



Project Exploration creates transformative learning opportunities for youth underrepresented in the sciences –particularly students of color and girls – by equipping them with the skills, practices, and mindset needed for a lifelong pursuit of learning. STEM@Home makes activities around science, technology, engineering, and math accessible and fun to do at home. This STEMbook activity, resources, and more are available at [www.projectexploration.org/stemathome](http://www.projectexploration.org/stemathome).

## In this activity, you will:

experiment with simple machines.



## Supplies Required:

Wooden ruler  
Object to lift  
Soup can or toilet paper roll

## Video

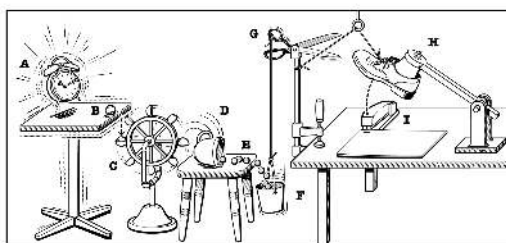
Simple machines: <https://tinyurl.com/y9soareb>

OK Go's Rube Goldberg machine: <https://tinyurl.com/4x9rcms>

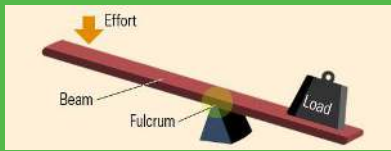
## Overview

A Rube Goldberg machine, named after American cartoonist Rube Goldberg, is a machine intentionally designed to perform a simple task in an indirect and overly complicated way. Usually, these machines consist of a series of simple unrelated devices; the action of each triggers the initiation of the next, eventually resulting in achieving a stated goal.

You will make a lever out of the given materials and explore the relationship of the fulcrum to the load. You will discover that it is easier to move an object when the fulcrum is closer to the load. In this experiment, you took a basic ruler or piece of wood and added a fulcrum to make a simple machine called a lever! To understand how a lever works – picture a playground see-saw. With the heavier object on one end, the lighter (empty) end of the lever was raised up. By moving the fulcrum closer to the heavy end, you were able to use the lever to help you raise the heavier object when you placed a lighter one on the opposite end.



## Instructions



1. Set the lever (ruler, foam board, or wood) over the soup can or toilet paper roll. Position it near the middle so that the board is balanced. The soup can or toilet paper roll is called the fulcrum, which gives your lever a pivot point.
2. Place a weight on one end and note what happens to each end of the lever.
3. Move the fulcrum (paper roll) closer to the end with the weight.
4. Place a lighter weight or object on the other end. If nothing happens, adjust the position of the paper roll (fulcrum) until the heavier end is raised up.
5. You have just made a lever and used it to lift a heavy object with a lighter one! You can experiment more by moving the fulcrum and changing the placement of the weights.

## Additional Resources

**Think About It!** What do you think would happen if you moved the fulcrum the opposite direction? Where are levers used in every

1. The best Rube Goldberg machines: <https://tinyurl.com/y856jh57>
2. How to make a Rube Goldberg machine: <https://tinyurl.com/yc6bmfj6>
3. What is a lever simple machine? <https://tinyurl.com/y7kp8ros>

## Share It Out

Talk about it with your family and friends.

**Share on social media:** record a video or take a picture of your machine and post the results online using the hashtags:

#SimpleMachineChallenge  
#ProjectExploration  
#StemAtHome

**Share via PE's website:** Students who complete STEM@home activities and share what they learned with the PE team via our website will earn points which can be traded in for cash prizes at the Explore Store. Your project number is 413. Learn more at [www.projectexploration.org/explore-store](http://www.projectexploration.org/explore-store)

### Join PE's character contest!

Design a STEM character who will lead kids through activities and be featured on our website and in our STEMbooks. Cash prizes will be awarded to the top 3 finalists. Learn more at: [www.projectexploration.org/character-contest](http://www.projectexploration.org/character-contest).



Call or text us for help: 312-772-6634

[www.projectexploration.org](http://www.projectexploration.org)