

Simple Machines by Design Project (Gr. 3-8)

Goal:

This project seeks to give students practice at problem solving by designing simple machines and using measurement/data collection to improve those designs. Primary students will focus on the

problem/design/invent/test(measure)/redesign/retest rubric. For older, middle school students, a bit more content emphasis can be added by using the proper physics terminology.

You will need:

- one design kit for each pair of students (*see detailed parts list*)
- meter stick or tape for each pair of students
- elementary gram balance/masses for every three groups
- direction/data sheets for each pair of students
- each team needs something to write with

Pre-teaching - vocabulary:

force: causes something (a mass) to move

load: something (usually a mass) which takes some work to move

fulcrum: the pivot point of a lever

lever: a simple machine made up of a bar which pivots around one point

pulley: made up of a wheel and axle, a pulley can change the direction of a force

'class one' : the simplest example

Time/space involved: An hour of dedicated time per challenge allows briefing and debriefing time. Some flat desks or work tables are required for this activity. The teacher needs to establish design time limits as things evolve in the lab. Ten minutes of design/invent time are usually enough. If students are having trouble with design, they should walk around the room to learn from other groups. Learning from observation is essential to the process!