Learning Packet

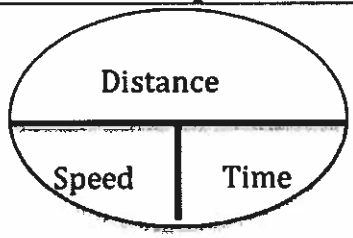
Day 1 Monday 5/18/20

Use this video link https://www.youtube.com/watch?v=Ferdzt_m3PU to help you complete the following items.

1. Motion is a change in position
2. Frame of Reference is what you compare a moving object against.
3. Identify 3 ways to measure motion:
   - Speed
   - Velocity
   - Acceleration
4. The tool used to measure speed is the Speedometer.
5. Identify 2 things needed to measure velocity:
   - speedometer
   - compass
6. Speed measures how fast or slow and object travels.
7. Velocity is speed plus direction.
8. Acceleration is how quickly or slowly an object speeds up, slows down or changes direction.
9. How do speed and velocity differ? Velocity take direction into account.
10. Speed and velocity and interchangeable term except for in science.
    True or False Velocity = Speed + Direction

Day 2 Tuesday 5/19/20

These are formulas to help you do calculations

Formula	Helpful Hint
Speed = $\frac{Distance}{Time}$ Velocity = Speed + direction	
Acceleration	$A = V_f - V_i / Time$

Examples

The car travelled 100km in 2 hours.

Calculate the average speed of the car.

$S = \frac{D}{T}$

$S = \frac{100}{2}$

$S = 50km/h$

The truck travelled at a speed of 60km/h for 3 hours

Calculate the distance that the truck travelled.

$D = S \times T$

$D = 60 \times 3$

$D = 180km$

The car travelled 180km at a speed of 60km/h

Calculate how long this took.

$T = \frac{D}{S}$

$T = \frac{180}{60}$

$T = 3$ hours

Practice Problems

1. A runner races in the 100 meter dash. It takes her 10 seconds to finish. What is her average speed?

A. 10m/s	B. 1000m/s	C. 100 seconds	D. 10 seconds

2. Find the velocity of a plane that traveled 3000 miles west in 5 hours.

A. 65 mph west	B. 6 mph	C. 600 mph west	D. 6000 mph west

3. How far will a person go if they jog for 2 hours at a speed of 12km/hr?

A. 6 km	B. 0.5 km	C. 10 k	D. 24km

4. The speedboats increased for 0m/s to 24m/s in a time span of 12 seconds. What is the acceleration?

A. $4m/s^2$	B. $2m/s^2$	C. 10 km	D. 24 km

5. Shona cycles at an average speed of 8km/h. How far has she traveled if she cycles for 4 hours?

A. 55km	B. 32km	C. 43km	D. 32 miles

Day 3 Wednesday 5/20/20

Motion Graphs: How to use and read them in physical science.

Use the link to help you understand motion graphs.

https://www.youtube.com/watch?v=RM02SnuJ0MY

1. The gradient gives you the Speed **.**

Speed	Velocity	Acceleration

2. A straight line indicates that speed is constant **.**

increasing	decreasing	constant

3. A flat line indicates that an object is D A & C **.**

A. stationary	B. constant speed	C. not moving at all	D. A and C

4. A steep line shows Acceleration **.**

5. Decreasing **gradient shows deceleration.**

6. Acceleration **can be described as positive or negative.**

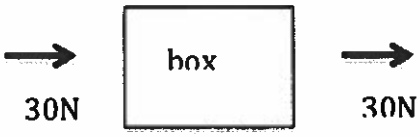
Day 4 Thursday5/21/20

Force

Term	Definition & Example
Force	A push or pull on an object
Balance Force	When two equal forces act on an object in opposite direction (no movement)
Unbalanced Force	When two forces are unequal in size an moving in opposite directions (change position, direction, speed)
Net Force	The overall force acting on an object. (Sum of forces)
Friction	A force that one object exerts on another when the rub against each other

Practice

1.



Identify the net force on each box and describe the movement of the box.

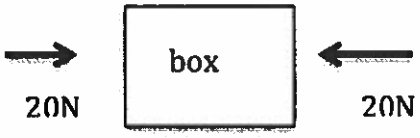
60 N of force to the right (Box moves → right)

2.

Identify the net force on each box and describe the movement of the box.

10 N of force to the left. (Box moves ← left)

3.



Identify the net force on each box and describe the movement of the box.

0 N of force. The forces are balanced. (box will not move)

Day 5 Friday 5/22/20

Work and Machines Notes & Practice Part 1

Work = a force on an object for a distance (the force must be in the same direction as the motion of the object)

Examples:

According to the scientific definition of work, which of these best shows that work is being done?

A A lamp hanging from a ceiling
B A rocket drifting through space
C A man pushing against a concrete wall
D A car being towed down a street

For work to be done on an object,

A the object must not move.
B the object must move, whether or not a force is exerted on it.
C the object must move some distance as a result of a force.
D a force must be exerted on an object--whether is moves is not important.

