

Cooking up a Comet



The ingredients for a six-inch comet are:

- 3-4 cups of HOT water
- 2 spoonfuls of potting soil, dirt, or crushed charcoal
- A dash of ammonia
- A dash of organic material (dark corn syrup such as Karo syrup)
- 5 pounds of dry ice

Other materials you will need:

- An ice chest
- A large mixing bowl (plastic if possible)
- 1 medium-sized garbage bag
- Heavy insulated rubber gloves
- Hammer
- A large mixing spoon
- Paper towels

Helpful hints:

- Dry ice is available at several grocery stores (some but not all Bel Air, Raley's, and Albertson's grocery stores. Call to confirm).
- Keep the dry ice in an ice chest packed with newspaper and tightly closed.
- Practice this activity at least once before doing it with your class.

Directions:

1. Line the plastic mixing bowl with the garbage bag.
2. Pour 3 cups of hot water in the mixing bowl.
3. Add 2 spoonfuls of potting soil.
4. Add a dash of ammonia.
5. Add a dash of Karo syrup
6. Stir all ingredients.
7. Put on rubber gloves.
8. Place the dry ice inside a heavy plastic bag or several layers of bags.
9. Crush the dry ice by pounding it with the hammer.
10. Add most of the dry ice to the mixing bowl while stirring vigorously.
11. Continue stirring until mixture is almost totally frozen.
12. Lift the comet out of the bowl using the plastic liner and shape it as you would a snowball.
13. Unwrap the comet as soon as it is frozen sufficiently to hold its shape.
14. Display the comet for your students.

Throughout the day, the comet will begin to melt and sublimate (turn directly from a solid to a gas – which is what comets do under the conditions of interplanetary space when they are heated by the Sun).

As your comet melts, your students may notice small jets of gas coming from it. These are locations where the gaseous carbon dioxide is escaping through the small holes in the still-frozen water. This type of activity is also detected on real comets, where the jets can sometimes expel sufficient quantities of gas to make changes in the orbit of the comet.

After several hours, your comet will become a crater-filled ice ball as the more volatile carbon dioxide sublimates before the water ice melts. Real comets are also depleted by sublimation each time they come near the Sun. Ultimately, old comets may break into several pieces or even completely disintegrate.



Recipe and general information modified from original recipe by Dennis Schatz (Pacific Science Center), which appears in *The Universe At Your Fingertips* (Project ASTRO Resource Notebook/Astronomical Society of the Pacific).