

Manchester College
Education Department
Lesson By: Natalie Aschenbrenner

Adapted from Sally Spooner, Sunset Elementary School, Cody, Wyoming
Riddles from: <http://www.siec.k12.in.us/~west/proj/space/index.html>

Lesson Title: Balloon Solar System

Length: 5 to 10 minutes

Age or Grade Level: 6th grade

Subject: Science/Solar System

Academic Standards:

- 6.3.1 Compare and contrast the size, composition, and surface features of the planets that comprise the solar system, as well as the objects orbiting them. Explain that the planets, except Pluto, move around the sun in nearly circular orbits.
- 6.3.3 Explain that Earth is one of several planets that orbit the sun, and that the moon, as well as many artificial satellites and debris, orbit around Earth.

Objectives:

1. Given a demonstration of Pluto's orbit, the student will identify it as the planet that does not have a near circular orbit with 100% accuracy.
2. Given a demonstration of objects orbiting Earth, students will name 2 of the objects with 100% accuracy.

Advanced Preparation by the Teacher:

Obtain materials and make sure a big enough area is available for the activity.

Materials:

- balloons
- big yellow punch bag/balloon
- small bouncy balls
- signs labeling planets
- chalk, tape, string, or something to mark the planets' orbit paths

Introduction:

Begin the lesson by telling the students some riddles: (*Knowledge*)

1. Which planet can we see most often without a telescope? (A: Planet Earth)
2. What is the center of gravity? (A: v)
3. Which cartoon character came from outer-space? (A: Pluto)
4. Which planet sings a song? (A: Nep-tune)
5. Which planet tells the temperature? (A: Mercury)
6. Which Planet is like a circus? (A: Saturn; it has 3 rings)

Now tell the students to look at the materials for the demonstration they are about to participate in, and tell them to guess what the materials are going to stand for. If they need a hint tell them it is space related. (*Synthesis*)

Step by Step Plan:

1. Have the students blow up a yellow punch ball to its fullest and balloons (nine different colors) to sizes representing the nine planets. (*Knowledge*)
2. Take the class outside or go into the gym inside. Have nine paths marked on ground or floor with string or chalk.
3. Have one student hold each balloon. Another student will hold the sun balloon.
4. The "sun" stands in the middle of a circle. The other children take their places on the marked paths. Each student should hold the label to their planet assigned while being part of the demonstration.
5. Begin the experiment by having children walk in their path or "orbit" around the sun. Stress that the planets never leave their own orbits. This travel around the sun is called "revolution". Ask the students what is different about Pluto's revolution compared to the other planets revolutions. (*Evaluation*)
6. After the students have orbited the sun once, bring in the added concept of "rotation". While moving around the sun, the students should also start to spin around like tops. This demonstrates "rotation". Ask the students how long it takes the earth to revolve around the sun (one year), and how long it takes for the earth to rotate on its own axis (one day). (*Knowledge and Application*)
7. Point out that "rotation" or spinning on one's own axis takes much less time than going all the way around the sun, "revolution." (*Analysis*)
8. Then add two more students to the demonstration. Have one student hold a small bouncy ball representing the Earth's moon and one student holding another bouncy ball representing a satellite orbiting the Earth.
9. Now have the rotating planets (spinning students with planet balloons) revolve around the sun (student with yellow punch balloon), while the moon and satellite (students with bouncy balls) orbit the earth. (*Application and Analysis*)
10. Ask the students what other objects the satellite can represent? (dust, debris) (*Application*)

Closure:

11. Thank the students for participating. Have students return to their seats. Have students write or draw a brief summary of the demonstration in their science journals.

Assessment: Observe students understanding of the solar system during the demonstration. Listen for correct answers. Check their journals for an understanding of the demonstrations representation of the solar system.

Adaptations:

Students who are academically advanced: Have them create their own way of representing the solar system. Or asks students how a planet's location in relation to the sun affects its climate.

Student who has poor motor skills: Pair student with an able student. Have capable student guide the student when walking around the sun and when spinning and walking around the sun.

Gardner Intelligences:

Visual: Demonstration of solar system using manipulatives

Verbal Linguistic: Each manipulative labeled as planet, moon, sun, or satellite.

Kinesthetic: walking and spinning

Interpersonal: performing demonstration as a class and discussing as a class

Bloom's Taxonomy: provided in italics and parentheses throughout the lesson.