Class: Science 6

Lesson Title: Solar System

Class Size:**20**
Time: **60 mins**

Curriculum Outcomes:
300-23 describe the physical characteristics of components of the solar system – specifically, the sun, planets, moons, comets, asteroids, and meteors

Learning Objectives:

1. Students will demonstrate an understanding of the parts of the solar system as well as their relationship to one another.
2. Students will show an understanding of the relationship between days and years of each planet and the planet's orbit/rotation.
3. Students will show an understanding of relative sizes and distances between each planet within the solar system.

Materials:

- Sun & Planet nametags (or pinnies, objects, etc. to represent each of the 9 planets)
    - Sun, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto
- Metronome (or some way of keeping a steady pace)
- Blowhorn
- Measuring tape (100m or 2 x 50m)

Preparation beforehand:

- You will need a large area (soccer or football field) to accurately describe the relative sizes and distances
- Lay the measuring tape(s) so that you have 100m of space
- Relative distances, sizes and orbit speeds can be found in the table attached at the end of this document (if you have fewer than 28 students, some numbers of the larger planets can be adjusted)

Introduction:

1. Discuss features of the solar system with the students (possibilities):
    - Order, names, and compositions
    - Sizes (comparison)
    - Relative distances from the sun (can we accurately depict distances in textbook? Why/why not?)
    - Planetary travel paths (orbit around the sun)
    - Years on each planet (what is a year (Revolution/orbit around the sun)? What is a day (rotation/spin on axis)?
2. Explain what a kinulation is (broken up into kinesthetic and simulation). Tell them that these are used to help students learn difficult concepts that are otherwise difficult to picture. It allows students to become part of the demonstration, and therefore easier to remember and learn. Ask students if they would like to try one. Proceed to the large open space (outside).

Solar System (relative size and distances):

1. Have students grouped into each planet according to the relative sizes indicated in the "Preparation Beforehand." Talk to the students about how the number of students in each planet indicates a larger or smaller size, but it is difficult to make exact because of the small number of students.
2. Instruct students to position themselves (as planets) on the measuring tape where they feel they would be (in the correct order).
3. Once students have done this, have them remember the meter marker their planet was located at.
4. Bring students in for a discussion on how most likely they spaced themselves out pretty evenly. Some groups of students will correctly place a large space between the inner and outer planets for the asteroid belt.
5. Give students their actual relative distance location according to the numbers above (Mercury – 1m, …).
6. Ask students to try to revolve around the sun as their planet would do (do not indicate a path or pace).
7. Bring students in to discuss any difficulties (some students will have had trouble keeping equal spacing from the sun, some will have had troubling keeping a consistent pace, etc.).
8. Have students do the revolution again, this time instruct them to try to keep an equal distance from the sun, and walk to a specific pace (using the metronome or a second counter and the orbit speeds in the table below).
9. Have students revolve around the sun for 2-3 minutes and tell them to count how many times they circle

the sun.

10. Bring students back in and discuss how many times each planet revolved around the sun (and whether they expected more or fewer revolutions than other planets). Bring up the topic of years on each planet, and how many years pass by in 1 Earth year on each planet.
11. Repeat the activity and include rotation on the axis (or spinning of the planets) while they are revolving around the sun. Ask students what it would mean to complete one rotation or spin on the axis (one day on that planet) vs. one revolution around the sun (1 year on that planet).

Conclusion – Possible wrap-up questions:

1. What benefits do you see in becoming part of the demonstration of the concept?
2. Is anything clearer to you because of being involved?
3. What would happen if planets moved closer or further from the sun? Why do the planets never all line up?

For a class of 28 Students:

Mercury Size = 1 student Distance = 1m Orbit Speed = move on every beat	Venus Size = 2 students Distance = 2m Orbit Speed = move on every beat
Earth Size = 2 students Distance = 3m Orbit Speed = move on every beat	Mars Size= 1 student Distance = 4m Orbit Speed = move on every 2nd beat
Jupiter Size = 7 students (6) Distance = 13m Orbit Speed = move on every 4th beat	Saturn Size = 6 students (5) Distance = 24m Orbit Speed = move on every 5th beat
Uranus Size = 4 students Distance = 49m Orbit Speed = move on every 7th beat	Neptune Size = 4 students Distance = 76m Orbit Speed = move on every 13th beat
Pluto Size = 1 student Distance = 99m Orbit Speed = move on every 6th beat	