Shooting Stars and Space Rocks, Grades 3-8

Program Description:

Grades 3-4
Using hands-on activities and dramatic media, students learn where meteors come from and why (and when) we have meteor showers. They examine comets inside and outside, learn about some famous and infamous comets, make a comet in the classroom, and simulate comet orbits. Examining collections of earth and space rocks, students analyze and categorize their collections, learn to tell meteorites from meteor "wrongs" (Earth rocks) and learn about the effects of recent meteoroid impacts on earth.

Grades 5-8
Using hands-on activities and dramatic media, students learn where meteors come from and why (and when) we have meteor showers. They examine comets inside and outside, learn about some famous and infamous comets, make a comet in the classroom, and simulate comet orbits. Students examine and classify rocks from earth and space and study meteorite characteristics. They explore the process of impact cratering on earth and throughout the Solar System and learn how life on earth has been affected by rocks from space.

Vocabulary:

analyze	gas	Meteor	model
asteroid	liquid	Meteorite	orbit
categorize	impact	meteoroid	shooting star
comet		meteor shower	Solar System
crater			solid

Possible Class Activities:

- Make a comet with dry ice and other comet ingredient
- Make a flipbook to demonstrate orbits of comets
- Work in teams to examine, organize, and categorize rock collections
- Analyze how other groups have categorized their rocks
- Meteorite hunting – with clues and tools, students find the 4.5 billion year old meteorites in their rock collections.

Pre-Visit Activities (in your classroom):

- Review vocabulary with students (above).

At CSSC:

- Visit the "Meteorite Wall" exhibit.
- Visit the exhibit "Planetary Landscapes: Sculpting the Solar System."

Post-Visit Activities:

- Creating Craters Classroom Activity (http://stardust.jpl.nasa.gov/classroom/activities/1-stardst-ch01.pdf)
- Scale model and other classroom comet activities (http://lyra.colorado.edu/sbo/mary/comet/demos.html)
- Middle School comet study and hands-on activity (http://amazing-space.stsci.edu/comets/teacher/lessonplan.html#follow)

Related Websites:

Exploring Meteorite Mysteries Teacher Guide with numerous Classroom Activities:

(http://spacelink.nasa.gov/Instructional.Materials/NASA.Educational.Products/Exploring.Meteorite.Mysteries/)

Comets and Meteor Showers (http://comets.amsmeteors.org/) Sponsored by the American Meteor Society
Sky & Telescope's Meteor Page (http://www.skypub.com/sights/meteors/meteors.shtml)
More asteroids and comets images and information from
Solarviews (http://www.solarviews.com/cap/index.htm)
and SEDS (http://www.seds.org/nineplanets/nineplanets)
Terrestrial Craters slideset (http://www.lpi.usra.edu/publications/slidesets/craters.html)
Terrestrial Impacts Complete List (http://gdcinfo.agg.nrcan.gc.ca/crater/world_craters_e.html)
Tungusta Impact (http://www.galisteo.com/scripts/tngscript/default.prl)
Chicxulub (http://antwrp.gsfc.nasa.gov/apod/ap960604.html) (65 Million Years Ago) crater
NASA Near Earth Object Program (http://impact.arc.nasa.gov/)
Peekskill Meteorite animation (http://impact.arc.nasa.gov/gallery/index.html)
Astronomy Activities on the Web
(http://www.astrosociety.org/education/activities/astroacts.html) list organized by topic and grade level

Correlation to State of California Science Standards:

Grade 3:
Physical Sciences

1. Energy and matter have multiple forms and can be changed from one form to another. As a

basis for understanding this concept, students know:

d. energy can be carried from one place to another by waves, such as water waves and sound, by electric current, and by moving objects.

e. matter has three forms: solid, liquid and gas.

2. Light has a source and travels in a direction. As a basis for understanding this concept, students know:

d. we see objects when light traveling from an object enters our eyes.

Life Sciences

3. Adaptations in physical structure or behavior may improve an organism's chance for survival. As a basis for understanding this concept, students know:

d. when the environment changes, some plants and animals survive and reproduce, and others die or move to new locations.

e. some kinds of organisms that once lived on Earth have completely disappeared; some of these resembled others that are alive today.

Earth Sciences

4. Objects in the sky move in regular and predictable patterns. As a basis for understanding this concept, students know:

a. the patterns of stars stay the same, although they appear to move across the sky nightly, and different stars can be seen in different seasons.

d. the Earth is one of several planets that orbit the sun, and the moon orbits the Earth.

Investigation and Experimentation

5. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform investigations. Students will:

c. use numerical data in describing and comparing objects, events and measurements.

d. predict the outcome of a simple investigation, and compare the result to the prediction.

e. collect data in an investigation and analyze them to develop a logical conclusion.

Grade 4:
Life Sciences

3. Living organisms depend on one another and on their environment for survival. As a basis for understanding this concept, students know:

b. for any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.

Earth Sciences

5. Waves, wind, water, and ice shape and reshape the Earth's land surface. As a basis for understanding this concept, students know:

a. some changes in the Earth are due to slow processes, such as erosion, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.

b. natural processes, including freezing/thawing and growth of roots, cause rocks to break down into smaller pieces.

c. moving water erodes landforms, reshaping the land by taking it away from some places and depositing it as pebbles, sand, silt, and mud in other places (weathering, transport, and deposition).

Investigation and Experimentation

6. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform investigations. Students will:

b. measure and estimate weight, length, or volume of objects.

c. formulate predictions and justify predictions based on cause and effect relationships.