

## Force Diagrams

This activity was created by Robyn.

Investigating the forces that act on objects allows us to identify where the **Center of Gravity** is on any given object. Investigating forces that act on objects also allow engineers to make huge structures that we use every day.

We investigate these forces using force diagrams. Force diagrams use arrows, often referred to as **vectors**, to indicate direction and magnitude of a force.

### Center of Gravity:

An imaginary point on an object or body that the total weight is concentrated to.

### Vectors:

Arrows that represent the direction and strength of a force. A longer arrow represents a stronger force. The point of the arrow shows the direction in which the force is being applied.

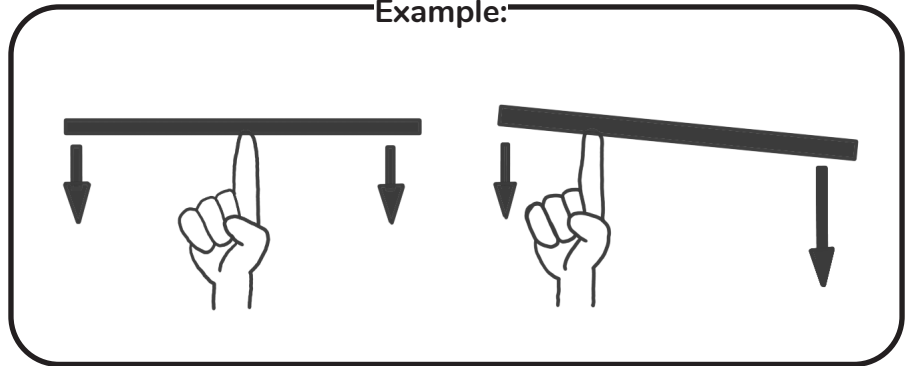
### Direction:

Direction of a vector indicates the way in which the vector is moving or pointing.

### Magnitude:

Magnitude of the vector indicates the size or strength of the vector.

### Example:



Try this example out with your finger and a ruler!

Below and on the following page there are several objects that have forces acting on them, or have internal forces acting on other objects.

On some objects the vectors have arrows but no direction and on others, the vectors have directions but no magnitude, and SOME have neither.

Complete and/or draw the vectors - and check your answers!

### LEVEL 1:

Draw the arrow head to indicate direction of the force on the black vector



Date: \_\_\_\_\_

Name: \_\_\_\_\_

**LEVEL 2:**

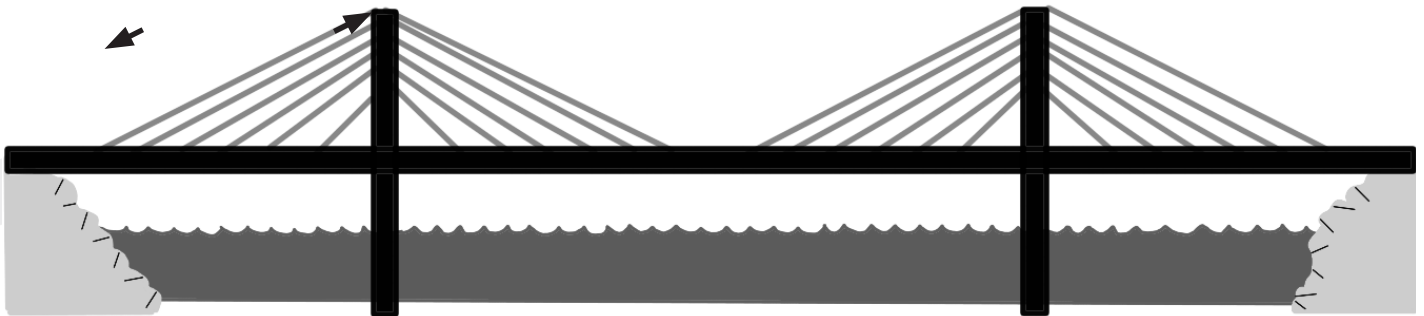
Draw the vectors.

*Hint: Refer back to the example on the previous page*



**LEVEL 3:**

Draw the vectors on the cables of this cable bridge. There is one example drawn for you. Do you think they will all be the same?



**LEVEL 4:**

Draw the vectors on this suspended climber. Think about the forces within the rope (refer to cable forces in level 3) and think about the forces pulling the climber down (refer to balance forces in level 2).

