FORCES

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Subject

Basic science

Prepared By

[Instructor Name]

Grade Level

5

Overview

This lesson plan covers teaching content for;

1. Meaning of push and pull
2. Forces
3. Evidences of forces

Objectives

Students should be able to;

1. Students will be able to demonstrate a push or a pull on objects in their environment.
2. Students will be able to describe other forces that cause a push and a pull.
3. Students will be able to record and compare measurement data during an investigation.
4. Students will analyze data and write to explain their investigation results in a science notebook.

Activity Starter/Instruction

1. Place a tennis ball on a table in the front of the classroom.
2. Ask students what could get that tennis ball to move. The responses you get are to push it, wind could blow it, and to shake the table.
3. Demonstrate each one as it is identified.
4. As you blow on the ball to model wind, ask the class if blowing is a type of push, just air doing the pushing instead of my hand and they say it is. As you shake the table you ask if that is also a push, this time by the table, and they say it is.
5. Ask if there is any other way to get the ball to move besides applying a push. After thinking about it for a while, a student tells me to pick it up which would cause it to move from the table to my hand.
6. You do that and as you are picking it up, ask if you are pushing the ball. Students tell me no, I am pulling it up.
7. Place the ball back on the table and pull it forward with my hand to show another pull. Tie a piece of yarn around it and pull that to make it

Teacher Guide

Day 1/ Lesson 1: 15 Mins

1. Take students outside and form collaborative working groups.
2. Explain that they will observe an early elementary student and an eighth grade student as they kick balls across a set distance to a finish line.
3. Before the demonstration, ask students to observe the setup and discuss predictions, possible outcomes, and hypotheses regarding the results. - If both students kick the same ball, over the same grass, at the same time, whose ball do you think will reach the finish line first? Why? What are some of the variables in this setup? Who do you predict will have the stronger kick? Besides strength of the kick itself, what else could change how fast the ball moves?
4. Encourage students to discuss their ideas with their partners and to generate additional questions that could be investigated.
5. Ask students to watch the demonstration and discuss the results with their group, particularly

Materials Required

-science journals
-tennis ball
-round objects

Additional Resources

- http://schools.utah.gov/curr/science/sciber0
- http://videos.howstuffworks.com/science/fc 29422
- http://library.thinkquest.org/10796/ch4/ch4
- https://study.com/academy/topic/force-for-
- https://www.sciencebuddies.org/teacher-re second-law?from=Blog
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Additional Notes

move by another pull.

8. Explain to students that all of these examples included pushes or pulls that caused things to move. These are all known as forces.

Guided Practice

Day 2/ Lesson 2: 15 Mins

1. Present the word "force" on chart paper and ask students to describe how they've used this word before or how they would explain what a force is to someone younger than them. Chart responses around the word force on the paper in a different colored marker.
2. Work the discussion to generate an accurate definition of force. Using the same colored marker as the word force, provide students the actual definition of force (a push or a pull in a specific direction)
3. Facilitate an interactive discussion with the class about how forces interact to affect motion.
4. Solicit student examples of pushing and pulling forces that they know of that affect the motion of objects.
5. Ask students to identify the forces that affected the motion of the kicked ball.
6. Ask them to hypothesize as to why the ball rolls more slowly on grass then concrete.
7. Guide the discussion toward the concept of friction, and its affect on the ball's motion.

in light of the predictions they made previously.

6. Encourage students to alter the demonstration set up to test other variables (kicking on cement versus grass, kicking golf balls instead of soccer balls, etc.) they mention in their discussions.
7. Make available resources, such as stop watches, chart paper, and gym balls of different sizes, that student groups can use in testing their ideas.
8. Encourage them to record their findings in a systematic fashion.
9. Ask students to discuss their findings within their own group and then with the whole class.
10. Provide prompts as needed to stimulate and deepen discussion such as "When the ball was kicked over cement instead of grass…" or "Changing the strength of the kick…" Encourage but do not require that every student contribute to the discussion.

Guided Practice

Day 3/ Lesson 3: 15 Mins

1. Present a few correct analogies from the previous lesson. Ask volunteers to explain why they are accurate.
2. Begin dropping non-bouncy, heavy objects onto the ground. Ask students if there is force acting upon the objects. Students' prior knowledge will most likely lead them to discuss gravity. Pose this challenge question on the board: "If gravity is a force (a push or pull in one direction) that affects all objects on Earth, what keeps objects from crashing through

		the floor?" 3. Ask students to work with a partner to conduct research on the Internet to answer the challenge question. 4. Require students to apply their research to diagram the answer to the challenge question. 5. Ask student volunteers to present and explain their diagrams to the class. Build on the students' explanations to facilitate a whole group discussion and flesh out students' understandings of balanced and net forces 6. Ask students to list experiences in which they have "defied" gravity. 7. Encourage students to tell stories about trampolines, the high jump, skateboarding tricks, slam-dunking a basketball etc. List these on the board along with the words "net force." 8. Ask students to assist you in diagramming the forces in the examples on the board. Tell students they can remember net force by thinking of slam-dunking into a basketball net, defying gravity, and having one force being stronger than the other. 9. Provide students with a choice of assessments including creating a cartoon, writing a paragraph, or giving a speech. Their projects should demonstrate the difference between balanced forces and net forces and

		give examples of each from their own experience. 10. Allow time for students to rework their ideas from the pre-assessment as needed.
	Assessment Activity 1. Test students based on the prior knowledge about pull and push policy of force 2. Refresh their knowledge about the Newton law of motion and force 3. Ask questions relating to force relation to friction to start your next lesson	Assessment Activity
	Summary Students will begin with a pre-assessment of force, work, and simple machines that will be used throughout the unit to gauge changes in conceptual knowledge and guide further teaching. This lesson introduces students to forces, including gravity and friction, and provides a foundation for upcoming lessons about net and balanced forces and effort and load forces	
