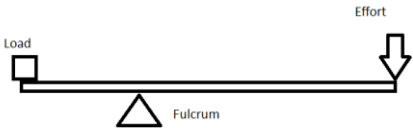
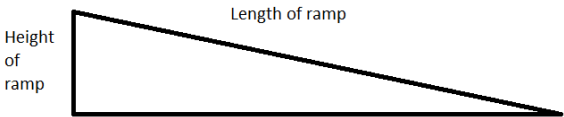
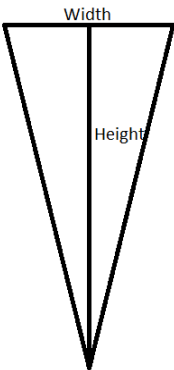
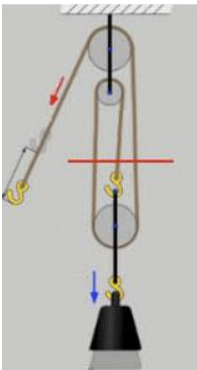


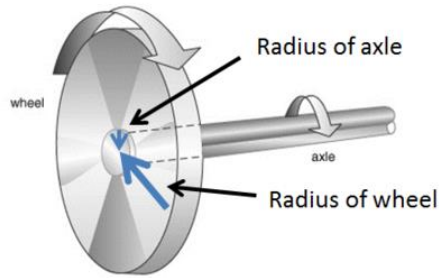
# Grade 8 Science – Mechanical Advantage of Simple Machines Answers

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

*We have already calculated Mechanical Advantage of Levers but there are 5 other simple machines. Each has the ability to make work easier using mechanical advantage. Your job is to find out through any means, how to calculate mechanical advantage for each of the rest of the machines.*

|                                                                                                                |                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>LEVER</b></p>           | <p>MA = EA ÷ LA - using arm length<br/>or<br/>MA = LF ÷ EF - using force</p>                                                                                                          |
| <p><b>Inclined Plane</b></p>  | <p>MA = length of ramp ÷ height of ramp<br/>or<br/>MA = force needed without ramp ÷ force needed with ramp.</p>                                                                       |
| <p><b>Wedge</b></p>         | <p>MA = Height ÷ Width<br/><br/>or<br/><br/>MA = load force ÷ effort force</p>                                                                                                        |
| <p><b>Pully</b></p>         | <p>MA = the number of supporting ropes (between load and upper pulley(s)).<br/>or<br/>MA = length rope pulled ÷ height load was raised.<br/>or<br/>MA = load force ÷ effort force</p> |

## Wheel and Axle



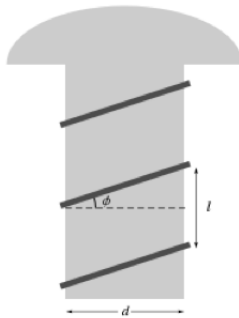
$$MA = \text{Radius of wheel} \div \text{Radius of axle}$$

or

$$MA = \text{load force} \div \text{effort force}$$

## Screw

|                        |                      |
|------------------------|----------------------|
| $MA = \frac{\pi d}{l}$ |                      |
| MA                     | mechanical advantage |
| $d$                    | diameter of screw    |
| $l$                    | lead of screw thread |

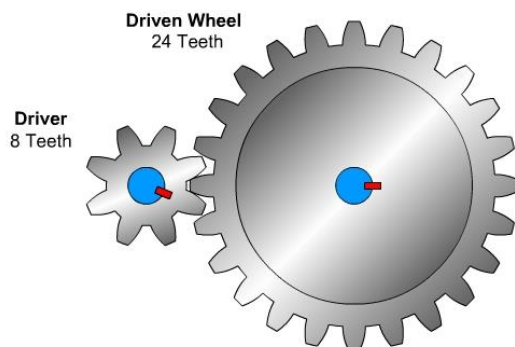


$$MA = \text{Circumference of screw} \div \text{pitch of screw}$$

or

$$MA = \text{load force} \div \text{effort force}$$

## Gears



$$MA = \text{teeth on driver} \div \text{teeth on driven}$$

or

$$MA = \text{diameter of driver} \div \text{diameter of driven}$$

or

$$MA = \text{load force} \div \text{effort force}$$