

VIOLENT UNIVERSE

OBJECTIVES:

- To document some of the violent processes in the universe
- To examine how some of these process could potentially affect the Earth
- To locate where the asteroid belt is in our solar system and how many asteroids come somewhat close to the Earth.

This show conforms to the following Illinois state science standards: 12.F.2b, 12.F.2c, 12.F.3a, 12.F.3b, 12.F.3c, 12.F.4b, 12.F.5a. Next Generation Science Standards: HS.ESS1.1, HS.ESS1.3, HS.ESS1.4, MS.ESS1.3

BRIEF SHOW DESCRIPTION:

The beauty of a starlit sky conceals the violent forces at work within our universe. From the upheaval of a giant star that explodes to release its material into space, to a future encounter between the Earth and a large asteroid that is too close for comfort, we will witness the forces that hold the universe together and occasionally try to rip it apart. Narrated by Patrick Stewart of Star Trek: The Next Generation and the X-Men films. We also add a section on the current night sky, the solar system and location of the asteroids in the asteroid belt.

PRE-VISIT ACTIVITIES/TOPICS FOR DISCUSSION:

- Try making craters in your classroom. Bring in a small wading pool filled out about halfway with sand and then put a thin layer of flour on top of the sand. Then drop rocks into the sand and see the craters. Make a table of what you see by varying the size of the rock, mass of the rock, height you drop the rock, angle you toss the rock. Can you vary the size of the crater?
- Talk about the difference in "possibility" and "probability." Just because it is possible that something could happen, doesn't mean it will happen. For example, is it possible to kick a ball from one end of the field and make a goal on the other end? Sure! But is it probable? The show talks about many things that could happen to the Earth, but the chances of the event actually happening is quite small.

POST-VISIT ACTIVITIES/TOPICS FOR DISCUSSION:

- Talk about how students feel about the show after watching it. Do some of these events frighten you? Which ones and why?
- Look up the space weather link below. Page down to the Near Earth Asteriod numbers. What is the closet asteroid to miss us? Note how "LD" means "lunar distance." So "2LD" means twice as far from us as the Moon. On this same web site, on the left, look at the Sun. Are there any major sunspot groups on the sun? Are Northern lights forecast for where you live? Look for the K_p index. When the K_p numbers reaches six or more, start looking for northern lights in the sky.
- Make a comet in your classroom! The recipe is below though be careful handling the dry ice. You can purchase dry ice from the local blood bank. Do not let students near the dry ice!
- With a telescope, check out the Moon in the sky (and keep in mind that you can see the Moon in the daytime near first quarter phase (afternoon) or third quarter phase (mornings). Can you

identify any of the craters? How large are they? Which craters are the youngest? Craters that appear on top of other craters are younger.

VOCABULARY LIST:

Asteroid
Black Hole
Comet

Crater
Galaxy
Gravity

Meteor
Supernova

INTERNET RESOURCES:

- Near Earth Asteroid project (including news): <http://neo.jpl.nasa.gov/>
- Tracking Near Earth Asteroids: <https://cneos.jpl.nasa.gov/>
- Asteroid classes and definitions: http://airandspace.si.edu/etp/asteroids/ast_near.html
- Spaceweather: <http://www.spaceweather.com>
- Comet recipe: <http://www.noao.edu/education/crecipe.html>
- Supernova basics: <http://imagine.gsfc.nasa.gov/docs/science/known2/supernovae.html>
- Black hole animations: http://hubblesite.org/explore_astronomy/black_holes/
- Arizona's meteor crater: <http://www.meteorcrater.com/>
- Moon craters:
[http://www.lunarpedia.org/index.php?title=Geologic Processes on the Moon/Cratering on the Moon](http://www.lunarpedia.org/index.php?title=Geologic_Processes_on_the_Moon/Cratering_on_the_Moon)
- Google Moon: <http://www.google.com/moon/>