

Simple Machines: Levers & Mechanical Advantage

Name: _____ Date: _____

LEARNING OBJECTIVE

The student will build a simple lever and measure how changing the fulcrum position changes the force needed to lift a load.

MATERIALS NEEDED

- A sturdy ruler or wooden dowel/paint stick
- a pencil, small block, or eraser to use as a fulcrum
- a small weight (a cup of coins, a toy, or a book)
- a small kitchen or luggage scale (optional, or estimate by feel)
- paper
- pencil

HANDS-ON ACTIVITY

1. Place a pencil or small block under the center of a ruler to act as a fulcrum, creating a simple see-saw lever, and place the weight on one end.
2. Push down on the opposite end and notice how much effort it takes to lift the weight when the fulcrum is exactly in the middle.
3. Move the fulcrum closer to the weight (so the weight side is shorter) and push down on the long end again, noticing any change in effort required.
4. Move the fulcrum closer to your pushing hand (so your side is shorter) and try lifting the weight again, noting the effort required.
5. Record your observations for all three fulcrum positions, ranking them from easiest to hardest to lift the weight.

QUESTIONS

1. Which fulcrum position made it easiest to lift the weight, and which made it hardest?
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2. Explain, using the term 'mechanical advantage,' why a longer effort arm makes lifting easier.
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3. If you wanted to lift a very heavy object with the least possible effort using this same lever, where would you place the fulcrum?

4. Name one real-world tool that works as a lever, and identify its fulcrum, effort, and load.
