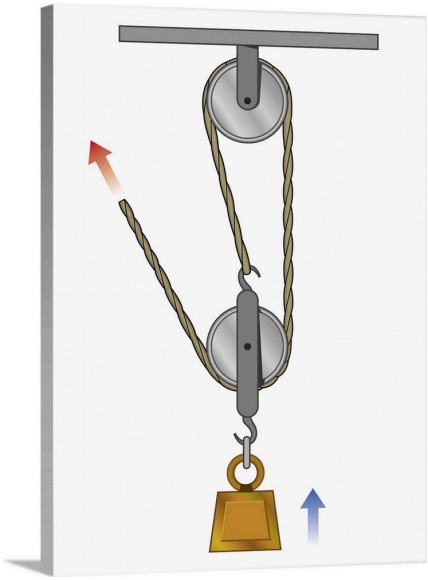
Name_____

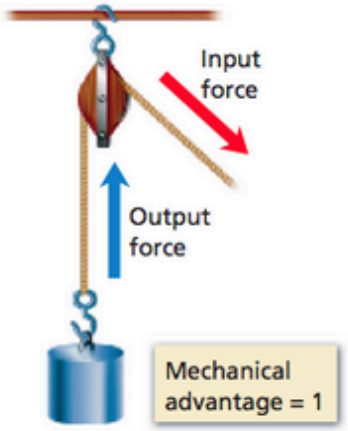
Unit 1- Worksheet 3:
Simple Machine Three
The pulley



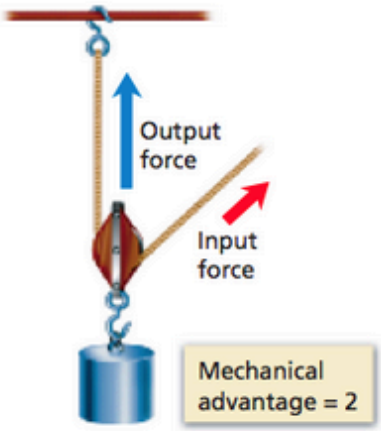
A pulley is a simple machine that consists of a rope, piece of string, twine, or cord that is free to move on one end and is attached to a fixed point on the other end. The **mechanical advantage** of a pulley is based on the number of ropes that support the moveable pulley

<u>Three types of pulleys</u>

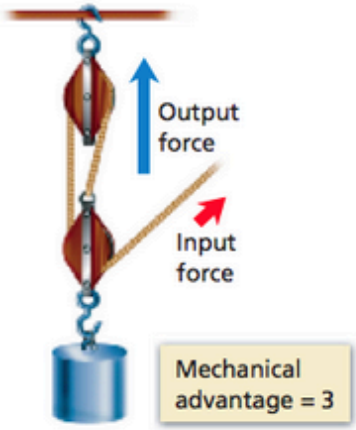
Fixed Pulley
A fixed pulley does not change the amount of force applied. It does change the direction of the force.



Movable Pulley
A movable pulley increases the amount of force applied. It does not change the direction of the force.

