



for grade levels 4 – 6

# ACTIVITY 6: MORE FORCE, LESS TURNS

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## The Rube Goldberg Challenge

After viewing the sixth video on Rube Goldberg Machines you can now see the importance of the screw. Use the video as a starting point to explain screws and force.

## Objectives

(*Science*) Predict and observe what happens when a force is applied to an object.

## Lesson Flow

1. Show your class Enable Education's E3 video about screws.
2. Divide the class into groups of 4 and hand out a block of wood to each group. Handout screws with a higher thread width and screws with a lower thread width to each group and ask them if they notice anything different about the screws.  
**Prompts:**
  - How are the screws similar?
  - How are the screws different?
3. Explain to the class that they will need to try and screw the screws into the wood by hand.
4. Tell the class to write down or record what happens for each type of screw. Ask the class if they noticed any difference.
  - Was one screw harder to screw into the wood than the other?
  - Which screw took longer to screw in?
  - Which screw did you really have to work on? Did it take more force?

## Materials/Preparation

- Wood Screws with various thread width (the distance that a screw goes into the wood with each turn is called the pitch – further in, higher pitch)
- Blocks of wood or a number of 2x4 pieces
- Screwdrivers
- Paper
- Cylinders (paper rolls, 2L drink containers, vases, etc.)
- Scissors
- Tape or glue

## 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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5. Explain to the students that the higher the pitch on the screw, the more force it will take to screw into something, however it will need less rotations. The lower the pitch is on the screw, the less force it will take. In this case it will need more rotations.
  - Higher pitch = more force, less turns
  - Lower pitch = less force, more turns
6. Ask the class if a screw resembles any other simple machine. Explain to the class that a screw is a type of an inclined plane. Have the groups cut an inclined plane out of construction paper. Hand out a cylinder to each group and ask the students to wrap the inclined plane around the cylinder.
  - When you wrap your inclined plane around your cylinder what do you get? What does it look like?
  - Do inclined planes raise objects?
  - Can a screw lower and raise an object like an inclined plane?
7. Explain to your class that screws have many uses. In their groups, have the students write down a list of other ways screws can be used and have them present their ideas to the class. If your groups are having trouble finding ideas, you can give them some examples (light bulbs, jar/bottle lids, airplane propellers, fan blades, pencil sharpener, etc.)

## What's Next?

- ▶ Have your class research whether a screw can be added to a mechanical system. Have them write about the mechanical system they researched, and how the screw was implemented into the design. (*Literacy*)