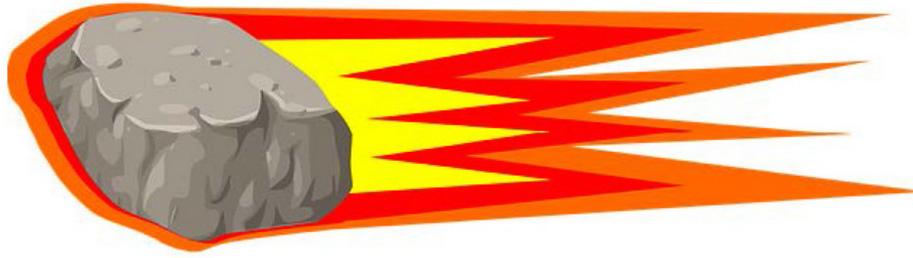


# COMET CAPERS FOR THE LITTLEST ASTRONOMERS

**OBJECTIVE** – Students will be able to learn about comets and build a hands on model.



### NATIONAL STANDARDS –

Next Generation Science Standards ([www.nextgenscience.org](http://www.nextgenscience.org)):

Disciplinary Core Idea Progressions

Earth Space Science Progression

- ESS1.A: The universe and its stars

Physical Science Progression

- PS1.A: Structure of Matter

Crosscutting Concepts

- Systems and system models
- Structure and function

Science and Engineering Practices

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
6. Constructing explanations (for science) and designing solutions (for engineering)

**BACKGROUND** – Comets have been known since ancient times and there are Chinese records of Halley’s Comet that go back two hundred years before Christ. As of 1995, 878 comets have been cataloged and their orbits calculated.

Comets are sometimes called “icy mudballs” or “dirty snowballs.” They are a mixture of ice—both water and frozen gases—and dust particles that date as far back as the beginning of the solar system.

Comets have “parts.” They are:

- Nucleus -This is a center made up of ice, gas, dust, and a few other solids.
- Coma - The coma is a dense cloud of water, carbon dioxide, and other gases that have sublimed from the nucleus.
- Hydrogen cloud- Some comets have a huge envelope of hydrogen around it.
- Dust tail - This tail can be millions of kilometers long and composed of dust particles driven off the nucleus by escaping gasses.
- Ion tail - This is a tail that is composed of plasma with rays and streamers caused by the comet’s interaction with the solar wind.

## Activity 6: Comet Capers

Comets are invisible except when they are near the Sun. Most comets have an eccentric orbit which takes them far beyond the orbit of Pluto. Most are seen once and then disappear for hundreds of years (only the short and intermediate-period comets, like Halley's, stay within the orbit of Pluto for a significant fraction of their orbits).

For more on comets, please visit Comets and Asteroids! By SciShow Kids (<https://youtu.be/02wrLS-ue1Q>) or Comets by Peekaboo Kidz (<https://youtu.be/-6nYgel4JI>).

### COMET TIDBITS

- Comets follow a regular orbit around the Sun.
- Bits of comets crossing the Earth's path become meteoroids.
- Scientists think that about 100,000 million comets orbit the Sun.
- A comet is made of dirty ice, dust, and gas. Think of it as a very dirty iceberg.
- A comet's tail can be millions of miles in length, but the amount of matter it contains can be held in a large bookbag.
- The three main parts of a comet include the coma, nucleus, and tail.

#### MATERIALS

- a. Student Data Sheet
- b. Small Styrofoam ball
- c. Skewer stick (blunted by cutting off the pointed end)
- d. Tinsel (preferably "ice blue" in color)
- e. Scotch® tape

#### PROCEDURE

(For an upper elementary version of this activity, please see <https://spaceplace.nasa.gov/comet-stick/en/>)

1. Show the students a picture of a comet. (<https://www.nasa.gov/comets>) Ask if anyone knows what it is called, where you can find it, or what it is made of.
2. Facilitate a conversation about comets using the background information provided. There is more information located at the NASA website listed above.
3. Lead students through the construction of the comet following the instructions below:
  - i. Pass out the materials (skewer stick, Styrofoam ball, and tinsel) to each student. Make sure to have tape available as well.
  - ii. Instruct the students to push the Styrofoam ball into the skewer. The skewer will become a handle for the comet model.
  - iii. Tape pieces of tinsel (about 12" long) to the top of the ball (opposite the skewer).
  - iv. Pull the tinsel down around the ball as shown in the picture.
4. Once the comet has been constructed, pass out the Student Data Sheet.
5. Have the students sketch the comet and label the parts mentioned in the background information. For younger students, you could sketch and label together as a class.
6. Allow students time to share their sketch as well as point to the different parts on the model of the comet.



## Activity 6: Comet Capers

### EXTENSION

(Note: This activity should not be done in a classroom with certain food allergies.)

## FOLLOW-UP FUN!

### Make an Edible Ice Cream Comet

#### 1. Collect these materials:

- vanilla ice cream
- paper baking cup like those for cupcakes
- vanilla wafers
- chocolate wafers
- ice cream cones
- a rolling pin
- spoons
- zipper-locking plastic bag
- wax paper



Even though this is not an accurate model of a comet, it is fun and an easy way to remember the concept that a comet is made of ice and rock.

#### 2. Make some dirt!

Put your wafers inside the plastic bag, push out the air, and seal the top. Roll it with the rolling pin to make your dirt.



#### 3. Make a comet!

Pour your dirt onto the wax paper and then roll a scoop of ice cream in it until it is completely covered with crumbs. Then take the comet and place it in a paper cupcake cup and put it in the freezer for 20 minutes.



#### 4. Eat your comet!

Remove the comet from the freezer and place it on your ice cream cone. Pretend to be the sun and melt that comet in your mouth and enjoy.



#### Quick Comet Facts

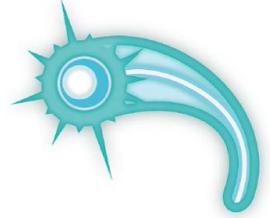
No two comets are alike. They differ in size, shape, and what they're made of.

Comet tails are a result of solar wind. Energy and particles from the sun push on the comet. This force pushes dust and gas behind the comet. The ion dust and gas have different weights, so they separate, making two separate tails.

Once scientists saw a third tail, which was a smaller tail forming just between the dust and gas tail. They discovered it was made of salt.

Comet tails have been discovered to be so long that the Voyager 2 passed through one that was thousands of miles away!

# COMET CAPERS



Name \_\_\_\_\_

**1. Draw a picture of your comet.**

Please make sure to label the coma, nucleus, and tail.

**2. What are real comets made of?**

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**3. Write one fact you learned about comets in this lesson.**

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