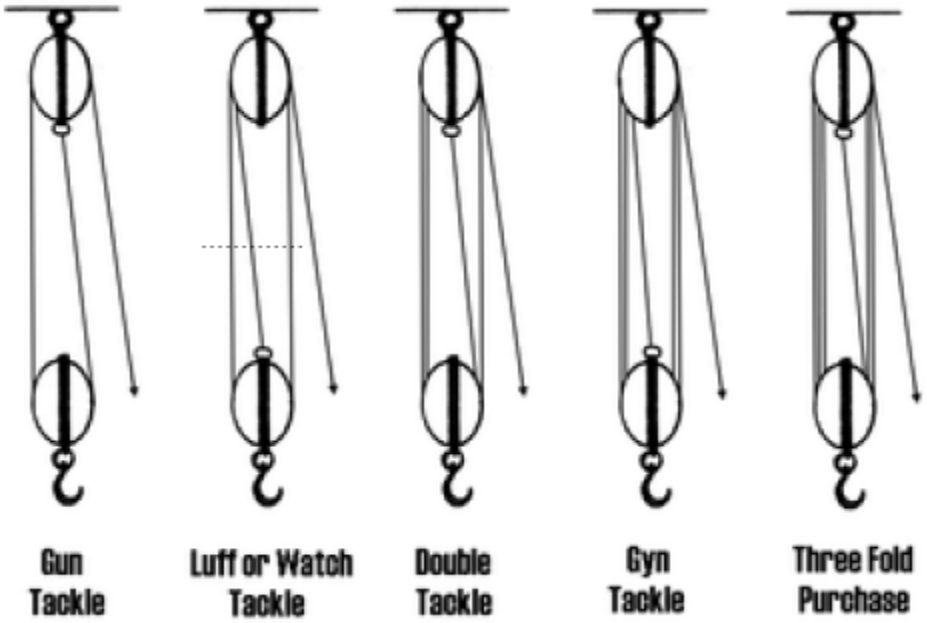


Block and Tackle
A block and tackle is a pulley system made up of fixed and movable pulleys.



The IMA of a pulley is equivalent to the number of support strands holding up the load. Example, a luff tackle has an IMA of 3, a dotted line is run through the 3 support strands. The fourth line is applying the effort force, but does not directly support the weight of the load.

1. Which of the block and tackle systems has the **<u>greatest</u> mechanical advantage.** Explain why in a written statement.



2. A person applies a force to the effort rope on a pulley. From the 5 pulleys shown above, which pulley will require the most pulling distance? Explain why.

3. A double tackle pulley is used to lift a 200 pound load. What is the required effort force if it is a perfect frictionless pulley?

50^{lb}

4. An ideal pulley lifts a 400 pound load using only 50 pounds of force.
    a. What is the mechanical advantage of this pulley? Explain how you know

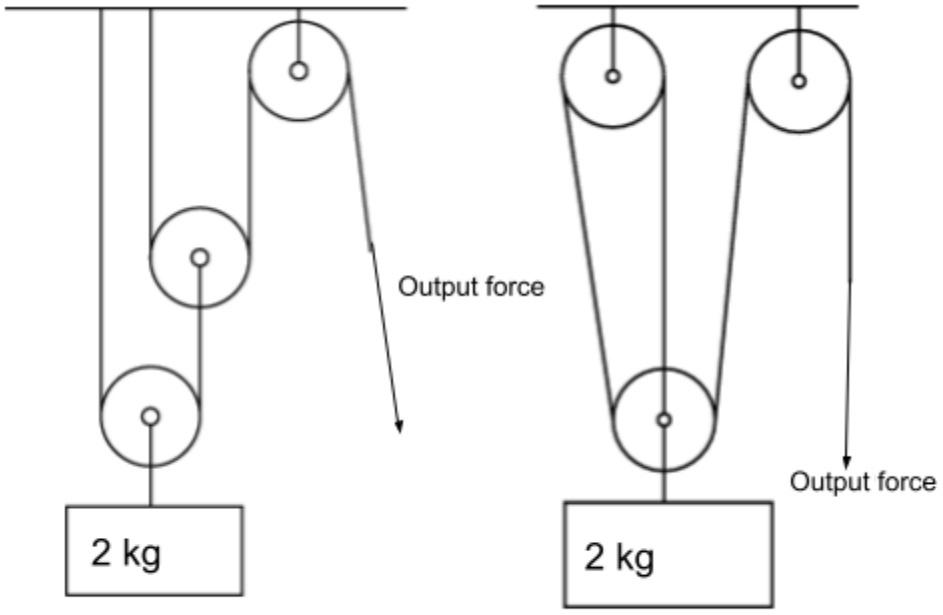
    b. If the effort was applied over 32 feet, how far was the load lifted? Show your work & write out your thought processing.

5. A gyn tackle block is used with an effort of 35 pounds to support the weight of the load.
    a. How much weight does each strand need to support?

    b. How heavy is the load?

175^{lb}

6. The image below shows two pulley systems. Which one will require a larger force to pull up the 2 kg block. Justify your answer.



Pulley System 1 Pulley System 2