



for grade levels 4 – 6

ACTIVITY 2: INCLINED PLANE & SPEED

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The Rube Goldberg Challenge

After viewing the second video on Rube Goldberg Machines, you can now see the importance of the inclined plane. Use the video as a starting point to explain inclined planes and friction.

Objectives

(*Science*) Demonstrate how forces cause change in speed or direction of objects.

(*Science*) Demonstrate that the greater the force applied to an object, the greater the change in speed or direction of the object.

Lesson Flow

1. Show your class Enable Education's E3 video about Inclined planes.
2. Discuss with your class force, friction and inclined planes.

Prompts:

- How do inclined planes help us to move heavier objects?
 - How does force works for inclined planes? What kind of force is needed to move items down an inclined plane?
 - Is friction a problem? How?
 - Friction is the resistance produced by rubbing to objects together. What is one way to reduce friction on an inclined plane?
 - Can you think of an example of other ways to reduce friction on an inclined plane for an object?
3. Have your class break into small groups.

Materials/Preparation

- Large textbooks.
- Toy cars.
- 20 x 10 boards.
- Large sheets of sandpaper.
- Large garbage bags.
- Squares of cotton fabric.
- Squares of felt material/wool material.
- Squares of carpet.
- Tape.
- Stopwatches.
- Art materials.
- Worksheets.

Classroom Accommodations

Group work of this nature may be difficult for some learners. Provide these learners with a quiet area to work or work one-on-one with the student to complete the assignment. Give extra time or shorten the amount of surfaces a student needs to test to ensure a better learning experience for the student.

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4. Each group will be provided an inclined plane, a small toy car and five different surfaces for their inclined plane (sandpaper, garbage bag, carpet, cotton fabric, felt or wool fabric).
5. Have students write down their hypothesis as to which surface on the inclined plane will make the car move fastest and slowest, including why they think that.
6. Each group will then build an inclined plane using text books and the provided board.
7. Students will then test each material (separately) with the car, timing how fast and how far the car made it down the inclined plane. Students must write down the results.
8. Once complete, each group should have the opportunity to share their results.

Note: For upper grade levels, or more advanced classrooms, have the students alter the incline of the inclined plane to see the different results.

9. Have students write a conclusion to their hypothesis.

What's Next?

- ▶ Have your students create graphs to present their results. (*Mathematics*)