

## Lesson Plan

|                        |  |
|------------------------|--|
| <b>Lesson Topic</b>    | Making Comets  |
| <b>Subject/Course</b>  | Science  |
| <b>Title</b>           | Dirty Snowballs  |
| <b>Grade Level</b>     | 1st grade-8th grade  |
| <b>Objectives</b>      | <ul style="list-style-type: none"> <li>• Students will develop a comet model.</li> <li>• The students will learn about the physical characteristics of comets.</li> <li>• The students will learn what happens to a comet when it comes close to the sun.</li> <li>• Students will learn facts, myths, and legends about comets.</li> <li>• Student will learn the difference between a meteor, comet, and asteroid.</li> </ul>  |
| <b>Lesson Duration</b> | One hour for activity. Plus an additional hour for discussion, and research depending on grade level.  |
| <b>Tasks/Actions</b>   | <ol style="list-style-type: none"> <li>1. Cut open one garbage bag and use it to line your mixing bowl.</li> <li>2. Have all ingredients and utensils arranged in front of you.</li> <li>3. Place water in mixing bowl.</li> <li>4. Add sand or dirt, stirring well.</li> <li>5. Add dash of ammonia</li> <li>6. Add dash of organic material (e.g. corn syrup), stirring until well mixed.</li> <li>7. Place dry ice in 3 garbage bags that have been placed inside each other. Be sure to wear gloves while handling dry ice to keep from being burned.</li> <li>8. Crush dry ice by pounding it with hammer.</li> <li>9. Add the dry ice to the rest of the ingredients in the mixing bowl while stirring vigorously.</li> <li>10. Continue stirring until mixture is almost totally frozen.</li> <li>11. Lift the comet out of the bowl using the plastic liner and shape it as you would a snowball.</li> <li>12. Unwrap the comet as soon as it is frozen sufficiently to hold its shape.</li> <li>13. After the students observe the comets, test some of the comets by putting them close to the heating lamp (the heating lamp represents the sun).</li> <li>14. Have students observe what happens to the physical appearance/condition when the comets come close to the sun. (The</li> </ol> |

|                                 |  |
|---------------------------------|--|
|                                 | <p>comets should change from a solid to a gas).</p> <p>15. Store the untested comets somewhere in the classroom, the students will observe their appearance the next day.</p> <p>16. The next day let the students observe the comets. The 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. In some cases, the comet may have a solid, rocky core that is then left to travel around the comet's orbit as a dark barren asteroid.</p> <p>17. <b>Dispose of the comets, this can be done by throwing them in the garbage.</b></p> <p>18. Discuss with the students about what they observed and learned.</p> <p>19. Finally allows the students to research about the myths, legends, and facts about comets. In addition to the student's research, they should also research the difference between a comet, meteor, and asteroid. Attached is a worksheet the students can fill out.</p> |
| <b>Materials/<br/>Equipment</b> | <p>Recipe for <b>ONE</b> comet:</p> <p>*Students in 6th-8th grade can be broken into groups and make their own comet.</p> <p>Materials</p> <ul style="list-style-type: none"> <li>- 2 cups of water</li> <li>- 2 cups of dry ice (Day-old dry ice works the best)</li> <li>- 2 spoonfuls of dirt or sand</li> <li>- ¼ teaspoon of ammonia</li> <li>- ¼ teaspoon of dark corn syrup</li> </ul> <p>Equipment</p> <ul style="list-style-type: none"> <li>- Ice chest</li> <li>- A large mixing bowl</li> <li>- Mittens or work gloves</li> <li>- A hammer</li> <li>- A large mixing spoons</li> <li>- Paper Towels</li> <li>- Safety goggles</li> <li>- Heating Lamp</li> <li>- Garbage Bags</li> </ul> <p>*Students must be careful around dry ice. Do not handle dry ice without gloves.</p> <p>*Dry ice must be kept in freezer overnight and transport dry ice with ice chest.</p>  |

|                                      |   |
|--------------------------------------|---|
| <b>References</b>                    | <ul style="list-style-type: none"> <li>• <a href="https://www.noao.edu/education/crecipe.html">https://www.noao.edu/education/crecipe.html</a></li> <li>• <a href="http://www.kidsastronomy.com/comets.htm">http://www.kidsastronomy.com/comets.htm</a></li> <li>• <a href="http://amazingspace.org/resources/explorations/cometmyth/teacher/scientificbackground.html">http://amazingspace.org/resources/explorations/cometmyth/teacher/scientificbackground.html</a></li> <li>• <a href="http://amazingspace.org/resources/explorations/cometmyth/home.html?textonly=">http://amazingspace.org/resources/explorations/cometmyth/home.html?textonly=</a> <ul style="list-style-type: none"> <li>○ This website contains an interactive online activity for students to learn about comet myths and legends.</li> </ul> </li> </ul> |
| <b>Extensions/<br/>Modifications</b> | <p>Another option is to make edible comets. The link for this activity is:</p> <p><a href="http://www.nasa.gov/sites/default/files/546138main_ESS8_Eat-A-Comet_C2.pdf">http://www.nasa.gov/sites/default/files/546138main_ESS8_Eat-A-Comet_C2.pdf</a></p> <p>* The edible comets do contain nuts and dairy products.</p>  |

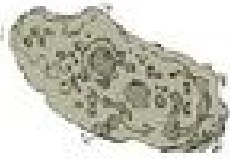




Name \_\_\_\_\_

Date \_\_\_\_\_

## Asteroid, Comet, or Meteor?

Place an "X" in the appropriate boxes to indicate characteristics of asteroids, comets, and meteors.

|   | <b>Asteroid</b><br> | <b>Comet</b><br> | <b>Meteor</b><br> |
|---|---|---|--|
| appears as a streak in the sky          |   |   |  |
| frozen ball of dust                     |   |   |  |
| is visible in our sky                   |   |   |  |
| made up of rock                         |   |   |  |
| orbits the Sun                          |   |   |  |
| orbits between Jupiter and Mars         |   |   |  |
| often called "Shooting Stars"           |   |   |  |
| usually burns up the Earth's atmosphere |   |   |  |