

STEM from Home

Simple Machines: Levers

Imagine if you had to carry home a box full of heavy books. Wouldn't it be easier to move them in a cart with wheels? That's what simple machines do. They make our work easier! They work by changing the direction of a force or the amount of force needed to complete a task.

In this activity card, we will explore one type of simple machine: the Lever

Your challenges include developing a Scratch project that demonstrates the use of a lever and becoming a detective to find the different lever functions your joints, bones and muscles combine to perform. You will also create your own device to accomplish a given task.

Main Activity: **Lever Fever!**

Introduction

In this activity, you will develop a project of your own. It will demonstrate the different types of levers.

Let's get started! Take a look at the [project here](#).

You can access [guidelines for the activity](#) here.

What You Will Need

Hardware

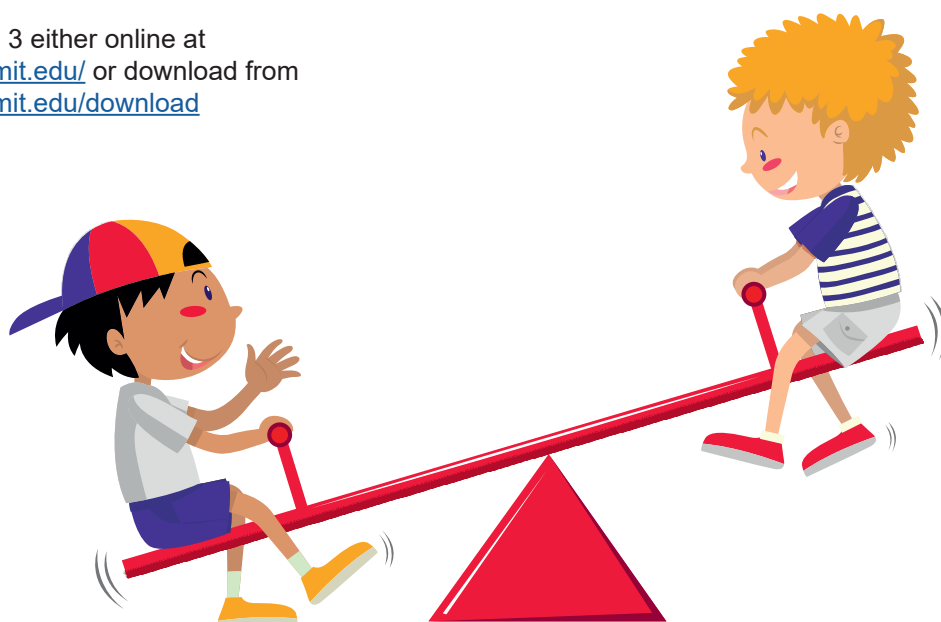
A computer capable of running Scratch or Scratch 3 software (either online or offline).

Software

Access Scratch 3 either online at <https://scratch.mit.edu/> or download from <https://scratch.mit.edu/download>

What you will learn

1. How to add, modify or remove characters (sprites)
2. How to add, modify or remove backgrounds (backdrops)
3. How to add customized characters
4. How to add customized backgrounds
5. How to make characters say something
6. How to change looks (costumes) of characters
7. How to navigate across the project



Bonus Activities

Activity 1: Lever Hunt

There are four parts to a lever – lever arm, pivot, effort and load. In our bodies:

- Bones act as lever arms
- Joints act as pivots
- Muscles provide the effort forces to move loads
- Load forces are often the weights of the body parts that are moved or forces needed to lift, push or pull things outside our bodies.

Different bones, joints and muscles in our body perform functions of different types of levers.

Now, for of the tasks below, identify the bones, joints and muscles working to do this and what kind of lever function are they performing.

- Nod Your Head
- Kick a ball
- Pick a bottle from the ground
- Stand on Tip Toe
- Bend your arm and flex your muscles
- Do Lunges

Add to the list, by being aware of your body functions for a full week. You could create a hand drawn table or a set of illustrations or create a digital [presentation](#).

Have fun!

Remember to be safe.



Activity 2: Weightlifting!

Ellie, an elephant in your neighbourhood zoo, is sick. She weighs 160 kilos and needs to be lifted onto a truck. The staff of the zoo needs your help.

Design a lever to do this task.

You will need to do the following:

1. Identify the type of lever which will be most effective for this task
2. Draw/ Construct the design of the lever labelling the Fulcrum, Effort and Load.
3. Indicate what materials would be used in the contraction.

You could draw your design on paper or use materials available in your home to create a working model of the lever. It's fun to Reuse and Recycle!



Challenge Activity: Watermelon Rescue!

Introduction

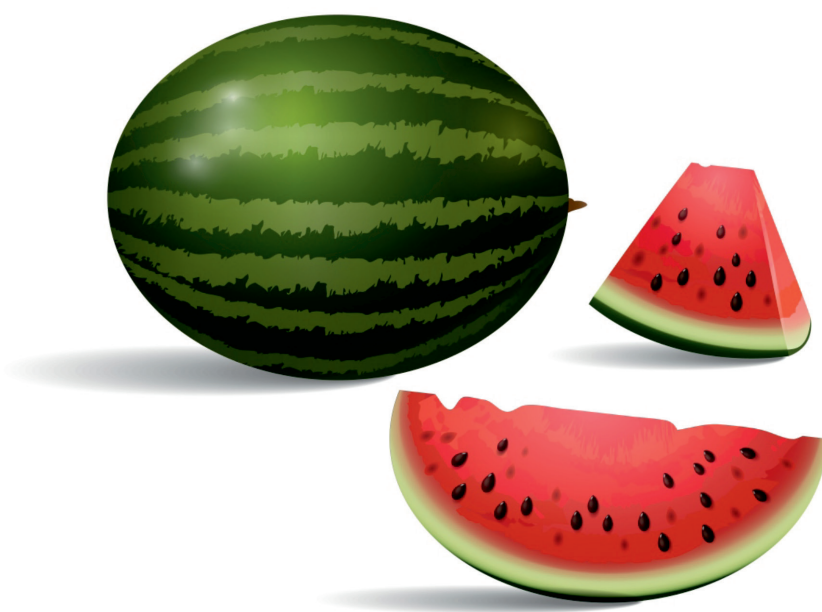
Watermelon farmers are facing a huge challenge and they need your help.

They have to transport their watermelons across a river urgently. The river is in flood and they can't use boats to cross it.

Your task is to use the knowledge you have gained about levers to create a working model of a device which can effectively and quickly transport the watermelons across the river.

Once you design your device:

- Launch a soft object like a cotton ball or a paper ball from your device multiple times and measure how far it travels each time.
- Launch paper or cotton balls of different weights and sizes from the device and measure how far each object travels.



Extended Challenge:

Build more than one device {the same or different design}. Launch the same object from each device and measure how far it travels. Share your best design with us.

Important Safety Precautions:

- Launch and test your device in an open level ground, perhaps in a garden under the supervision of an adult.
- Do not use sharp or heavy objects to test your device.
- Take all due precautions and ensure nobody is in the line of the device.

You can submit your final design digitally using [Presentation](#) software. You could also use the coding skills learnt in the main activity (Lever Fever) to create an animated presentation using [Scratch](#). The choice is your.