

DESCRIBING FORCES

Use the resources on Mr. Hanna's website to complete the following assignment.

VOCABULARY:

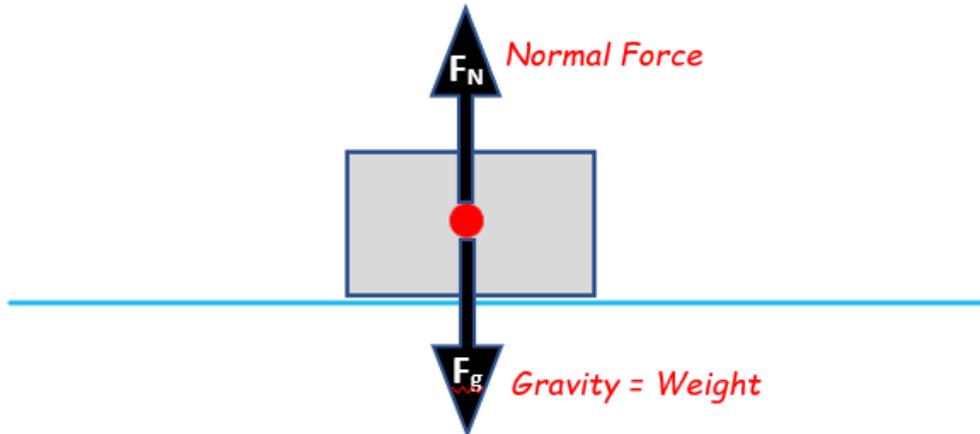
- 1) FORCE – *a push or pull on an object*
- 2) NET FORCE - *overall force on an object (the sum of all the forces)*
- 3) UNBALANCED FORCES – *the net force does NOT equal zero*
- 4) BALANCED FORCES – *the net force equals zero*
- 5) APPLIED FORCE – *a force which is applied to the object by another object*
- 6) GRAVITY – *attractive force between any two objects with mass*
- 7) NORMAL FORCE – *a force which opposes gravity when an object is resting on a surface*
- 8) FRICTION – *the force that one surface exerts on another when the two rub against each other*

SHORT ANSWER:

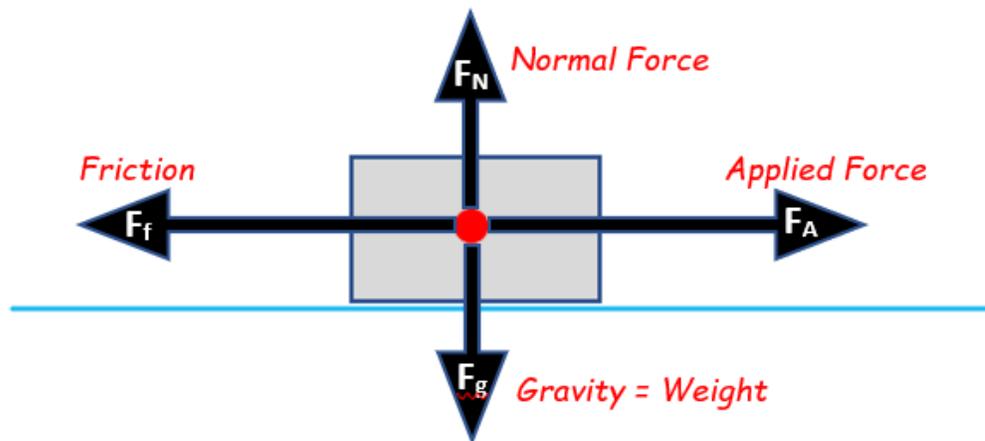
- 9) How are forces described (two pieces of information)?
Forces are described by their strength (in Newtons) and their direction.
- 10) Compare contact forces with non-contact forces and give examples of each.
Contact forces act on an object through direct contact while non-contact forces can act on an object at a distance (without "touching" it)
- 11) How do balanced forces affect motion? How do unbalanced forces affect motion?
Balanced forces do NOT cause a change in motion. If the object is at rest (not moving), it will remain at rest under balanced forces; if it is in motion, its motion will remain constant under balanced forces.
Unbalanced forces cause a change in the motion of an object. This could be seen as speeding up, slowing down, or changing direction. In other words, unbalanced forces cause the object to ACCELERATE.
- 12) Which objects exert a gravitational force on the objects around them?
All objects with mass exert a gravitational force on the objects around them, even you...even your pencil.
- 13) What two variables affect the strength of the gravitational force between two objects?
The gravitational force depends on the masses of the objects and the distance between them.
- 14) If gravity is pulling down on you now as you are sitting on your seat, why aren't you falling down? (include the concepts of balanced/unbalanced forces in your answer)
Because you are not accelerating (changing motion), you know the forces acting on you must be balanced (zero net force). Therefore, an equal but opposite force must be acting to balance out gravity...this is called the "normal force". It is the force with which your chair is pushing up on your body.
- 15) What two variables affect the friction force between two objects?
The friction force depends on the texture of the surface and the force pushing the surfaces together.
- 16) Which direction does the friction force act compared to the motion of the object?
Friction always opposes motion (acts in the opposite direction to the motion of the object).

PRACTICE:

17) Draw a force diagram of a box resting on the floor.



18) Draw a force diagram of the same box being slid across the floor at a constant speed.



19) Are the forces balanced or unbalanced in #17 and #18 above? How can you tell?

Both #17 and #18 show that the forces are balanced. I know this because in both cases, the motion of the box is remaining constant (not changing), whether it's at rest in #17 or moving at a constant speed across the floor in #18. Because the motion isn't changing, I know the net force must be equal to zero, meaning the forces are balanced.

20) What would happen to the box in #18 if it was not experiencing balanced forces (if the applied force pushing it forward was stronger than the friction force)?

If the forces in #18 were unbalanced, for example if the applied force was stronger than the friction force, then the box would accelerate in the direction of the net force, which in this case would be the direction of the applied force (F_g and F_N would still cancel each other out).