

FORCES, WORK AND MACHINES

INTRODUCTION

A **machine** is a device that can decrease the force applied (or increase the force exerted) to reduce the work required to carry out certain tasks. Machines can have a wide range of complexity. We are going to focus on the simplest ones, known as the **simple machines**, like the **pulley**. Along the experiments you will check if the force required to carry out a particular work is reduced.

In order to measure and compare forces, you need a dynamometer, a measuring device you have already used in the previous lab practice.

MATERIAL

- Pulleys.

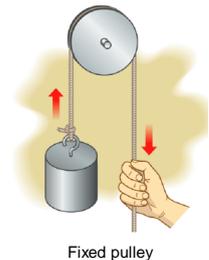
- Dynamometers.

- Weights (20, 50 g).

PROCEDURE

A. SIMPLE MACHINES.

Look for information on the internet, summarizing what simple machines consist on, their applications and examples. Focus your work on the pulley and write a paragraph about its characteristics and applications.



B. MEASURING FORCES WITHOUT PULLEYS.

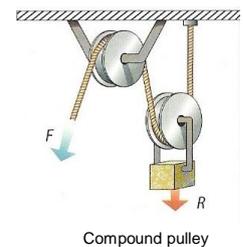
Before starting, check if the dynamometer starts in 0 N. Add 50 g and write down the value of the force. Then, repeat the process with 70, 100 and 120 g. Write down all the measurements.

C. MEASURING FORCES WITH A FIXED PULLEY.

Repeat the process from the previous stage, writing down the measurements.

D. MEASURING FORCES WITH A COMPOUND PULLEY.

Repeat the process from the previous stages.



RESULTS

1. Make a **table** with four columns, enter the masses you have used with the dynamometer and the forces you have measured for each mass in the three cases (without pulley, with fixed pulley and compound pulley).
2. From these data, draw a **force – mass graph**, representing the three results in the same graph.
3. Compare the results and **argue** whether the pulley, effectively decreases the force applied to perform the same work. Add your personal **opinion** about this experiment (procedure, handicaps, etc.).