

# SIMPLE MACHINES

## Description:

Participants will be asked to identify, use and answer questions about simple machines.

Number of Participants: 2

Approximate Time: 45 minutes

## The Competition:

Each participant will move from one station to another for up to 15 stations. Each station will contain a picture or example of a simple machine. The student will be asked to identify the machine and answer a question about it, or use equipment to measure some variable such as length, force or weight.

The simple machines involved are:

1. Lever
2. Inclined Plane
3. Pulley
4. Screw
5. Wheel and Axle
6. Wedge

Students must move at the indicated time to ensure that all teams have equal opportunity to use the equipment at each station (2 minutes per station). An answer sheet will be provided.

## Scoring:

The scoring of the event will be based on the number of correct responses.

## Sample Questions:

There is a drawing or a sample of a lever at a station. The student will be asked:

1. What simple machine is being used?
2. The point of support on this simple machine is called \_\_\_\_\_?
3. What is the length of the effort arm in centimeters? \_\_\_\_\_

There is a setup of an inclined plane with a mass on it and a meter stick available.

1. What simple machine is being used?
2. Calculate a problem knowing that work equals force times distance.

# SIMPLE MACHINES (advanced)

## Description:

Participants will identify, use and answer questions about simple machines.

Number of Participants: 2

Approximate Time: 30 minutes

## The Competition:

Participant(s) will move between stations containing pictures or examples of devices made up of one or more simple machines. Teams must move at the time indicated by the event supervisor to ensure that all teams have equal opportunity to use the equipment at each station (e.g. 2 minutes per station).

At each station they will answer questions about the device. The first question at each station will be: Which simple machines are contained in the device? Check all that apply.

Lever  Inclined Plane  Pulley  Screw  Wheel & Axle  Wedge

Additional questions may ask them to identify parts of the simple machines (e.g. load, effort, fulcrum), to use equipment to measure some variable(s) such as length, force or weight and/or to demonstrate their understanding of the following relationships as they apply to each type of simple machine. They will not be required to know the formulas or perform calculations.

Work = Force X Distance

Mechanical Advantage = Distance moved by effort / Distance moved by load

## Scoring:

Question #1 at each station will be worth 6 points. One point will be deducted for each type of simple machine the device contains that is not checked or is incorrectly checked. Point value for additional questions will be based on their difficulty/complexity. The team with the highest total points for all stations will win.

## Sample Stations:

STATION 1: (The station contains two levers)

1. Which simple machines are contained in the device? Check all that apply.

Lever  Inclined Plane  Pulley  Screw  Wheel & Axle  Wedge

2. The point marked with an "A" on this simple machine is called ?

3. Which of these levers has the greatest Mechanical Advantage ?

