

## Create your own Rube Goldberg Machine! (Level 1)

<b>Description</b>	Teach your learners the principles of engineering and the values of resilience, creativity, and attention to detail with this hands-on activity
<b>Leading Question</b>	How can we create a machine that helps us do something useful or fun in our house?
<b>Total Time Required</b>	30-50 minutes per day over 5 days.
<b>Supplies Required</b>	Pencil, color pens, paper/notebook, household items to create the machine (ball, toy car, Legos, tape, straws, cards, dominoes, strings, etc. - any items found at home)
<b>Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1. Understanding of motion and force.</li> <li>2. Understanding of an example of a machine that uses force to work.</li> <li>3. Design and execution of a machine.</li> </ol>
<b>Previous Learning</b>	Basic understanding of force and motion strand (G1 science)

## DAY 1

Today you will learn about what makes things move.

<b>Suggested Duration</b>	<b>Activity and Description</b>
<b>10-20 minutes</b>	<p>Discussion:</p> <ul style="list-style-type: none"> <li>• What is motion? <ul style="list-style-type: none"> <li>○ Let the learner reflect and answer. They may refer to their science textbook</li> <li>○ Explain that motion is when something moves from one place to another</li> </ul> </li> <li>• How do things move? The learner will stand up and act out how these objects move:</li> </ul>



- Do these objects move on their own?
  - Let the learner reflect and answer
  - Explain that some objects (like people and animals) move on their own, while others (cars and trolleys) need someone to push or start them. This is called force.
- What is a machine?
  - Let the learner reflect and answer
  - A machine is something that is designed to make our work easier. Give them examples: wheels, scissors, cars are all different types of machines
- Do machines move on their own? How does a bicycle move?
  - Let the learner reflect and answer
- Explain that a bicycle works to move us from one point to another by applying force to the pedals

**10-20  
minutes**

The learner will pick an item either from the house or his or her imagination, draw it, and write how it moves. If he or she cannot write yet, they can draw an arrow, zigzag line etc. to depict the motion of the item

## DAY 2

Today you will look at different videos and ways to build a new machine.

**Suggested  
Duration**

**Activity and Description**

**5-10 minutes**

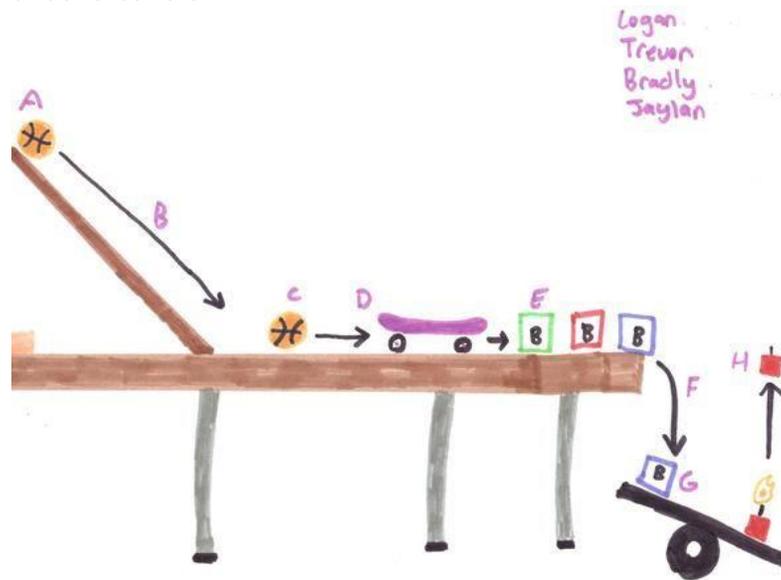
- Watch some videos Rube Goldberg machines online to get the learner excited about building their own. If you do not have access to the internet, you can show them one of the images below:

To secure coins:



Source:

To put out a candle:



**5-10 minutes**

- The learner will reflect on  
What is happening in this video/image?
- Explain that a Rube Goldberg machine is a type of machine that is made to do something for us (such as pressing a button), and has many different parts connected to each other and move together to achieve the goal

**15 minutes**

- The learner will walk around the house collecting 5-10 items and place them on a table.

