

**Science Day Gravity Lesson**  
**Marble Run**  
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**EDUC 312, 314P**

**Rationale:**

- Science provides children the opportunity to exercise their innate curiosity, learn about the natural world, and develop their problem-solving skills. Gravity is a scientific concept. By teaching scientific concepts, it builds the students scientific literacy. This will enable them to take an active role in society, demonstrating problem-solving and decision making skills.

**Goal:**

- The student will learn the effects of gravity.

**Objective:**

- The student will demonstrate and apply their knowledge of gravity by constructing a marble run.

**Standards:**

**SOL 4.2**

The student will investigate and understand characteristics and interaction of moving objects. Key concepts include:

- a) motion is described by an object's direction and speed;
- b) forces cause changes in motion;
- c) friction is a force that opposes motion; and
- d) moving objects have kinetic energy.

**Content:**

- The concept of gravity and the forces that are involved: motion, momentum, acceleration, and resistance.

**Advance Organizer:**

- Bounce a ball and ask "Why does this ball fall back down after you throw it into the air?"
- Key terms will be defined. While defining gravity, the effects of momentum, acceleration, and resistance on gravity will be examined
  - Questions for students:
    - What will happen if I roll the ball and it comes to a wall? (this describes the role of resistance)
    - What would happen if the ball were rolled down a hill? (acceleration; momentum) Up a hill? (gravity and resistance)

- When we bounce the ball and it hits the floor, what happens? (meets with the floor—resistance)

**Procedure:**

- Students will construct a marble run. They will be given the instructions to construct a marble run using the materials provided. The objective is to see how long they can make the run keeping the marble in continuous motion. Students will be divided into groups.
- First, they will gather their materials and start to brainstorm and discuss construction ideas.
- Next, the students will start to design the run. It is anticipated that they will attempt to construct many models and experiment to find one that will move the marble the furthest by using the natural forces of momentum, acceleration and resistance.

**Materials:**

- Masking Tape
- Rubber Bands
- Marbles
- Tubing and other various items for tracks
- Crates and other various objects for height
- Timers
- Connecting Blocks
- Book “ “
- Paper/Pencils

**Closure:**

- All groups of students will be brought back together, each group will be given the opportunity to test their marble run and demonstrate it for the other groups. The results will be discussed and the key concepts of gravity, motion, acceleration, and momentum will be reviewed.

**Questions: (to be used during the closure activity)**

- During your investigation, which designs worked the best? Which ones didn't work as well?
- How would you explain why some designs worked better than others?

**Assessment:**

- Each group will be assessed by observation of the marble run constructed. In order to complete a successful run, they will need to manipulate gravity, motion, acceleration and momentum to keep the marble moving.

**Differentiation:**

- There will be two sets of materials provided. The first set will include items for a smaller scale run. The second set will include items for a larger scale run. Students can engage in all aspects of the run or take on specific portions of the project by planning, constructing or demonstrating the run. There will also be a book about the forces of gravity for students to read and paper/pencil for them to draw a run that demonstrates the forces in action.