

Dabble Lab Lesson Plan

Series: Science Brain Builders

Title: *Robotics Engineering: Learn It, Try It!*, by Ed Sobey

GENERAL INFORMATION: Grade Level(s): 4-9 Lesson Plan Title: The Magic of Motion Curriculum Area: Robotics Engineering

Overview of Lesson: In this lesson, students will learn how to create motion and build a mobile platform. Upon learning to do so, students will then work collaboratively to build a Rube Goldberg machine as a class. The Merriam Webster Dictionary defines Rube Goldberg as “Accomplishing by complex means what seemingly could be done simply.” Ideally this lesson is implemented once students have gained an understanding of electrical and structural engineering. (See *Electrical Engineering: Learn It, Try It!* by Ed Sobey and *Structural Engineering: Learn It, Try It!* by Tammy Enz.)

BENCHMARKS OR LEARNING OBJECTIVES:

AASL Skills Indicator 1.1.2: Use prior background knowledge as context for new learning.

Grade 5 Benchmark: Predict answers to inquiry questions based on background knowledge and beginning observations or experiences.

Grade 8 Benchmark: Observe and analyze an experience, demonstration, or source that introduces a topic, problem, or question to gather background information.

AASL Skills Indicator 2.1.5: Collaborate with others to exchange ideas, develop new understandings, make decisions, and solve problems.

Grade 5 Benchmark: Express their own ideas appropriately and effectively while working in groups to identify and resolve information problems.

Grade 8 Benchmark: Participate in problem-solving process with group.

ASSESSMENT METHODS & CRITERIA:

Each student group will build a mobile platform. Students will then create their group’s contribution to the class Rube Goldberg machine. It is optional to present this machine upon creation in some manner or display the machine in the library for all to see.

RESOURCES AND OTHER LEARNING SUPPORT MATERIALS:

Demonstration:

- Roll of masking tape
- Toy motor
- 9-volt battery
- Two clip leads

Project:

- Handout with directions for building a mobile platform (See pp. 18–23 of *Robotics Engineering: Learn It, Try It!* by Ed Sobey.)
- Scissors for each student group
- Plastic straw for each student group
- Wooden kebab skewer for each student group
- Cardboard (Depending on the grade level, provide 3x4 inch (8x10 cm) pieces for each student group, or let students cut these themselves.)
- Masking tape roll per student group
- Clear scotch tape roll per student group
- Toy motor (same as the one from the demonstration) for each student group
- Three plastic toy wheels per student group

Rube Goldberg Machine Project: These materials will vary based on what students choose to create.

INSTRUCTION AND ACTIVITIES:

1. Begin class by introducing the creation of motion and what provides power to a motor. (See pp.14–17 of *Robotics Engineering: Learn It, Try It!* by Ed Sobey.)
2. Discuss with the class what is known about motion and power in their everyday lives. How are these machines powered?
3. Assign students groups, and provide each student with a handout illustrating the directions for building a mobile platform. (See pp. 18–23 of *Robotics Engineering: Learn It, Try It!* by Ed Sobey.)
4. Review the directions, and give students time to build the mobile platform. (It is optional to have each student group measure the amount of time it takes their mobile platform to travel a specified distance.)
5. Discuss as a class how students might make their mobile platforms travel faster. What might the mobile platforms be used for?
6. Introduce what a Rube Goldberg machine is and how it works. (There are many videos available that may inspire students. Another option is to have students find examples of successful Rube Goldberg machines and share with the class what made these machines successful.)
7. Introduce students to the class project: Each student group will be responsible for building part of a Rube Goldberg machine.
8. Begin brainstorming as a class what should be included in the class' Rube Goldberg machine.
9. Once students have decided as a group what parts will make up the machine, assign or let student groups choose which part they will build. Give the class a deadline for completing their part so there is time to put these parts together with the rest of the class.

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