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Period _____

The Keys to Success of the Science Final Exam!

7.P.1.1 – Explain how the motion of an object can be described by its position, direction and speed compared to something else.

1. What is **Newton's first law** and what are some ways we experience it in real life?

An object @ rest will stay @ rest and an object in motion will stay in motion unless acted upon by an unbalanced force.

2. What equation represents **Newton's second law**?

$$F = ma \rightarrow \text{Force} = \text{mass} \times \text{acceleration}$$

3. What is **Newton's 3rd law** give some everyday examples?

Every Action has an equal, But opposite Reaction

4. What is a **reference point**?

place or object used for comparison to determine if something is in motion.

5. How does **reference point** help you to **determine** if something is in **motion**?

Gives you a point of view to determine if something is in motion. If an object changes position relative to a reference point, it is in motion.

6. How does **force** affect the **acceleration** of an object?

More force = greater acceleration
less force = smaller acceleration

7. How does **mass** affect the **acceleration** of an object?

Greater mass = smaller acceleration
smaller mass = greater acceleration

8. What is the amount of **force** needed to **accelerate** a ^{mass} 15kg object by ^{acceleration} 3m/s². (**Show your work including formula**)

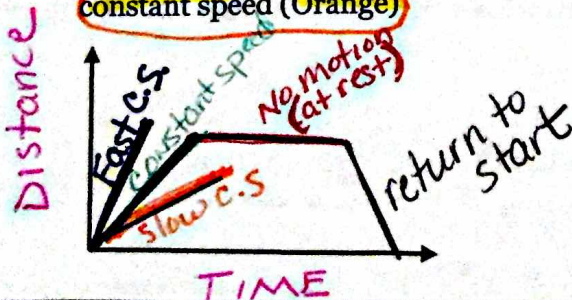
$$F = ma \quad m = 15\text{kg} \quad a = 3\text{m/s}^2 \quad F = (15)(3) \quad F = 45\text{N}$$

9. An object has a **mass** of 18kg. A **force** is applied to this object and causes it to **accelerate** at a rate of 3.5 m/s². Calculate the **force** that was applied to this object. (**Show work including formula**)

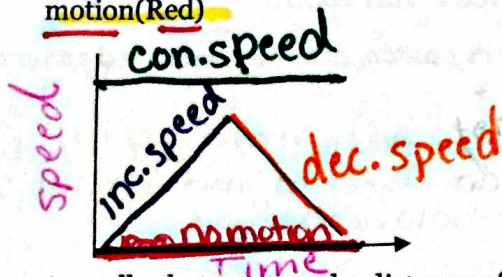
$$F = ma \quad m = 18\text{kg} \quad a = 3.5\text{m/s}^2 \quad F = (18)(3.5) \quad F = 63\text{N}$$

7.P.1.3 – I can use a graph to describe & interpret the motion of an object.

10. Insert all that follow on the graph below. 1. Place the **distance** on the right axis, **time** on the right axis, label **constant speed (Green)**, returning to start, **no motion (red)**, **faster constant speed (blue)**, **slower constant speed (Orange)**



11. On the speed time graph below label the following points. Place speed on the right axis, time on the left axis, label constant speed (green), increasing speed (Blue), decreasing speed (orange), no motion (Red)



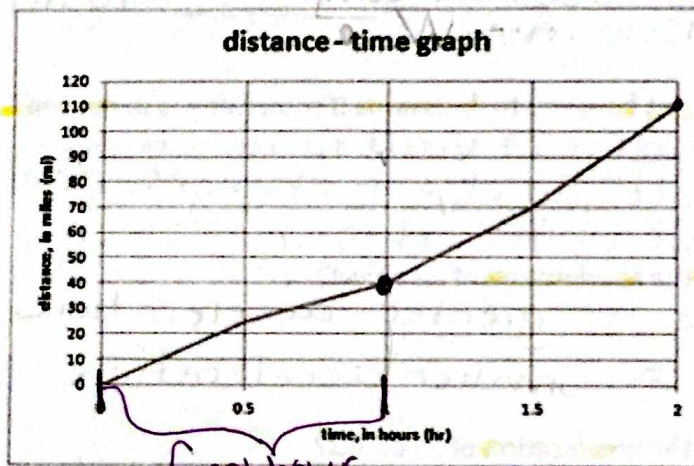
12. A small robot can travel a distance of 32.5 meters in 13 seconds. What is the average speed of the small robot? (Show your work, include the formula)



