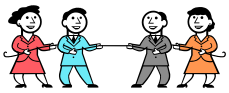
Introduction to

FORCES



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 PULL in a particular DIRECTION.

FORCES

FORCES AFFECT HOW OBJECTS MOVE.

Forces can affect motion in the following ways: They can make objects:

BIG SCIENCE IDEA

i) START MOVING
ii) MOVE FASTER
iii) MOVE SLOWER
iv) STOP MOVING
v) CHANGE DIRECTION
vi) CHANGE SHAPE

FORCES

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

FORCES

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

Forces cause
ACCELERATION.

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:

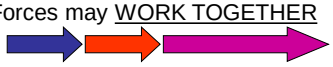
1) Strength of the Forces

2) Direction of the Forces

FORCES

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

Forces may WORK TOGETHER



or OPPOSE each other.

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.

MEASURING FORCE

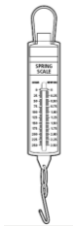
The strength of a force is measured in NEWTONS.

The symbol is (N).

We use a SPRING SCALE to measure force.

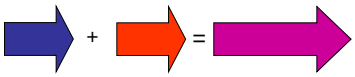
MEASURING FORCE

- 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

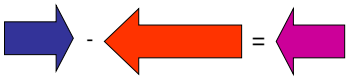
Two forces in the <u>same direction</u> can <u>add</u> together to produce a larger net force.



5 N right + 5 N right = 10 N right

COMBINING FORCES

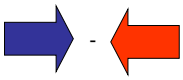
Two forces in <u>opposite directions</u> can <u>subtract</u> to produce a smaller net force in the direction of the larger force.



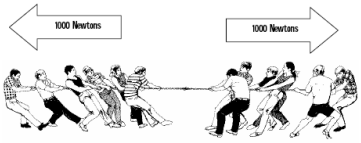
5 N right - 10 N left = 5 N left

COMBINING FORCES

Two forces may <u>cancel each other out (if equal and opposite)</u> to produce NO NET FORCE.

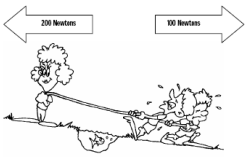


5 N right - 5 N left = 0 N (No Net Force)



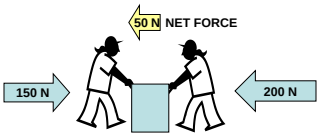
Circle the best answer:

1) The forces shown above are PUSHING / PULLING forces.
2) The forces shown above are WORKING TOGETHER / OPPOSITE FORCES.
3) The forces shown above are EQUAL / NOT EQUAL.
4) The forces DO / DO NOT balance each other.
5) The net force is 1000 N TO THE RIGHT / 1000 N TO THE LEFT / ZERO.
6) There IS / IS NO motion.



Circle the best answer:

7) The forces shown are PULLING / PUSHING forces.
8) The forces shown are WORKING TOGETHER / OPPOSITE FORCES.
9) The forces shown are EQUAL / NOT EQUAL.
10) The forces DO / DO NOT balance each other.
11) The stronger force is pulling RIGHT / LEFT.
12) Motion is the to the RIGHT / LEFT.



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? **50 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 200 N.

a) Draw & label the forces on the diagram.

b) What is the net force?

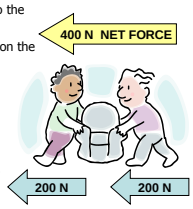
400 N LEFT

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