

Creative arts Microlesson

A. Information Components

Lesson Title: Roller Coasters and Gravity

Grade Level: 2nd

State Standards Connection:

2. Manifest Scientific Attitudes and Interests

- a. Demonstrate a sense of curiosity about nature.
- c. Pose science questions about objects, events, and processes.
- f. Accept and use scientific evidence to help resolve ecological problems.

4. Communicate Effectively Using Science Language and Reasoning

- a. Record data accurately when given the appropriate form (e.g., table, graph, chart).
- b. Describe or explain observations carefully and report with pictures, sentences, and models.
- c. Use scientific language in oral and written communication.
- d. Use reference sources to obtain information and cite the source.
- e. Use mathematical reasoning to communicate information.

State Core Standards:

Standard 3: Physical Science

Objective 2: Communicate observations about falling objects.

Indicator 1. Observe falling objects and identify things that prevent them from reaching the ground.

Indicator 2. Communicate observations that similar objects of varying masses fall at the same rate.

Specific Lesson Objective: Students will be able to experiment with gravity by building a rollercoaster and observe how gravity affects the speed at which the marble moves on it.

Lesson Purpose: I want the students to understand how gravity works and identify things that prevent them from hitting the ground.

Vocabulary Focus: Gravity, Incline, Decline

Materials: Rollercoaster Book (1) Foam pipe covers, Cut in Half (40) Large Marbles (1 bag) Small Marbles (1 bag) duct tape (4 rolls)

Lesson Time: 45 mins

B. Instructional Procedures.

Engage and Launch: (10 mins)

1. Start off the lesson by asking the students if they have ever been on a rollercoaster or seen one. Get a few examples and thoughts about the ones they like or dislike: fast, slow, sudden drops, loops etc. Then ask what force makes rollercoasters work. Try and get them to guess Gravity
2. Next we'll be reading Rollercoasters by Marla Frazee. This is to help them get ideas for building their own roller coaster. Any time a student says the like a rollercoaster in a book tell them to keep that idea for our experiment later.
3. Explain that we will be making rollercoasters with foam pipes, duct tape and marbles. They will have 15 minutes to build it and then they will present their coaster to the class.

Teacher Role	Asks questions; Assesses prior knowledge; Provides information needed for Explore phase
Student Role	Gains interest; Calls up prior knowledge; Develops a need to know

Explore: 25 min.

- 1 Divide students into groups of 4. Each group will get a roll of duct tape and start out with 5 pipes. They may use more as needed. The students can build however they like. They will have 15 minutes to build their project.
- 2 I will be walking around helping as needed. Asking open ended questions and helping the students work on their project.

Teacher Role	Makes open suggestions; Questions and probes; Provides feedback; Assesses understanding and processes
Student Role	Explores resources and materials; Hypothesizes and predicts; Records observations and ideas;

Explain and Summarize: 5 minutes

1. Bring all the students together for a discussion of their findings and thoughts.
2. Each group will present their project. I will have each group tell about their roller coaster. If the marbles fly off the roller coaster I will ask why they think it happened and how to fix it. If there are any loops I will ask how that is possible. What makes the marble speed up and slow down? Does a large or small marble effect how fast or slow or if it even works?

Teacher Role	Asks for clarification and evidence from students; Enhances or clarifies student explanations; uses students' experiences as a basis for explaining new concepts; provides new vocabulary; evaluates
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	student explanations.
Student Role	Clarifies understandings discovered; Shares understandings for feedback; Forms generalizations; Seeks new explanations

Elaborate and extend: 5 mins

1. Now I'd ask the kids if their roller coaster would be safe for actual people to ride. What could they do to make it safe?
2. With extra time: have the students draw a rollercoaster. Draw the inclines red, the declines blue and the flat point green.

Teacher Role	Asks questions; Poses new problems and issues;
Student Role	Applies new knowledge by performing related tasks; Asks questions;

Evaluate:

1. Formative assessments will occur during each phase as I listen to student responses to open-ended questions and hearing their predictions about why their roller coaster is or isn't working.

Teacher Role	Observe and assess students; Asks open-ended questions;
Student Role	Demonstrate an understanding of a skill or concepts; Evaluates his/her own progress and knowledge; Answers open-ended questions by using observations, evidence, and previously accepted explanations

Adaptations for Special Needs:

ELL students with limited English are paired with other students speaking their first language in these groups. This allows them to have more complex concepts and thoughts translated and allows for deeper level understanding. Science definitions will be defined simply and written on the board as well as used verbally and shown visually.

Students are grouped in mixed ability groups, allowing students in special education will benefit from group instruction and discussion. All students in the groups can share ideas and thoughts. Those with more advanced writing skills can help other students write their ideas in their science notebooks.