

# How to lift heavy objects with levers

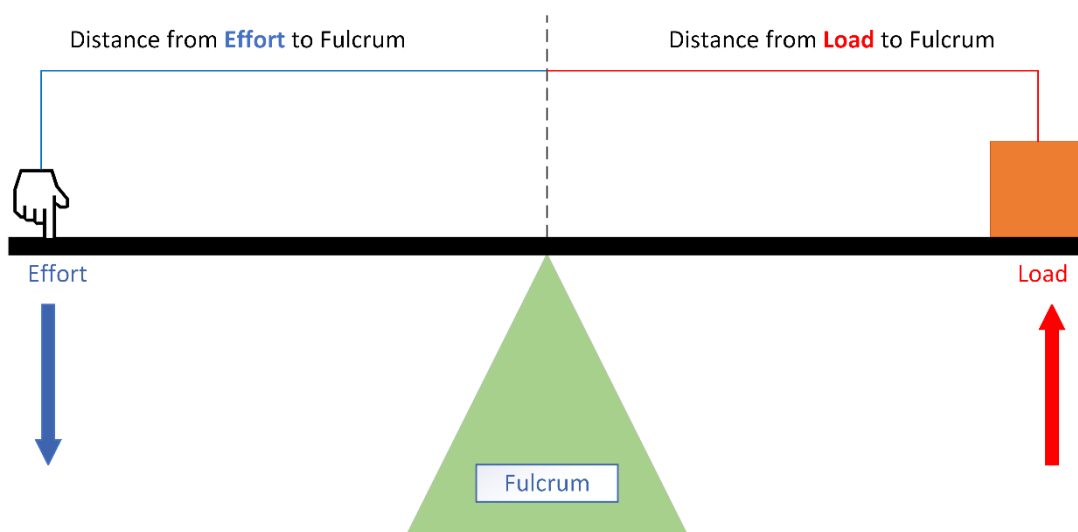
<p><b>Respective blueprint</b></p>	<p>"Kilonion" (Shantuf)</p>
<p><b>Description</b></p>	<p>In this pedagogical sequence students will learn about levers and how they are used to lower the power needed to lift heavy objects</p>
<p><b>Learning Objectives</b></p>	<p>Students will:</p> <ul style="list-style-type: none"> <li>- develop a basic understanding of how levers work</li> <li>- understand how levers lower the power needed to lift heavy objects</li> <li>- create a model of a Kilonion</li> </ul>
<p><b>Related curricular subject(s)</b></p>	<p>Physics, Technology, Mathematics</p>

<b>Prerequisites / preparatory actions for teachers</b>	Teachers should gather the materials for the blueprint
<b>Prerequisites / preparatory actions for students</b>	Have a knowledge of equations, be able to build objects
<b>Age of students</b>	12-18
<b>Duration</b>	2 hours
<b>Level of difficulty</b>	Medium

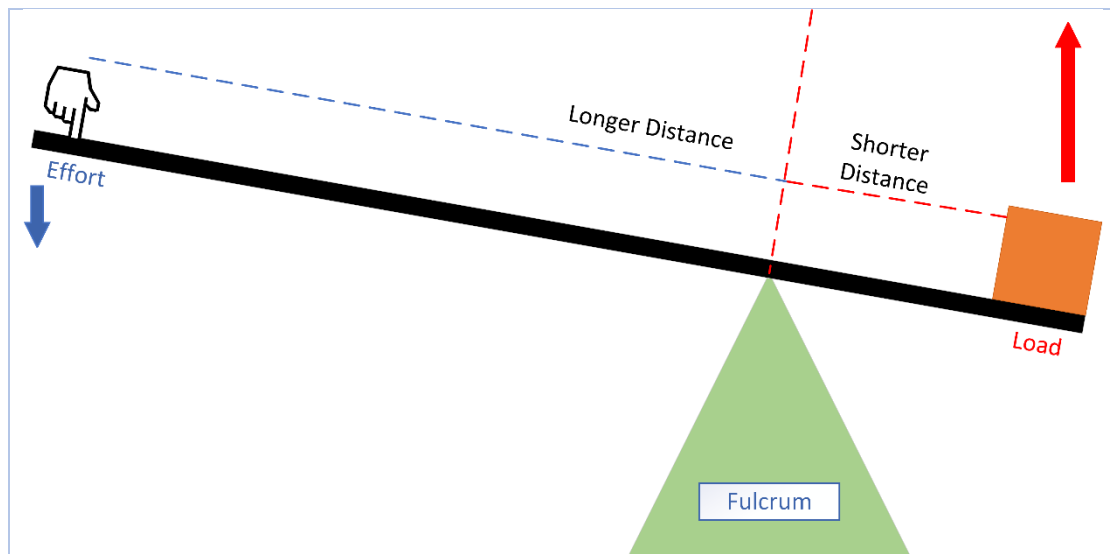
## Step by step description of the tasks

### Step 1: What is a lever?

A lever is a simple machine that has two parts: a rigid beam and a fulcrum, which move together. At each end of the beam, there is a lot of effort and a lot of load (force). The point where the beam turns is called the fulcrum, and it is where the beam meets the ground. When one end of the lever is moved, the other end is also moved. This will move something up. Levers work because they have a lot of torque. When an object is made to rotate around its axis, torque is the amount of force it takes to make it do so (or pivot point).



*Fig. 1 Basic parts of a lever showing the locations of the fulcrum, effort and load*



*Fig. 2 When the fulcrum is closer to the load, then less effort is needed to move the load*

**Activity 1:** Try to create a small lever in the class using objects like a pencil and a rubber or another object as the fulcrum and try to lift something a load by moving the fulcrum closer or farther from a load.

**Activity 2:** Introduce to the class everyday objects based on the principles of leverage

**Step 2: "Give me a place to stand on, and I will move the earth"**

Discuss with your students the above phrase and ask them to find who have said it.

Discuss with your students the law of the lever according to Archimedes

**Activity 3:** Ask our students to study resources like:

<https://www.youtube.com/watch?v=vUPyAnWSJEk>

<https://energyeducation.ca/encyclopedia/Lever>

to understand how levers work.

### **Step 3: Build the "Kilonion" (Shantuf)**

Students should build in teams of 3-4 different versions of the "Kilonion" and to present to the class. The materials could be provided by the teacher or they could be brought by the students.

### **Assessment activities**

**Assessment activity 1.** Ask the students to present their creations to the class.

**Assessment activity 2.** Students should search information about the three types of levers and should present information and images to the class.