

Roto-Copter Lesson Plan 6th Grade

Teacher

Date

School

SLE # PS.6.6.7: Describe the effects of force:

move a stationary object, speed up, slow down or change the direction of motion, change the shape of objects, PS.6.6.4: Recognize and give examples of different types of forces: gravitational forces, NS.1.6.2: Identify and define components of experimental design used to produce empirical evidence: hypothesis, replication, sample size, appropriate use of control, use of standardized variables, NS.1.6.5: Communicate results and conclusions from scientific inquiry

Objectives:

Content: I will be able to describe the effects of force to move a stationary object. I will be able to recognize and give examples of different types of forces.

Language: I will be able to use the terms force, friction, gravitational forces, speed, velocity, and acceleration while working with my group.

Assessment: The teacher will be able to assess student knowledge based on completed graph, writing, and also on their participation.

Technology/Materials: photocopies of Roto-Copters on different types of paper (cardstock, copy, etc), pencils, scissors, paper clips, crayons or markers, newspaper, plastic or Styrofoam bowl, masking tape, measuring tape

Vocabulary: force, friction, gravitational forces, speed, velocity, acceleration

Bloom's: X Remembering X Understanding X Applying X Analyzing X Evaluation X Creating

Questions: How does a helicopter fly? Describe the forces that help a helicopter fly or cause it to fall. Predict what would happen to a helicopter if you made the blades shorter or longer. Predict what would happen if something were to be added to the blades.

High Yield Strategies: X Identifying similarities & Differences Summarizing & Note Taking X Cooperative Learning X Reinforcing Effort & Providing Recognition X Setting Objectives & Providing Feedback X Generating & Testing Hypotheses X Cues, Questions & Advanced Organizers X Homework & Practice X Nonlinguistic Representations

Instructional Strategies:

Engagement: Activate prior knowledge by asking questions above. Take a piece of paper and show it to the students. Ask them to predict what would happen if you were to throw it up in the air. Then, take a crumpled piece of paper and do the same thing. Throw both papers into the air to test student predictions. Next, ask the students if they could predict where each piece of paper will land if thrown again. The crumpled piece of paper will be easy to predict, but the uncrumpled one will be harder.

Exploration: Place students into pairs. Distribute the copies of the Roto-Copters and the supplies to the students. (I would give each group a large copter and a small one.) Allow students to cut them out. Walk them through folding the copters and adding the paper clip. (Instructions are provided.) (NOTE: You will need to draw the circles on the newspaper so that all the circles are the same size. I would suggest using a Frisbee or other large circular object as a template.) Have the pair's team up against another pair of students. (You may choose them for the students or allow them to pick themselves.) Have the students measure and then place strips of masking tape 3 to 4 feet away from the newspaper. Place the cereal bowl in the center of the circle. Instruct the students to try to land the Roto-Copters inside the cereal bowl. If they land it in the cereal bowl they receive 3 points, if they land it in the circle they receive 2 points, and if they land it on the newspaper they receive 1 point. Have the students play 4 or 5 rounds and keep track of points.

While the students are playing, walk around the room asking questions such as, "Why do you

think your copter is flying that way? What could be affecting it's flight? Describe some changes to it that you may want to make." As you hear terms from students, write them on the board to review later.

Explanation: After each round, have students write about what was occurring as they threw the copters. Have the pairs work together to come up with a plan make ONE change to their Roto-Copters in order to help them in the next set of rounds. After they alter their copters, they will need to write about why they chose to do this and what results they expect. Then allow them to try another 5 rounds of flights.

Elaboration: When done, allow the students to work together to diagram their copters and how they could make another change to the copter to improve flights. Explain that they were only allowed to make ONE change because if they changed more than one variable, then they would not understand which variable affected the copter's flight. Go back to the words written on the board and have students explain why they used them and to explain the usage of them.

Intervention Strategies: See ELL Levels in curriculum map.

Accommodations & Modifications (IEPs) Group work, pair as needed, remodel as needed, walk throughout the room to facilitate learning.

Evaluation: Allow students to share their modifications and whether or not they worked. Allow students to offer suggestions on modifications to try later.

Closure: Have the students create a diagram of their Roto-Copter and describe where gravity and different forces were affecting the copters.

Homework: Have students take copters home, make another adjustment and try again.