SI Units

Work = Joules (Newton Meter)
Force = Newton
Distance = Meter

Formulas

Work= Force x Distance

$$\text{Distance} = \frac{Work}{Force}$$

$$\text{Force} = \frac{Work}{Distance}$$

Examples:

If you exert a force of 20 newtons to push a desk 10 meters, how much work do you do on the desk?

A 10 joules
B 200 joules
C 30 joules
D 100 joules

It took a bulldozer 62,000 J of work to move a rock 30 meters. How much force did the bulldozer have to apply?

A 2.1 N
B 2066.7 N
C 206.7 N
D 186000 N

Machine = a device that make work easier

1. **Changing the amount of force**
2. **Changing the distance**
3. **Changing the direction of the force**

Input Force = You
Output Force = Machine

Mechanical Advantage (MA) = the number of times the machine multiplies your input force

$$\text{MA} = \frac{Output\ force}{Input\ force}$$

$$\text{Mechanical Advantage of an incline plane} = \frac{length\ of\ incline}{height\ of\ incline}$$

Day 6 Monday 5/25/20

Work and Machines Notes and Practice Part 2

Examples:

The number of times a machine multiples your effort force is called—

A mechanical advantage
B work
C mechanical efficiency
D power

If you exert a force of 20 newtons on a can opener, and the opener exerts a force of 60 newtons on the can, the ideal mechanical advantage of the can opener is —

A 6
B 2
C 3
D 1,200

What is the mechanical advantage of this incline plane?

A .25
B 5
C 15
D 4

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2 Types of Mechanical Advantage (MA)

1. **Actual Mechanical Advantage = friction (less efficient)**
2. **Ideal Mechanical Advantage = no friction (more efficient)**

$$\text{Efficiency} = \frac{Output\ work}{Input\ work} \text{ X } 100\%$$

An ideal machine would be 100% efficient. Machines are not 100% efficient due to friction. Friction can be reduced by lubrication (oil).

Examples:

The work put into a machine is always greater than the work output. This is due to —

A gravity
B friction
C power
D work

$$\text{Efficiency} = \frac{\text{Work Output}}{\text{Work Input}} \text{ X } 100\%$$

A person in a wheelchair exerts a force of 25 newtons to go up a ramp that is 10 meters long. The weight of the person is 60 newtons and the height of the ramp is 3 meters. What is the efficiency of the ramp?

A 68%
B 30%
C 80%
D 60%
E 72%
F 139%

Day 7 Tuesday 5/26/20
Work and Machines Notes and Practice Part 3

Power

$$\text{Power} = \frac{Work}{Time}$$

Examples:

The amount of work completed in a certain period of time is called—

A power
B mechanical efficiency
C motion
D mechanical advantage

$$P = {}^{W}/_{t}$$

To complete a project, 200,000 Joules of work are needed. The time taken to complete the project is 20 seconds. How much power is needed?

A 200,020 J/s
B 10,000 J/s
C 0.0001 J/s
D 1,000,000 J/s

It took Bradley 45s and 60N of force to move a sofa 5m into a moving truck. How much power did he exert?

A 6.67 W
B 12 W
C 300 W
D 1.33 W

Day 8 Wednesday 5/27/20

Newton's First Law

Link 1	http://teachertech.rice.edu/Participants/louviere/NewtLon/law1.html
PPT	**../Newton's First Law (Force) PPT 20 (1).pptx**

State Newton's 1st Law: The law of Inertia - An object at rest will stay at rest and an object in motion will stay in motion until it is acted upon by an unbalanced force.

	List 5 Examples of Newton's 1st Law
1	A picture sitting on a table
2	A speeding car hits on brakes and seatbelt tightens
3	Earth orbiting around the sun
4	A magician snatches the tablecloth from under some dishes
5	A boulder rolling down a mountain

Day 9 Thursday 5/28/20

Newton's Second Law

Link 1	http://teachertech.rice.edu/Participants/louviere/Newton/law2.html
PPT	**../Newton's Second Law.pptx**

State Newton's 2nd Law: Law of Acceleration: Explains the relationship between (force, mass & acceleration). The net force on an object is equal to the product of it's acceleration and mass

	List 5 Examples of Newton's 2nd Law
1	F = M x A
2	The harder you push the cart the faster it goes
3	A basketball accelerates faster than a bowling ball given the
4	same amount of force.
5	The more force you but on the pedals of your bike the faster it goes.

Day 10 Friday 5/29/20

Newton's 3rd Law

Link 1	http://teachertech.rice.edu/Participants/louviere/Newton/law3.html
Link 2	**https://emediava.org/lo/1000001771**
PPT	**../Newton's 3rd Law.pptx**

State Newton's 3rd Law: Law of Action / Reaction
If an object exerts a force on another object, then the second object exerts a force of equal strength in the opposit direction

List 5 Examples of Newton's 3rdLaw	
1	A rocket taking off into space
2	The shooting of a cannon
3	When you paddle a boat the oar goes backwards & boat forwards
4	When you jump
5	Walking