

Week 6: A Simply Complicated Sip

Hot summer days make us feel lazy. That's why we love simple machines ... they make work easier. Perform the easy task of pouring your favorite summer drink into a cup by using at least three simple machines to build a deliberately complicated invention called a Rube Goldberg machine.

Experiment

RUBE GOLDBERG MACHINE

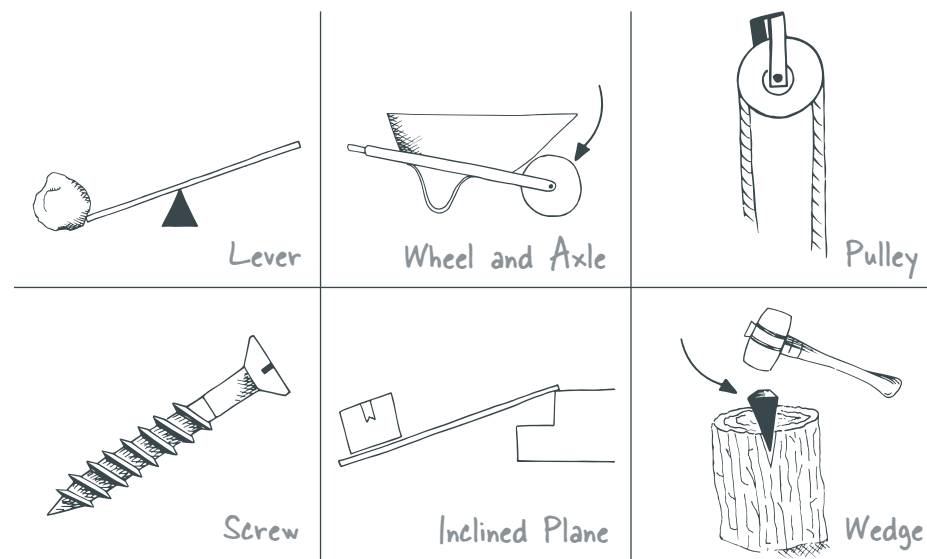
Materials

Suggested items include:

- Bottles
- Cups
- Cardboard tubes or boxes
- Tape
- Aluminum foil
- Books
- Balls
- Cans
- String
- Pencils
- Rulers

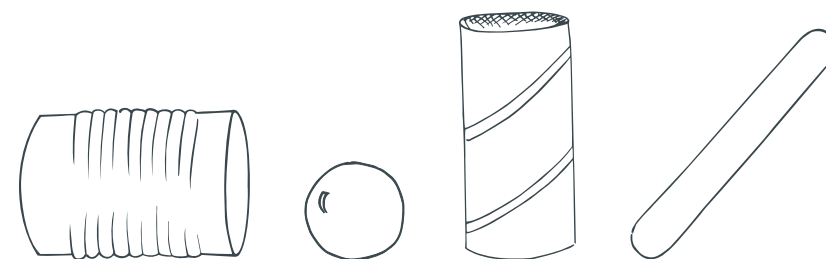
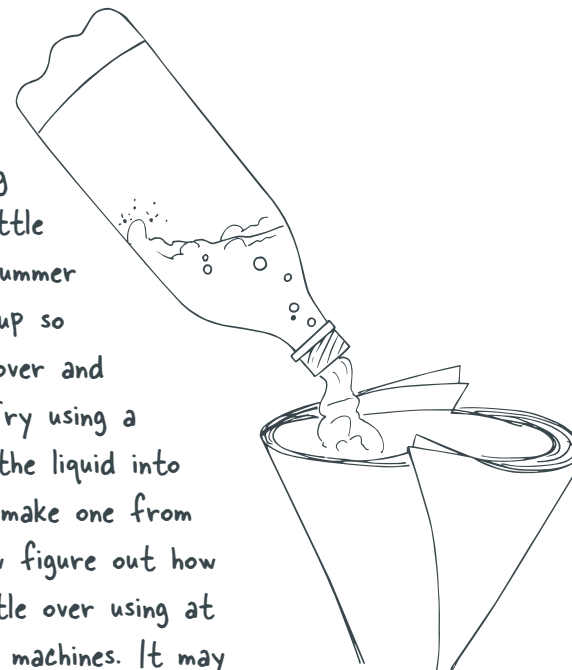
Instructions

There's no "right" way to build a Rube Goldberg machine, it's all based on your imagination. Start by learning about the six types of simple machines before deciding which three to use: inclined plane, wheel and axle, lever, pulley, screw and wedge.



Find a location for your machine; it may be helpful to have a spot that lets you use several heights, like a table and chair, or a stack of books on a table.

Set up your final step first by securing your cup and positioning a small plastic bottle filled with your summer drink above the cup so that it can fall over and pour the liquid. Try using a funnel to direct the liquid into the cup—you can make one from aluminum foil. Now figure out how to knock the bottle over using at least three simple machines. It may take several tries to get each step to work right, but that's part of the fun!



What's happening?

Rube Goldberg was an engineer and artist who drew cartoons of overly complicated inventions. His drawings showed a long, difficult process that ended in a simple task. Complex machines are made up of simple machines connected together in a chain reaction. Simple machines make work easier by providing a tradeoff between force and distance, meaning you'll need to exert less force if you use a simple machine to move an object a longer distance.

Game on!

Try making your invention even more complicated by using all six simple machines. Challenge your friends to see who can build a machine with the most steps. Dream up another invention, like one that can turn your lights off while you're lying in bed, and draw how it will work.

Tips

- Use a funnel to direct the liquid into the cup. You can make one from aluminum foil.
- It takes some weight to knock over your bottle ... falling books and rolling cans can be helpful.
- If pouring a drink is too difficult, try building a machine that gets a ball into a cup instead.

More Ways to Play With Machines

Understand how simple machines work by playing MSI's Simple Machines online game at msichicago.org/simple-machines.

Play the board game *Mouse Trap*, a classic example of a Rube Goldberg machine.

Check out *Swiss Jolly Ball* at MSI, a giant pinball machine that's 7 feet high and 15 feet wide.

Like this activity? You could be a ...

- Robotics Technician
- Inventor
- Electrical Engineer
- Industrial Designer

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