William M. Staerkel PLANETARIUM

A Teacher's Guide for:

"SOLAR SYSTEM SAFARI"

OBJECTIVES:

- To survey the different types of objects that make-up our Solar System.
- To explore the differences between stars, planets, moons, asteroids, and dwarf planets.
- To examine why Pluto is no longer considered a planet.
- To explore the cause of day and night and how objects in the sky appear to move.
- Understanding how new discoveries in science can change the way we think about things and that new ideas in science require evidence.
- To examine what makes our Earth special in the Solar System.

This show fulfils the following state Illinois science standards: 12.F.1a, 12.F.2a, 12.F.3b. Next Generation Science Standards: MS.ESS1.3, MS.ESS1.1, 1.ESS1.1

BRIEF SHOW DESCRIPTION:

A jungle adventurer uses a magical camera to take visitors on an exciting safari through the Solar System. The Sun, Moon, planets, and dwarf planets come to life, taking on unique personalities and describing their own characteristics and eccentricities. Learn about the planets and the current status of Pluto. This show was originally written and produced by the Roger Chaffee Planetarium in Grand Rapids, Michigan, and is intended for grades 3-5.

PRE-VISIT ACTIVITIES/TOPICS FOR DISCUSSION:

- What is a "safari?"
- Have students compare and contrast the planets in our solar system. Which are like Earth? How are planets like Jupiter and Saturn different?
- Give the students various objects in a bowl or shoebox to separate into groups. This could be candy or coins or something else. Scientists group things with like characteristics. The same is true in astronomy as we group together "planets," "stars," "asteroids," "moons," and "comets."
- Ask students how they would group objects in the solar system and see what they come up with. Can you write definitions for each group? What would happen if a new group were created? Would it change your impressions of the groups you already have?
- If appropriate, ask the students what their feelings are regarding the status of Pluto. Why do they feel the way they do? Do their parents feel differently?

POST-VISIT ACTIVITIES/TOPICS FOR DISCUSSION

- After seeing the program, have the student's impressions changed regarding the status of Pluto? Science is a dynamic process and ideas are altered as new information is collected. Science also likes to group things. You might explain that if given a large group of animals, you could, just by inspection, separate the dogs into a group, then the

cats, then the hamsters, etc. Scientists grouped stars together, then planets, then asteroids, then comets, all separate. But then objects in this Kuipter belt of comets were discovered. That made a new group and we started wondering if Pluto was in the correct group! So it was moved to a new group called "dwarf planets."

- Do you like the new planet definition? According to the show, a planet had to 1) orbit the Sun (several moons are larger than Mercury, but they orbit their respective planets and not the Sun directly), 2) be circular (meaning there are large enough that gravity can mold them into a roughly spherical shape) and 3) be the biggest thing in their orbit. This last one is the one that axed Pluto as there are now know to be many things in that part of the solar system. Could you think of a better definition?
- Which planet is the most fascinating planet in the solar system and why?
- Discuss why the show depicted the planets the way it did? For example:
  - Mercury with tennis shoes (it moves the quickest)
  - Venus as a lady (some will say Venus is "hot" which you can deal with as you please, but Venus is the goddess of love and beauty and its clouds trap the Sun's heat, making it the hottest planet)
  - Mars – elderly man with lots to tell (but note its "secrets" . . .where is all the water? Was there life there at one time? The red comes from rust)
  - Jupiter – a king (with a kingdom of moons and, of course, it is the largest planet)
  - Saturn – a queen (second largest and, of course, queens like rings, right?)
  - Uranus – with crutches (it "fell over" or, more likely, was knocked over on its side by a collision in the distant past, so it rolls around the Sun)
  - Neptune – a pirate (It is thought that Neptune captured or "stole" the moon Triton since it orbits backwards. Neptune was also the god of the sea.)
- Have your class be an interplanetary travel agency and construct travel brochures encouraging future travelers to certain planets and moons. What are the "must-see" sights in the solar system?

VOCABULARY LIST:

Planet	Asteroid
Kuiper Belt	Dwarf Planet
Comet	Moon

INTERNET RESOURCES:

- The New Horizons mission to Pluto & beyond: http://pluto.jhuapl.edu/
- Mars Phoenix mission: http://phoenix.lpl.arizona.edu/
- Peoria's model solar system: https://www.peoriariverfrontmuseum.org/dome-planetarium/community-solar-system
- Staerkel's scale model solar system: https://www.parkland.edu/Audience/Community-Business/Parkland-Presents/Planetarium/Educational-Resources/Campus-Solar-System
- Kids interactive solar system: http://www.kidsastronomy.com/solar_system.htm
- National Geographic site: http://science.nationalgeographic.com/science/space/solar-system
- What are Near-Earth Objects? (http://neo.jpl.nasa.gov)
- The Nine planets: https://nineplanets.org/
- Could a comet or asteroid hit us? https://cneos.jpl.nasa.gov/sentry/

- Kuiper Belt Objects: https://solarsystem.nasa.gov/solar-system/kuiper-belt/overview/ or http://www.harmsy.freeuk.com/kuiper.html
- Who was Gerald Kuiper? http://en.wikipedia.org/wiki/Gerard_Kuiper
- Visit past and present space mission sites from the Jet Propulsion Lab: http://www.jpl.nasa.gov
- The Planetary Society http://www.planetary.org
- Current number of moons in the solar system: http://www.windows.ucar.edu/tour/link=/our_solar_system/moons_table.html (keep in mind this is a tough one to keep updated!)
- How old would you be on the other planets? http://www.exploratorium.edu/ronh/age/index.html