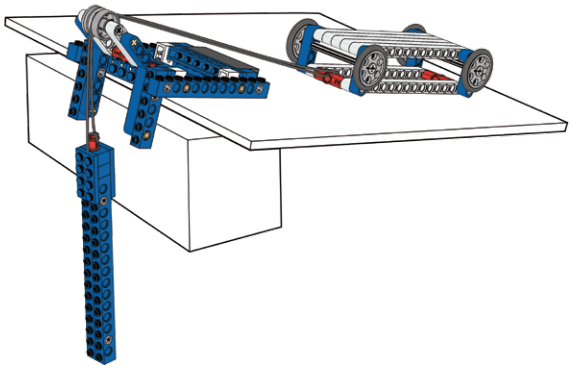
Ramp

Name(s): _____ **Date and Subject:** _____

Build the Box Frame, roller and effort weight

(Building Instruction 17A and 17B to page 11, step 15)



- Make sure the wheels on the Box Frame turn freely
- The Box Frame can be turned upside down, to be used as a sled, without the wheels. Or turned around again as a cart with wheels

Build the Ramp.

- Place a support so the top of the 30 cm (≈ 11.8 in) plank is situated 10 cm (≈ 3.9 in) off the floor
- Place the Box Frame on the Ramp and the roller at the top edge. Let the effort weight hang lose over the edge
- Have the 60 cm (≈ 23.6 in) plank ready to make changes to the Ramp

What is the advantage of using the Ramp?

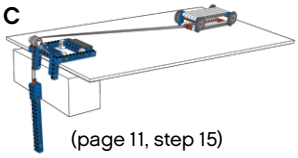
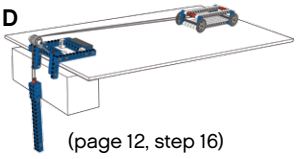
Investigate the difference between ideal and actual mechanical advantage.

First, calculate the ideal mechanical advantage and predict how much effort is actually needed to pull the Box Frame A to the top of the Ramp.

Then test how much effort is needed by adding LEGO® bricks to the effort weight and calculate the actual mechanical advantage.

Calculate the percentage of accuracy between the ideal mechanical advantage and the actual mechanical advantage.

Next, follow the same procedure for Box Frame B, C and D.

	Ideal mechanical advantage	My prediction of effort needed	Actual effort needed	Actual mechanical advantage	Percentage of accuracy
A  (page 11, step 15)					
B  (page 12, step 16)					
C  (page 11, step 15)					
D  (page 12, step 16)					

Redesign needed?

A Ramp can come in many shapes and sizes to match specific needs.

Now redesign the Ramp to make it the best in its class. We have highlighted some questions you could explore. Choose one area that you would like to investigate.

Then design a test that will help you explore how it functions and possible additional improvements you could make to your new Ramp. Remember to record all your test results.