**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pd:\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Simple Machines/Mechanical Advantage/Efficiency**

Essential Questions**:** \_\_\_\_\_\_\_\_\_ **how simple machines, such as inclined planes, pulleys, levers and wheel and axles, *are used to create mechanical advantage and increase efficiency*.**

Work is done when a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and moves it a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Work = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* The unit for work is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (N· m)
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is done if the object \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ travel a distance

Definitions:

Energy:

Work:

Force:

**WORK PROBLEMS:**

How much work is being done by a weightlifter below that applies 1000 Newtons of force but does not move the mass?

How much work is being done by a weightlifter below that applies 500 Newtons of force lifting a mass 2.0 meters?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is done if the object \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ travel a distance

**According *to the scientific definition*, what is work and what is not?**

* + a teacher lecturing to her class WORK NOT WORK
	+ a mouse pushing a piece of cheese with its nose across the floor WORK NOT WORK
	+ A scientist delivers a speech to an audience of his peers. WORK NOT WORK
* A body builder lifts 350 pounds above his head. WORK NOT WORK
* A mother carries her baby from room to room. WORK NOT WORK
* A woman carries a 20 kg grocery bag to her car?

**MECHANICAL ADVANTAGE**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = how many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ force you get out of a simple machine

**Mechanical Advantage**

**MA = (Fout)/(Fin)**

Simple machines\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ themechanical advantage

Machine

w/

6 M.A.

**EXAMPLE:** A mechanical advantage of 6 means the machine outputs 6 times more force

10 N in

\_\_\_\_\_\_\_\_\_ out

**Mechanical Advantage: What does it mean?**

Mechanical Advantage = \_\_\_\_\_

* ***There is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to using the machine***

Mechanical Advantage \_\_\_\_\_\_\_\_

* **The machine makes work \_\_\_\_\_\_\_\_\_\_\_\_\_**

Mechanical Advantage \_\_\_\_\_\_\_

* ***The machine makes work \_\_\_\_\_\_\_\_\_\_\_\_***

**Efficiency**

*Some output work is lost due to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of work input to work output is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What would improve the efficiency of a machine?(Hint: What reduces friction?)

**Simple Machines**

A device that helps make \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to perform by accomplishing one or more of the following functions:

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_from one place to another,
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a force,
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a force, or
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or speed of a force.

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 **6 Simple Machines**

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| WHEEL & AXLEHas a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ secured to a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, called an axle. * When \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the wheel or axle \_\_\_\_\_\_\_\_\_\_\_\_\_\_, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. One full \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of either part \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_one full revolution of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_part.
 |
| EXAMPLES OF WHEEL & AXLE (INCLUDE NAME & DRAWING) |

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| LEVERS* A rigid bar that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ around a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* The bar may be either \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* In use, a lever has both an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) force and a \_\_\_\_\_\_\_\_\_ (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ force).
* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ force moves; NOT the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ force
 | Lever1stclass |
| EXAMPLES OF LEVERS (INCLUDE NAME & DRAWING) |

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| PULLEYConsists of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.* A pulley can be used to simply \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a force or to gain a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, depending on how the pulley is arranged.
* A pulley is said to be a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_pulley if it \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rise or fall with the load being moved.
	+ A fixed pulley \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a force; however, it \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ create a mechanical advantage.
* A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_pulley \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_ with the load that is being moved. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ moveable pulley \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a mechanical advantage; however, it \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ change the direction of a force.
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| EXAMPLES OF PULLEYS (INCLUDE NAME & DRAWING) |

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| INCLINED PLANEis an even \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_surface (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_). * The inclined plane makes it \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a weight from a lower to higher elevation.
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| EXAMPLES OF INCLINED PLANES (INCLUDE NAME & DRAWING) |

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| WEDGEis a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plane. Wedges are used as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ devices.  |
| EXAMPLES OF WEDGES (INCLUDE NAME & DRAWING) |

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| SCREWAlso a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plane. * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the screw are like a type of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (or \_\_\_\_\_\_\_\_\_\_\_\_\_ plane)
 |
| EXAMPLES OF SCREWS (NAMES & DRAWINGS) |