

Grade 8 Science - **Mechanical Advantage Worksheet**

Name: _____ Class: _____ Date: _____

From our work with the lever apparatus, we have proven the two ways of calculating Mechanical Advantage (MA) for Levers.

MA = $\frac{F \text{ (output force)}}{F \text{ (input force)}}$ - Use this one when you are using FORCE (N)

MA = $\frac{L \text{ (length of input arm)}}{L \text{ (length of output arm)}}$ - Use this one when you are using DISTANCE (m)

Use these formulas to calculate the mechanical advantage for the following problems.

1. A construction worker uses a board and log as a lever to lift a heavy rock. If the input arm is 3 meters long and the output arm is 0.75 meters long, what is the mechanical advantage of the lever?
2. A lever used to lift a heavy box has an input arm of 4 meters and an output arm of 0.8 meters. What is the mechanical advantage of the lever?
3. A lever with an input arm of 2 meters has a mechanical advantage of 4. What is the output arm's length?
4. A lever with an output arm of 0.8 meter has a mechanical advantage of 6. What is the length of the input arm?

5. A rake is held so that its input arm is 0.4 meters, and its output arm is 1.0 meters. What is the mechanical advantage of the rake?

6. A broom with an input arm length of 0.4 meters has a mechanical advantage of 0.5. What is the length of the output arm?

7. A child's toy rake is held so that its output arm is 0.75 meters. If the mechanical advantage is 0.33, what is the input arm length?

8. Betty wanted to lift up her entire family with a specially designed teeter-totter. She has a weight of 1600 N and her entire family has a combined weight of 30400 N. If she has a beam that is 20m long, where should she place the fulcrum?