Lesson Plan by: April Zuber

Lesson: An Egg-celent Gravity Experiment

Length: 1 hour

Age or Grade Intended: 5th Grade

Academic Standards:
Science
5.2.4. Keep a notebook to record observations and be able to distinguish inferences from actual observations.
5.3.13. Demonstrate that the Earth’s gravity pulls any object toward it without touching it.

Performance Objectives:
1. Before experimenting, the students will record at least four hypotheses concerning what will happen when they drop an egg from a high spot.
2. During the experiment, the students will record at least five observations or supporting ideas about the egg drop.
3. Through experimentation the students will test gravity by dropping an egg from a ladder and record their results with 100% accuracy.
4. After the experiment is complete, the students will fill out a KWL chart with at least 4 characteristics in each column.
5. After the explanation, the students will write an entry in their journal expressing a way to further extend this activity with at least 3 personal insights or concerns.

Advanced Preparation by Teacher:
To prepare for this activity I will need several eggs, notebooks for the children to record data, a ladder, and a variety of different items (ranging from light to heavier, large to small). I will also need to have a great deal of background knowledge on the subject of gravity, so I can meet all of the students’ questions and needs. I will also test and record my observations of what happened when I dropped each of the objects I will be giving the students to work with.

Procedure:
**Engagement:** This activity will give the students an opportunity to broaden their concepts of gravity as they explore the art of objects falling to the ground when they are released. To grab their interest, the teacher will ask questions to the class to help set the stage. The following are some of the questions:

- What would happen if I were to let go of this pen? (Knowledge)
- What makes you think the pen will drop? (Knowledge)
- How do you know it will drop? (Knowledge)
- Does this idea only apply to the pen? (Knowledge)
- What is this theory often called? (Knowledge)
The class will also fill out a KWL chart for this activity. We will record data that we already know about gravity, and things we want to learn about gravity through this experiment. As we address the idea of gravity, we will address any misconceptions or questions that the students are harboring. For instance, many students do not know that air plays a huge part in lighter objects (a feather) falling slower than a heavier object (a marble). Here I would introduce the idea that the students are going to run their own tests to figure out the basics of gravity. The students are also going to formulate and hypotheses and predictions that they have in their appropriate groups.

**Exploration:** Since this phase is activity oriented, the students are going to be given all of the materials to work with for about 20-25 minutes. The students are going to work in their groups to test their predictions and hypotheses. I will be walking around asking the children probing questions about their experiments, such as:

- Can you explain some of your observations?
- How do these results correlate with your hypotheses?
- Was there a difference between dropping the egg and dropping the paper clip? If so, what was the difference?
- How do you think air plays into gravity and objects falling?
- How does height affect dropping the objects?

**Exploration:** As a class we will now explore the concept of gravity. We will begin by making a concept map of our observations during our gravity experiment. Did height make any difference? Did the weight of the object make any difference? We will also make a list of vocabulary words that could be implemented into our word wall. We would also discuss Galileo’s experiment where he dropped items from the Leaning Tower of Pisa in Italy. What do you think about Galileo’s findings? How do they relate to your experiment? Are the tests similar or different? How are they similar or different? The class will then record the information they learned through this activity on their KWL chart.

**Elaboration:** What would happen if we put a parachute on the egg? What would happen if we dropped a feather and a marble in a vacuum tube? How can the students relate gravity to other situations? The students will address these ideas when writing in their journals. They will need to apply what they have learned about gravity, and find a way to dig deeper into its possibilities. How could we further this activity in the future? The students will have an opportunity to suggest their own ideas to take this activity to the next step. As a class we will decide what aspect of gravity we want to explore next.

**Evaluation:** Most of the evaluation is carried out through the entire lesson. For instance, the KWL chart assesses what the students know before and after the experiment. Their journals will reflect on how they relate this activity to their personal lives, and how they would like to further explore these ideas. This will enable the students to apply what they have learned and also self-evaluate the lesson.

**Adaptations/Enrichments:**

Since the students will be working in groups, they will have the opportunity to compare and contrast their ideas about gravity. This will enable students to pick up on characteristics that they normally would not have seen. Since most of the work is done in groups or as a class, this activity can meet various needs. Gifted students can relate gravity to Newton’s three laws of motion, or formulate a lesson to further our
investigation of gravity. To aid students with special needs, there will be a list of vocabulary words and their definitions posted in the room for easy access. This will be useful while journaling and making references in group meetings.

This activity also meets several of the Gardner's Multiple Intelligences, such as interpersonal, logical/mathematical, and intrapersonal. This meets the logical/mathematical intelligence because it enables the students to use reasoning throughout the experiment. The students have the opportunity to ask questions and apply different theories while they are leading their own experiments. Both the intrapersonal and interpersonal intelligences are met because while the students are working in groups, they can also make observations on their own, and reflect accordingly.

Self Reflection:

- Did the students actively explore the concept of gravity?
- Did their ideas and findings following the true explanation of gravity?
- Did the students gain a better understanding of what gravity is and how it works?
- Were the students able to apply the concept of gravity to their own lives?
- How did the students extend this activity and decide to further explore it?