

Building a Model Comet

OBJECTIVES

Students will be able to:

- ★ Identify the characteristics of comets.
- ★ Indicate how they are and are not like the phenomena they represent.

MATERIALS

There are two models that can be used for this lesson. One is more difficult to construct and requires a great deal of attention to safety since it involves the use of dry ice. It should only be used as a teacher demo (but is not required for the lesson). The other model is easier to construct but less realistic. As one of the lesson's objectives is exploring the usefulness and limitations of models, the second model provides food for thought.

Optional Teacher Demo: Dry Ice Model

See: youtu.be/2lk874N7AjQ

Student Model:

- ★ Activity sheet
- ★ One 2" Styrofoam or other ball or an 8 ½" X 11" piece of paper
- ★ Two 1–2' lengths of Mylar strips, raffia, ribbon, or yarn
- ★ Transparent tape and/or white glue
- ★ One wooden skewer (shish kebab type)
- ★ One marker or pen
- ★ Chenille stems in different colors
- ★ Cotton balls
- ★ Miscellaneous art supplies, e.g., clay, paper strips or streamers, paints, markers, netting or other fabrics, bulk cushion stuffing, foil, etc.
- ★ Optional: An electric hair dryer (with electrical power available) for modeling the sun's effect

Note: For a video on how to make this model, see: youtu.be/A6PEt8w3vw

TIME REQUIRED

One to two 40-minute periods



Build your students' interest in space exploration and teamwork with the *Luciana* book. Visit scholastic.com/american-girl to find out more!

LESSON STEPS

1. Introduce the topic by showing the class the comet interactive video at: stardustnext.jpl.nasa.gov/multimedia/ci/index.html.
2. Draw a diagram of a comet on the board, labeling the nucleus, coma, ion and debris tails, and the gas jets.
3. **Optional:** Perform a demonstration using the dry ice model shown at youtu.be/2lk874N7AjQ.
4. Tell the class that they will now work together in teams to build a model of a comet. Show the materials they have to work with. Indicate that when they finish the model, they will be drawing a diagram of their model, which shows how the parts of the model correspond to the parts of an actual comet. They will need to carefully plan to make sure they include all the relevant parts.
5. Explain to students that they will be collaborating in teams to complete their models. Use a T-Chart to help students brainstorm what collaboration “sounds like” and “looks like.” The following T-Chart is provided as an example.

Collaboration	
Sounds Like	Looks Like
Using a person's name What do you think? Is this okay with you? Do we all agree? What can I do to help? We need your ideas.	Smiling Nodding Eye Contact Leaning Forward

6. Form teams, distribute materials, and let them get started.
7. When the models are completed, distribute worksheet to students. Have them draw a labeled diagram of their model and answer the two questions about the benefits and limitations of models.
8. **Optional:** If feasible, guide students to test their comet models with a hair dryer, which simulates the energy that forms the comet “tail” in a direction away from the Sun.
 - i. Have someone be the “Sun” and aim the hair dryer at the head of the comet as it approaches and then as it moves away from the Sun. The student will need to turn in a circle to do this.
 - ii. Have a second student hold the comet model by the stick and walk in an oval (elliptical) orbit around the Sun.
9. As a class, discuss how the models are and are not like real comets. Discuss the benefits and limitations of models. Visit nasa.gov/comets to find out more about comets.

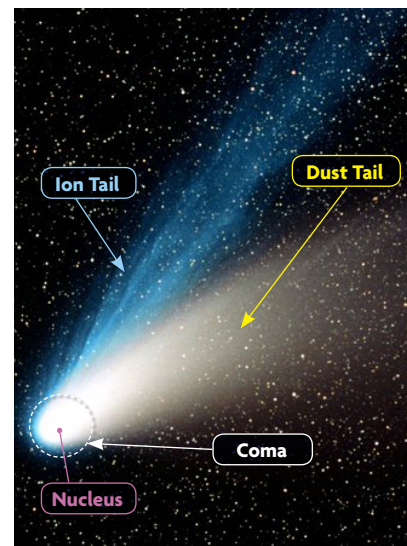
Name _____

Make Your Own Comet Model

Like our planets, comets are in orbit around the Sun. Comets are composed of gas, ice, and dust left over from the early formation of the solar system about 4.5 billion years ago.

Comets have three parts: the nucleus, the coma, and the tails.

1. The **nucleus** is the solid center of the comet, made of gas, ice, and dust.
2. The **coma** is the gas and dust cloud that surrounds the nucleus.
3. Comets have **two tails**:
 - A dust tail, which is like a trail of crumbs left behind the comet. The dust tail is yellowish in color because sunlight reflects off the dust grains.
 - The ion tail is mostly gas and always points away from the Sun. In addition, the ion tail appears bluish because the gas is glowing.



Directions for Your Comet Model

1. Put the stick into the Styrofoam ball (the nucleus).
The stick isn't part of the comet, but it will make it easier for you to hold your model!
2. Add cotton balls or similar materials to help shape the nucleus.
3. To represent the coma's gas jets, add yarn or similar material to different sides of the nucleus.
4. For the dust cloud section of the coma, attach cushion stuffing or similar material around the nucleus.
5. For the ion and dust tails, add chenille stems.



In the book *Luciana* by Erin Teagan, the main character

learned the importance of reading directions before working on an important project with her team.

Follow the directions carefully as you build your model comet, and remember to be a good teammate!

Think It Through

Write your answers on a separate sheet of paper.

1. Complete a scientific illustration of your model comet. Be sure to include labels.
2. How is your model like a real comet?
3. How is your model unlike a real comet?
4. How well did your team work together? What did you learn about teamwork from this activity?