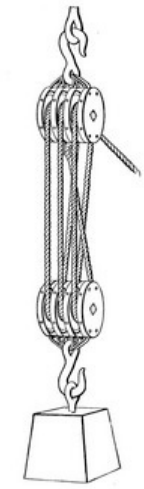
Name: _____ Partner(s) _____Date: _____

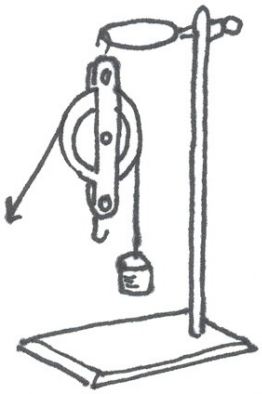


Pulley Activity

Purpose: To explore the mechanical advantage provided by different pulley systems. You will be examining different pulley configurations to help you understand the concept of Mechanical Advantage (MA).

Materials: ring stand, pulleys, string, spring scale, weight, meter stick

Procedure:



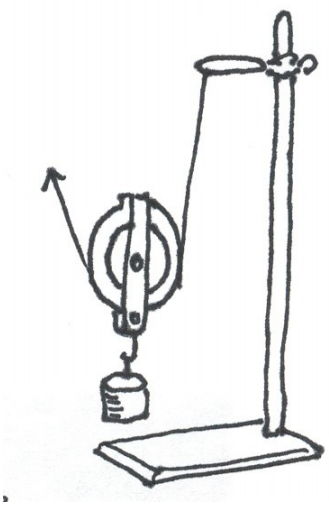
#1: Single Fix Pulley

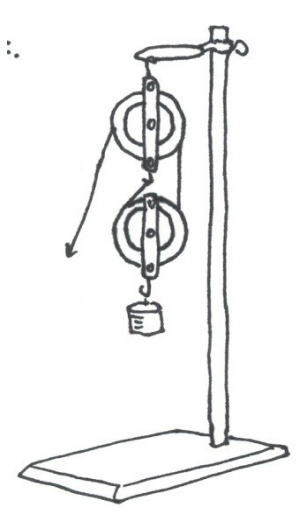
1. Use spring scale to determine the object's weight .
2. Setup pulley as shown.
3. Use the spring scale to measure the force required to lift the weight.
4. Count the number of strings pulling in the upward direction.
5. Measure the height the object moves versus the distance the spring scale moves.
6. Calculate AMA and IMA

.

#2: Single Moveable Pulley

1. Use spring scale to determine the object's mass.
2. Setup pulley as shown.
3. Use the spring scale to measure the force required to lift the weight.
4. Count the number of strings pulling in the upward direction.
5. Measure the height the object moves versus the distance the spring scale moves.
6. Calculate AMA and IMA.



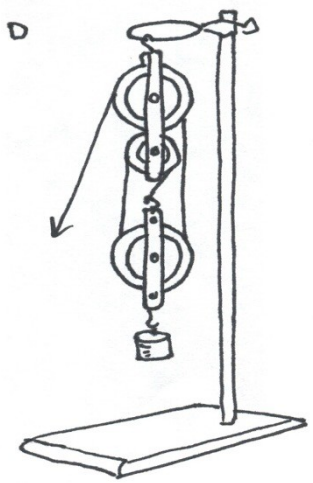


#3: Single Fixed, Single Moveable

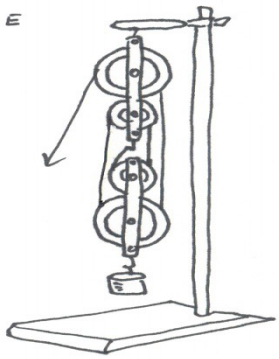
1. Use spring scale to determine the object's mass .
2. Setup pulley as shown.
3. Use the spring scale to measure the force required to lift the weight.
4. Count the number of strings pulling in the upward direction.
5. Measure the height the object moves versus the distance the spring scale moves.
6. Calculate AMA and IMA.

#4: Double Fixed, Single Moveable

1. Use spring scale to determine the object's mass.
2. Setup pulley as shown.
3. Use the spring scale to measure the force required to lift the weight.
4. Count the number of strings pulling in the upward direction.
5. Measure the height the object moves versus the distance the spring scale moves.
6. Calculate AMA and IMA.



#5 Double Fixed, Double Moveable



1. Use spring scale to determine the object's mass.
2. Setup pulley as shown.
3. Use the spring scale to measure the force required to lift the weight.
4. Count the number of strings pulling in the upward direction.
5. Measure the height the object moves versus the distance the spring scale moves.
6. Calculate AMA and IMA.

#6 Triple fixed, Double Moveable

1. Use what you have learned in #1 - #5 to set up a triple fixed and double moveable system. Complete the data table.

#7 Triple Fixed, Triple Moveable

1. Use what you have learned in #1 - #5 to set up a triple fixed and triple moveable system. Complete the data table.

1. The law of conservation of energy states that in a closed system the total energy is constant. In other words, energy is neither created nor destroyed. When using a simple machine, you use less force. What do you have to do more of in exchange?

2. How does a pulley system demonstrate conservation of energy?

3. A pulley is an example of a simple machine. Many simple machines are useful because they allow the user to lift a heavy weight using less force than it would take to lift the weight directly. The mechanical advantage of the machine is a measure of this benefit.

4. Explain why the number of supporting ropes determines the mechanical advantage?

5. Why can you count a section of rope you are pulling up on, but not a section you are pulling down on?

6. How does friction affect the mechanical advantage of a pulley system?

Pulley Configuration	# Strings Going Up	Object Weight (N)	Force Required to Lift Weight (N)	AMA	Height Lifted (cm)	Length of String Pulled (cm)	IMA
#1. Single Fixed							
#2. Single Moveable							
#3. Single Fixed, Single Moveable							
#4. Double fixed, Single Moveable							
#5. Double Fixed, Double Moveable							
#6. Triple Fixed, Double Moveable							
#6. Triple Fixed, Triple Moveable							