
2 cups of finely crushed dry ice (frozen carbon dioxide)

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Assignments:

1) Look and listen. Write down what is happening to the comet.

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2) Your teacher will proceed to blow on the comet with a hairdryer. Write down what is happening to the comet.

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3) Make a drawing of the comet showing the different parts. (A "real" comet behaves very similarly when approaching the sun!)

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