## DAY 3

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Today you will design your own Rube Goldberg machine!

Suggested Duration	Activity and Description
2 minutes	<ul style="list-style-type: none"> <li>Explain that the learner will be creating their own Rube Goldberg machine at home! Tell him or her that a Rube Goldberg machine must meet the following criteria It should have many small parts arranged close to each other It must do something at the end – like ring a bell, push a button, etc.</li> </ul>
20-30 minutes	<ul style="list-style-type: none"> <li>The learner will reflect on the type and purpose of the machine they want to make. They can watch more videos if needed to get inspiration. Ask him or her to draw the machine they want to build in their notebook or on a piece of paper using a pencil. A machine to put sugar in tea, made of a small pall, a few wooden popsicle sticks and a cup with tea at the end.</li> <li>A machine to pop a balloon made of a small ball, toy car/light stone with a pin attached, a wooden plan or popsicle sticks and a balloon at the end.</li> </ul>
10 minutes	<ul style="list-style-type: none"> <li>Discuss: What is the purpose of your machine? What is it making easier for you to do?</li> <li>What items in your house do you think you can use to create your Rube Goldberg machine that you have drawn?</li> </ul>

## DAY 4

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Today you will assemble and create your own Rube Goldberg machine.

Suggested Duration	Activity and Description
10-20 minutes	<ul style="list-style-type: none"> <li>Time to test our design! Under your supervision, the learner will assemble all the items, allow her or him to set up and test a part of the machine, e.g. a toy car with a pin taped to the top sliding down a ramp made of popsicle sticks and popping a balloon.</li> <li>You can also create some items using paper or other adaptable material, if some items are unavailable</li> <li>After the setup is complete, ask them to get the machine going and observe what happens together</li> </ul>

<b>10-20 minutes</b>	<ul style="list-style-type: none"> <li>● Discussion: <ul style="list-style-type: none"> <li>○ What do you think worked?</li> <li>○ What did not work?</li> <li>○ What can you change?</li> </ul> </li> </ul>
<b>5-10 minutes</b>	<ul style="list-style-type: none"> <li>● Give them feedback and ask them to refine their design and items list either to fix errors or expand the machine (by adding just one or two additional parts. Do not complicate the design)</li> <li>● If the learner did not get it right this time, explain that designing a machine is a process and making mistakes is a part of it. Explain that this is the purpose of testing, so we can learn from our mistakes and make things work better.</li> </ul>

## DAY 5

Today you will refine your machine so that it works perfectly!

<b>Suggested Duration</b>	<b>Activity and Description</b>
<b>10 minutes</b>	<ul style="list-style-type: none"> <li>● The learner will refine the design of the machine based on yesterday's feedback by either expanding or refining it. They can draw the final design in color pens</li> </ul>
<b>5-10 minutes</b>	<ul style="list-style-type: none"> <li>● The learner will assemble all the items necessary and set up the modified machine for another testing round of the final design presented to the rest of the family!</li> </ul>
<b>5 minutes</b>	<ul style="list-style-type: none"> <li>● Start the machine!</li> </ul>
<b>5 minutes</b>	<ul style="list-style-type: none"> <li>● Discussion: <ul style="list-style-type: none"> <li>○ What do you think of your final design?</li> <li>○ What do you think worked?</li> <li>○ What didn't work?</li> <li>○ What can you change?</li> </ul> </li> </ul>

## ASSESSMENT CRITERIA

- Successful creation of a Rube Goldberg machine that consists of 3 or more simple and/or compound machines, and that solves some problem/serves some purpose.

## ADDITIONAL ENRICHMENT ACTIVITIES

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- There is always room for extending the complexity of the final design by adding more items.