Introduction to **FORCES**

When you ride a bike, your foot **PUSHES** against the pedal. The push makes the wheels of the bike move. When you drop something, it is **PULLED** to the ground by gravity.

A **FORCE** is a **PUSH** or a **PULL** in a particular **DIRECTION**.

**FORCES AFFECT HOW OBJECTS MOVE.**

Forces can affect motion in the following ways:
- i) START MOVING
- ii) MOVE FASTER
- iii) MOVE SLOWER
- iv) STOP MOVING
- v) CHANGE DIRECTION
- vi) CHANGE SHAPE

Since forces cause changes in **SPEED** or **DIRECTION** of an object, we can say that forces change **VELOCITY**, so….

**FORCES**

More than one force can act on an object at one time. What happens to the object when forces act depends on 2 things:

1) **Strength** of the Forces
2) **Direction** of the Forces

**MEASURING FORCE**

The strength of a force is measured in **NEWTONS**.

The symbol is (N).

We use a **SPRING SCALE** to measure force.

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**FORCES**

Identify each picture as a **PUSH** or a **PULL**. Is the force causing a change in speed or direction or both?

**FORCES**

When 2 or more forces act on an object, the forces **combine** to form a net force.

**FORCES**

If the forces **cancel each other out**, and do not cause the object to move, the forces are said to be **BALANCED**.

If the forces **don’t cancel each other out** – 1 force is stronger than the others – the forces are **UNBALANCED** and will cause a **CHANGE IN MOTION**.

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We use a **SPRING SCALE** to measure force.
**MEASURING FORCE**
- Always "zero" your balance before use.
- Pull gently and with constant force.
- Practice using your spring scale to drag items across your desk.

**COMBINING FORCES**
Two forces in the same direction can add together to produce a larger net force.

\[ 5 \text{ N right} + 5 \text{ N right} = 10 \text{ N right} \]

**COMBINING FORCES**
Two forces in opposite directions can subtract to produce a smaller net force in the direction of the larger force.

\[ 5 \text{ N right} - 10 \text{ N left} = 5 \text{ N left} \]

**COMBINING FORCES**
Two forces may cancel each other out (if equal and opposite) to produce NO NET FORCE.

\[ 5 \text{ N right} - 5 \text{ N left} = 0 \text{ N} \] (No Net Force)

13) Two movers are trying to move a heavy box. One mover pushes to the right with a force of 150 N. The other mover pushes to the left with a force of 200 N.
   a) Draw & label the forces on the diagram.
   b) What is the net force? **400 N LEFT**
   c) Will the box move? **YES**
   d) If yes, in what direction? **LEFT**

14) Two movers are trying to move a heavy chair. One mover PULLS to the left with a force of 200 N. The other mover PUSHES to the left with a force of 150 N.
   a) Draw & label the forces on the diagram.
   b) What is the net force? **400 N LEFT**
   c) Will the chair move? **YES**
   d) If yes, in what direction? **LEFT**

15) Four children are fighting over the same toy. Mike is pulling North with a 50 N force, Justin is pulling East with a 40 N force, Chantal is pulling South with a 50 N force, and Tykera is pulling West a 30 N force.
   a) Draw & label the forces on the diagram.
   b) Is there a net force on the toy? **YES = 10 N EAST**
   c) In which direction will the toy move? **EAST**
   d) Who gets the toy? **JUSTIN**