

Name _____

Investigating Pulleys

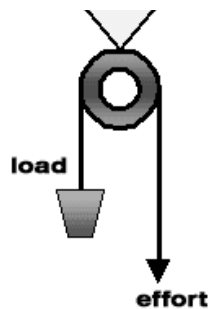
Question: How does the type of pulley system affect the mechanical advantage provided by the pulley?

Hypothesis: Use a complete sentence to make a hypothesis for the above question.

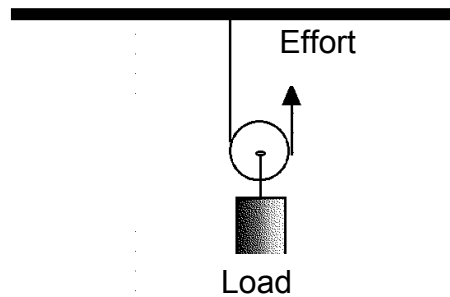
Background Information:

A pulley system is another type of simple machine. It is made up of a grooved wheel and a rope or line. Like a lever, it provides a MECHANICAL ADVANTAGE in lifting a heavy load.

There are two basic types of pulleys. When the grooved wheel is attached to a surface it makes a FIXED PULLEY. The benefit of a fixed pulley is that it *changes the direction of the required force*. For example, to lift an object from the ground, the effort would be applied downward instead of pulling up on the object. However, a *fixed pulley provides no mechanical advantage*. The same amount of force is still required, but is applied in different direction.



Another type of pulley, called a **MOVABLE PULLEY**, consists of a rope attached to a surface. The pulley moves along the rope. The wheel supports the load, and the effort comes from the same direction as the rope attachment. *A movable pulley reduces the effort required to lift a load.*



These two types of pulleys can be combined to form **DOUBLE PULLEYS**, which have at *least two wheels*. There are different combinations that can result in a double pulley. As the pulley becomes more complex, the total lifting effort decreases. For example, a system made of a fixed pulley and a movable pulley would reduce the workload by a factor of two, because the two pulleys combine to lift the load.

Procedure:

1. Build a single fixed pulley system.
2. Use the spring scale to find the effort needed to lift the load.
3. Record in the data chart.
4. Build a single movable pulley system.
5. Use the spring scale to find the effort needed to lift the load.
6. Record in the data chart
7. Build a single fixed / single movable pulley system.
8. Use the spring scale to find the effort needed to lift the load.
9. Record in the data chart
10. Build a different single fixed / single movable pulley system.
11. Use the spring scale to find the effort needed to lift the load.
12. Record in the data chart

Data:

Pulley System	Number of Pulleys	Direction of Effort/Force	Load in Newtons	Effort/Force in Newtons
Single Fixed				
Single Movable				
Single Fixed / Single Movable				
Single Fixed / Single Movable				

Analyze Data:

Make a *Bar Graph* to show the pulley system data – the type of pulley and the effort it takes to lift the load. Remember title, labels, correct units of measurement, and spacing.

What relationship does the data show?

