Physics Test Study Guide for Thursday 4/3

Please ask a classmate or see Ms. T or Mr. Wild's notebook if you need to catch up! This test is open note, so make sure you have all the info you need!

Topics Covered (with ISN pages)

- Position and Motion (pg 120-121)
- Distance and Displacement (pg 122)
- Speed and Velocity (pg 123-125, 130-132)
- Distance-Time Graphs (pg 126-127, 129)
- Acceleration (pg 133)
- Gravity and Friction (pg 134-139)
- Newton's Laws of Motion (pg 140-145)
- Forms of Energy (pg 147-148)
- Energy Transformations (pg 149-150)
- Heat Transfer (pg 151)

Vocabulary:

Reference point: The starting point you choose to describe the location, or position, of an object

Motion: The process of changing position

Distance: The total length of the path followed by a moving object

Displacement: The difference between the initial position and the final position of an object

Speed: A measure of the distance an object travels per unit of time

Velocity: The speed and direction of a moving object

Contact force: A push or a pull on one object by another that is touching it

Noncontact force: A force that one object can apply to another object without touching it

Gravity: An attractive force that exists between all objects that have mass

Force: A push or pull on an object

Static friction: Prevents surfaces from sliding past each other

Sliding friction: Opposes the motion of surfaces sliding past each other

Fluid friction: Occurs between a surface and a material that flows

Net force: The combination of all forces acting on an object

Inertia: The tendency of an object to resist a change in its motion

Practice Problems:

1. When is an object considered to be in motion?

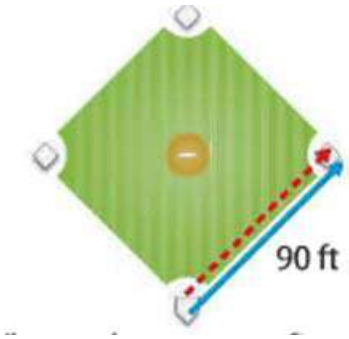
The object's distance and direction from the reference point must be changed._____

_____

2. When is an object NOT considered to be in motion?

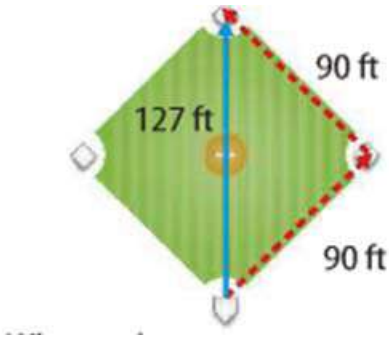
The object's distance and direction from the reference point must NOT have changed._____

_____



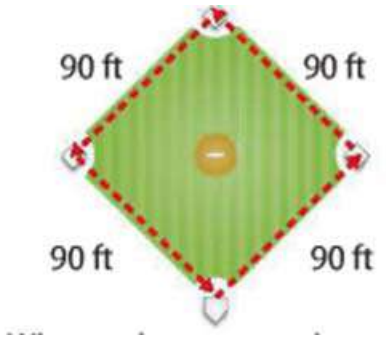
Distance: 90 ft__

Displacement: 90 ft__



Distance: 180 ft_

Displacement: 127 ft__



Distance: 360 ft__

Displacement: 0 ft___

Speed Problems:

1.A girl cycles for 3 hours at a speed of 40km/hr. What distance did she travel?

d = s * t d= 40 km/h* 3 h **d = 120 km**

2. John is a runner. He runs the 100 m sprint in 10.6 seconds. How fast did he travel?

s = d/t s = 100 m/10.6 s **s = 9.43 m/s**

3. Lauren walks 100 meters in half a minute. What must her speed have been to travel at this distance?

s = d/t s = 100 m/30 s **s = 3.33 m/s** (or, see below)

s = d/t s = 100 m/0.5 s **s = 200 m/min**

4. Jason backstrokes at an average speed of 8 meters per second, how long will it take him to complete the race of 200 meters length?

t = d/s t = 200 m/8 m/s **t = 25 s**

5. Cecilia's SUV was detected exceeding the posted speed limit of 60 kilometers per hour, how many kilometers per hour would she have been traveling over the limit if she had covered the a distance of 10 kilometers in 5 minutes?

