

Force Diagrams

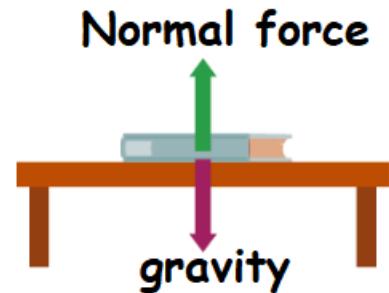
A force diagram is a drawing that shows the different forces acting on an object.

This object can be at rest (stationary) or a moving object.

* stationary or at rest means not moving.

KEY POINTS:

- Forces work in pairs and in opposite directions.
- Multiple (many) forces act on an object at the same time.
- The size and direction of these forces determine the movement of the object.
- We can show the different forces acting on an object by using a force diagram.
- The arrows used in a force diagram will show us:
 - 1. the direction of the force and 2. the size of the force.



The size of the arrow shows us the strength of the force.

The longer the arrow the bigger the force.

BALANCED FORCES

Balanced forces: two forces of the same size acting on an object in opposite directions.

In this picture the **green** arrow is pointing upward (upthrust)

The **purple** arrow is pointing downwards. (gravity)



Both arrows are **equal in length** and in **opposite directions** which means that these forces are balanced.

This means that the boat is at rest (stationary).

-When **balanced forces** act on a stationary object, the object **remains at rest**. (does not move)

-When **balanced forces** act on a moving object, this object **will continue moving in the same direction and the same speed**.

Friction

Applied force by the engine of the car



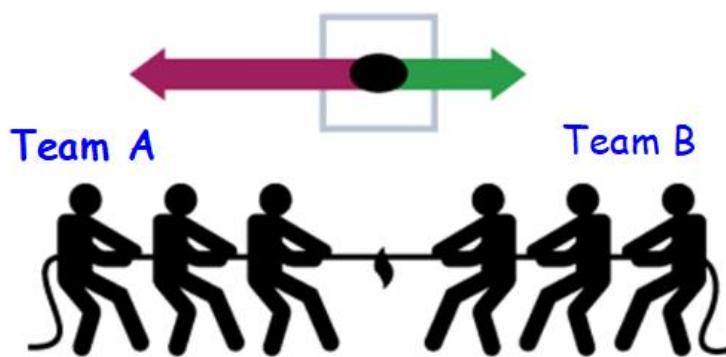
The car is traveling in the same direction at the same speed.

UNBALANCED FORCES



left

right



In this diagram, you can see that the purple arrow is longer than the green arrow.

This means that the force exerted by Team A is greater than the force exerted by Team B so the movement will be to the left towards Team A.

Unbalanced forces: two forces of **different size** acting on an object **in opposite directions**.

-When an **unbalanced force** acts on a **stationary object**, the object **starts to move**.

-When an **unbalanced force** acts on a **moving object**, it will either **change the object speed or direction** or **change the speed and the direction**.



The upward forces exerted by the engine of the rocket is greater than gravity, the rocket will speed up and move upward.