

## Class: Grade 9 Science

### Lesson Title: Space Exploration – Motion of Celestial Bodies

Class Size: 24  
Time: 30 mins

#### Curriculum Outcomes:

**312-4** Students will be expected to describe and explain the apparent motion of celestial bodies

**312-5** Students will be expected to describe the composition and characteristics of the components of the solar system

#### Learning Objective(s):

1. To assist students in visualizing/understanding the motion of celestial bodies, including the Sun, Mercury, Venus, Earth and its moon, Mars, as well as asteroids and the asteroid belt.

#### Materials:

- Bristol board cutouts to represent the planets
- String
- SMART Board + Laptop

#### Preparation beforehand:

- Ensure there is a large open space for the activity and that you have access to the internet and audio from your computer / SMART Board.

#### Suggestion:

- **Role of the teacher:**  
Teacher will facilitate the Kinulation by probing students for prior knowledge, and providing initial instructions of the task. The teacher should be present to respond to any questions and instruct students when to change positions.

#### Introduction:

1. Begin by assessing students' prior knowledge of the Solar System, with particular focus on the Sun, the terrestrial planets, the gaseous planets, and asteroids. Ask students how they would define the terms orbit, revolve, rotate, and spin. Students may want to pair up to demonstrate their understanding through movement.
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 learn. Ask students if they would like to try one.

#### Activity:

1. Present students with a short video clip by Bill Nye, where he is biking through a scaled down version of the solar system to give them a better idea of how much space is between planets.
  - a. Link to Bill Nye clip: <https://www.youtube.com/watch?v=97Ob0xROUt8>
  - b. Link to scaled down version of the Solar System: <http://www.phrenopolis.com/perspective/solarsystem/>
2. Divide the class into two groups (about 10 students per group) and have them rotate through positions acting as the Sun, planets, the Earth's moon, and asteroids.

#### Conclusion – Possible wrap-up questions:

1. Provide examples where you can correctly use the terms: spin, rotate, orbit, and revolve.
2. Why do you think that everything continues to orbit and not move into the Sun and collide?
3. Do the planets closer to, or further from the sun, move faster? Why?
4. Were we able to accurately represent the various speeds of the celestial bodies? How might we have done a better job?

## Helpful Hints

If you have access to a multipurpose room or gymnasium, or if weather permits, you could take the students outside the classroom to a more spacious area. Given more space, students could work as one group to represent the entire Solar System.

- As a form of exit slip have students reflect on the following: What questions or problems might we have regarding the orbits of planets, comets, and asteroids? (From the curriculum document, 312-4)

The following class, students could be provided with a formative entrance slip to inform the teacher how much they took away from the lesson:

### Entrance Slip

#### Grade 9 Science

1. Fill in the blanks using the terms *spin*, *orbit*, *terrestrial*, and *gaseous*:

- a) The Moon \_\_\_\_\_ the Earth
- b) The Earth \_\_\_\_\_ on its axis.
- c) Mars is a \_\_\_\_\_ planet.
- d) Jupiter is a \_\_\_\_\_ planet.