

Iona Prep Conceptual Physics Lab:

The Mechanical Advantage of Pulley Systems (Using Data Studio)

Simple machines may be used to change the direction of an applied force or to multiply the applied force by a factor. Depending upon the configuration, the factor may be greater or less than 1.

The Pulley is one example of a simple machine.

Today you will examine pulleys in various configurations.

Procedure:

1. Attach the force sensor to the computer, Run Data Studio Zero the force sensor before attaching the red string. Then set up the red string as indicated in the pictures for system 1. Record the sensor reading.

Reading 1: _____ Newtons

2. Reset the red string as indicated in the pictures for system 2. Record the sensor reading.

Reading 2: _____ Newtons

3. Reset the red string as indicated in the pictures for system 3. Record the sensor reading.

Reading 3: _____ Newtons

The Mechanical Advantage of a simple machine is defined as the ratio of the Effort/Resistance.

In this case the Resistance is always Reading 1.

For system 1 the Mechanical Advantage is Reading 1/Reading 1. Calculate that value.

For system 2 the Mechanical Advantage is Reading 1/Reading 1. Calculate that value.

For system 3 the Mechanical Advantage is Reading 2/Reading 1. Calculate that value.

Conclusion:

The Mechanical Advantage of System 1 = ____

The Mechanical Advantage of system 2 = ____

The Mechanical Advantage of system 3 = ____

Detailed Drawings of the three systems:

System 1:

Top detail



Bottom Detail



System 2

Top detail



Bottom Detail



System 3

Top detail



Bottom Detail