5 min/60 min = 0.083 h

s = d/t s = 10/0.083 h s = 120 km/h 120 km/h-60 km/h = **60 km/h**

Write 3 examples of contact forces:

1. leaning against a wall

2. pushing a shopping cart

3. pulling a rope in tug of war

Write 3 examples of noncontact forces:

1. static electricity

2. magnetism

3. gravity

Gravity Questions:

1. If the moon was closer to the Earth the force between them would:

a. get smaller
b. disappear
c. stay the same
d. get bigger

2. Which of these will feel the biggest gravitational pull on Earth?

a. A 1000 kg elephant
b. A 100 g mouse
c. A 100 kg football player
d. A 10 kg bicycle

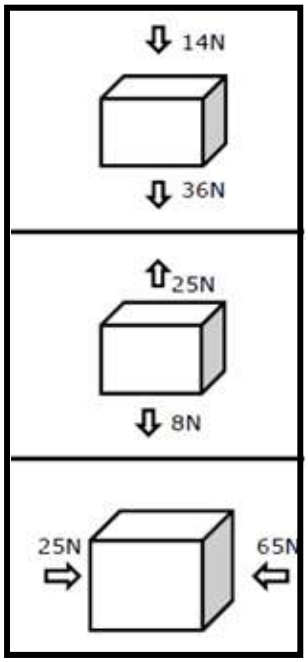
3. Which of these is not a correct statement?

a. Gravitational pull is less on the Moon than on Earth
b. Gravitational pull is less on top of Mount Everest than at sea level
c. There is no gravitational pull on the Moon
d. There is a greater gravitational pull on Jupiter than on Earth

Static, Sliding, or Fluid Friction?

Swimming in water: fluid friction
Leaning against a wall: static friction
Ice skating: sliding friction
Dragging a sled: sliding friction
Walking: static friction

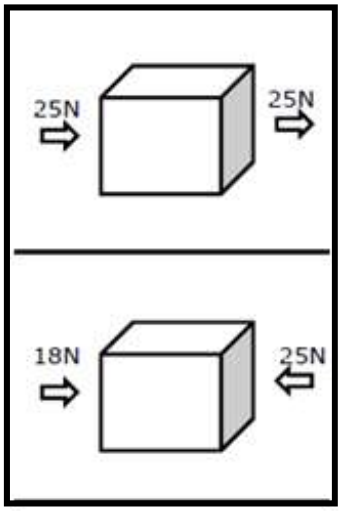
What is the net force?



Net force = 50 N ↓
Balanced? No

Net force = 17 N ↑
Balanced? No

Net force = 40 N ←
Balanced? No



Net force = 50 N →
Balanced? No

Net force = 7 N ←
Balanced? No

Newton's Laws of Motion:

Explain which law of motion relates to why we need to wear seatbelts:
The first law of motion states that an object in motion tends to stay in motion unless acted upon by an outside, unbalanced force. If the car stops, you will remain in motion – until the seatbelt applies an unbalanced force to you to stop you from moving.

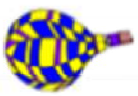
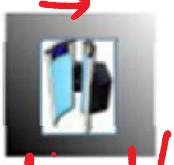
Explain in your own words what would happen if you were standing on a skateboard and then pushed the wall: If you were standing on a skateboard and pushed the wall, the reaction force from the wall would make you roll backwards. This is the third law of motion, which states that every action (or force) has an equal and opposite reaction.

Explain which law of motion relates to why GPS satellites haven't stopped orbiting Earth:
An object in motion tends to stay in motion unless acted upon by an outside, unbalanced force. GPS satellites in space have no unbalanced forces to stop their movement around the Earth, so they would continue to move at the same velocity around the planet.

Define Newton's First Law:
If the net force on an object is zero, an object at rest will remain at rest, and an object in motion at a constant velocity will remain in motion at a constant velocity.

Define Newton's Second Law:
The acceleration of an object is equal to the net force exerted on the object divided by the object's mass. (equation → f = ma)

Define Newton's Third Law:
For every action (force), there is an equal and opposite reaction. (Or, forces occur in pairs.)

Burning coal  chemical → thermal	Firecracker  chemical → thermal / radiant / sound	Breaking on a bike  mechanical → thermal	
Hand Crank Radio  mechanical → sound	Electric Guitar  electrical → sound	Lightstick  chemical → radiant	
Crane  chemical → mechanical → potential → kinetic	Car  chemical → mechanical	Iron  electrical → thermal	
Solar Calculator  radiant → electrical	Magnifying Glass  radiant → thermal	Mixer  electrical → mechanical	
Microwave  electrical → radiant	Hot-air Balloon  thermal → mechanical	Light Bulb  electrical → radiant / thermal	Plant  radiant → chemical
Windmill  mechanical → electrical	Nuclear Power Plant  nuclear → electrical	Piano  mechanical → sound	Eating  chemical → mechanical
Sun  nuclear → radiant / thermal	Tanning Bed  electrical → radiant / thermal	Battery  chemical → electrical	Television  electrical → radiant / sound

Type of Energy Transfer	Definition	Example
1. Conduction	a. The transfer of thermal energy as the result of direct contact between moving particles.	b. The heat from a hot sidewalk burns my bare feet due to conduction.
2. Convection	a. The transfer of thermal energy in a fluid as the result of movement in the fluid itself.	b. Heat moves through a pot of soup on the stove by convection, with hot fluid rising up and cool fluid sinking down.
3. Radiation	a. The transfer of thermal energy via electromagnetic waves.	b. The transfer of the Sun's energy to Earth is an example of radiation.