**Simple Machine Notes**

I. Types of **Simple Machines**

 **A. Levers** – have a fulcrum, an effort arm, and a resistance arm.

 1. Three types of levers are: FRE

 a. **1st class** –

 

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 Ex. – hammer pulling nails, prying with a screwdriver, crowbar, seesaws

 b. **2nd class** –

 

 Ex. - doors, wheelbarrow

 c. **3rd class** –

 

 Ex. – brooms, hoe, baseball bat, fishing rod

 2. Torque is force applied to the lever causing it to turn or rotate.

 a. Effort torque = effort arm x effort force

 b. Resistance torque = resistance arm x resistance force

 B. **Pulleys** – Has a rope around a pulley(s) that is pulled to move an object.

 Ex. - flag poles, cranes, window blinds

 C. **Wheel-and-axles** - When one shaft is turned and it turns

 another shaft/wheel/gear.

 Ex. screwdriver, pencil sharpener, gears, winches

 D. **Inclined plane** – Ramp that forms a right angle to the

 ground

 Ex. - wheelchair ramp, on-off ramps, overpasses

 E. **Screw** - An inclined plane wrapped around a post.

 Ex. - jar lids, wood screws, switchbacks

 F. **Wedges** - A double inclined plane forming a point

 Ex. – doorstop, any blade, scissors, etc.

II. All simple machines can be classified as either a lever or an inclined plane.

 A. Pulleys and wheel-and-axles could be classified as circular levers with the axle being the fulcrum.

 B. Screws and wedges are modified inclined planes.

III. Compound machines are machines that combine 2 or more simple machines.

 Ex. – bicycle, scissors

IV. Mechanical Advantage - how many times a machine

 multiplies the effort force.

 A) Ideal mechanical advantages - the mechanical advantage of a machine if there were no friction or loss of energy.



 B) Actual mechanical advantage - the MA with friction

