Rube Goldberg Machine

Grade: 3-4

Time: 1 hr

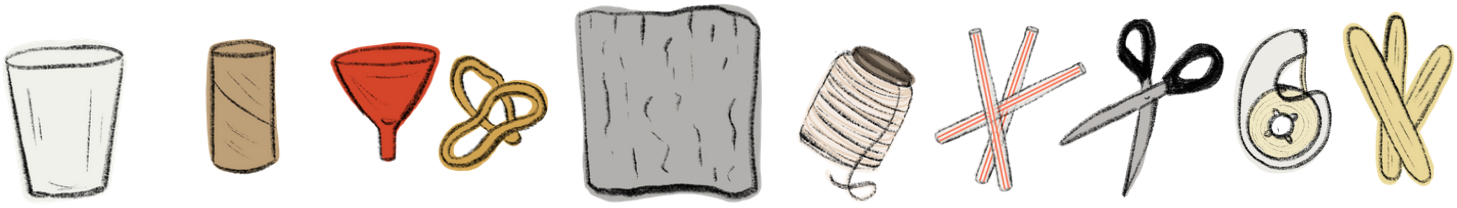
Activity Overview :

Today you will learn about simple machines by making a Rube Goldberg contraption. It is a machine that completes a simple task with many moving parts, in a complex way. You will use materials to make a system of these simple machines to knock down a cup! To get an idea about what exactly a Rube Goldberg machine is, watch this fun music video.
https://bit.ly/39oYLSB

- What are simple machines? How do they work?
- Can you think of how rube goldberg machines are used in real life?

Materials:

- Paper Cups
- ToiletPaper/Paper Towel Rolls
- Funnels
- Rubber Bands
- Aluminum foil
- String
- Cardboard (old cereal boxes work well!)
- Straws
- Popsicle Sticks
- Bottle Caps
- Tape
- Scissors
- Marbles



Don't worry if you don't have all these supplies. Experiment with other everyday items and see what you can build!

Activity:

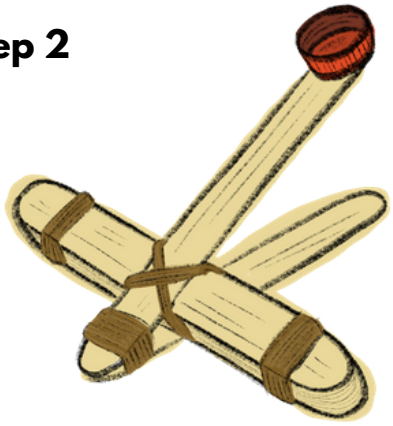
1. Set up a tower with a paper cup on the top. Your goal is to knock this cup down.

Step 1

2. Create a catapult out of rubber bands and popsicle sticks. This will be your first simple task in your contraption. Below is an example of what it could look like.

3. Think about your contraption and design the layout of the machines.

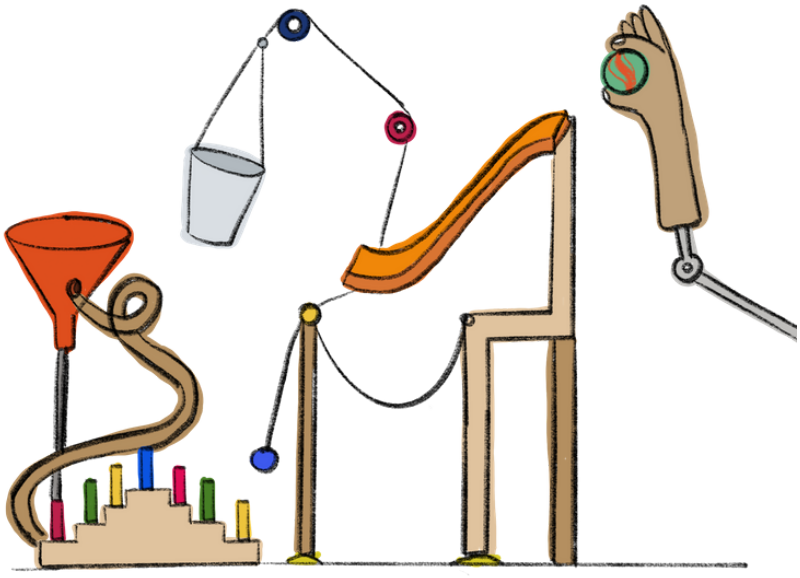
Step 2



4. Create about 4-5 different simple machines such as: ramps, pulleys, and levers.These different tasks should all connect to each other and in the end, knock over the cup. Think about how they can all work together. Can a catapult launch a marble that knocks down a cereal box? Can a marble come out of a funnel and go down a ramp?

5. Once your contraption is ready and built, test it out. Did the tower with the cup on top fall down? If not, that is totally okay! Just fix your contraption and try again, this is the engineering design cycle.

6. If your contraption knocks down the cup, you have successfully completed your Rube Goldberg machine!



Engineering and Science Connections

Simple Machines are devices that include the wedge, wheel and axle, lever, inclined plane, screw, and pulley — these machines have been used for thousands of years going all the way back to the days of ancient Egypt and the construction of the great pyramids!

By doing this activity, you also learned all about the Engineering Cycle. You started with a problem, designed a solution for it, built a prototype (a simple model of your idea) and then tested it out. If the prototype works then the engineers will use it in their final design. However, if it doesn't work the first time, it's okay, you just go through the cycle again and keep making changes until it works!

Who is Rube Goldberg anyway? Rube Goldberg was an American who loved to draw and create as a child and teenager. He eventually went to university to become a mining engineer and ended up working on mapping sewer pipes and water mains in California.
As much as he enjoyed his job, he always found himself doing what he truly loved the most-drawing. He started drawing cartoons for local newspapers and the public fell in love with his whacky inventions.

Rube used his engineering background to create funny and strange cartoons that would show complicated machines that used chain reactions to complete a simple task. Soon enough, everyone couldn't stop talking about Rube's inventions and his work became popular across the nation!

Eventually, his creations moved off of the page and into real life. People started building his wild chain reaction machines just to watch the engineering and science in action. Rube Goldberg has, and continues to, inspire millions of people to build their own complex machines to carry out simple and boring tasks (like pouring orange juice in a cup, or turning off your alarm in the morning).

Share your creations!

Don't for get to share your experiments and creations with us! We would love to see what you've made. You can Email us at: esqinfo@uwaterloo.ca or send us a message/tag us on our social media!

Facebook: @uwengoutreach

Twitter: @UWEngOutreach

Instagram: @uwengoutreach

Thanks for exploring, discovering, and learning with us!

3, 2, 1 Done!

3 - Write or draw 3 things you learned from this activity

2 - Write or draw 2 things you found super interesting or cool and want to learn more about

1 - Do you have any questions about the activity? Did something make you wonder...what if? how? or why?