dist. = 32.5m
time 13sec
 $S = \frac{32.5m}{13sec} = 2.5mp$

13. A truck travels between two cities according to the distance-time graph shown below. What is the truck's average speed for the first hour? What is the truck's average speed for the entire trip?

1st hour
 $S = d \div t$
 $S = 40 \div 1$
40 miles per hour



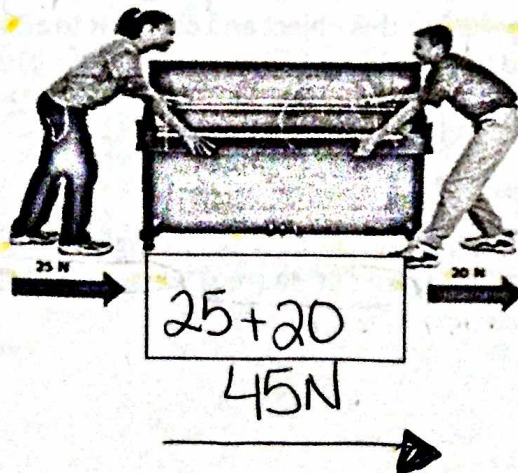
Entire trip
 $S = d \div t$
 $S = \frac{110}{2}$
 $S = 55mph$

7.P.1.2 - Explain the effects of balanced and unbalanced forces acting on an object

14. How does a magnetic force affect an object?

Like poles repel (move away) from one another
Opposite poles attract (move toward) one another

15. In the box below calculate the net force and draw an arrow to show the direction that the couch will go in. The arrow must reflect the size and direction on the force.

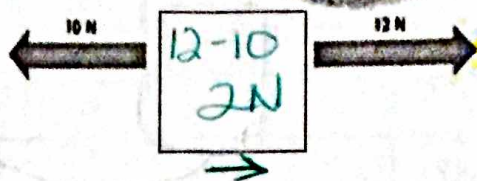


Forces moving in same direction so add

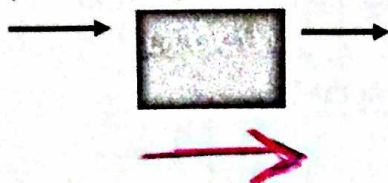
16. In the box below draw an arrow to show the size and direction of the net force between the two dogs.



Forces moving in opposite directions so subtract



17. Which way will these boxes go?



so will be balanced stay @ rest (if @ rest) or stay in motion (if in motion)

7.P.2.1 - Explain how kinetic and potential energy contribute to mechanical energy of an object

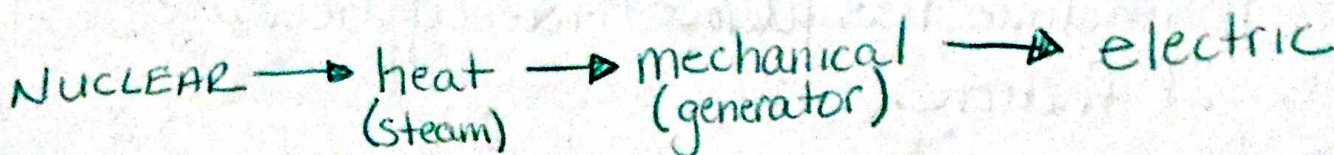
18. A sky diver ready to jump out of a plane is a great example of how mechanical energy can be transformed from one type to the next. What type of energy does she have at each point during her dive.

- a. Standing at the edge of the airplane waiting to jump potential
- b. As she is moving swiftly through the air approaching ground Kinetic
- c. As she finally lands and is now on the ground potential
- d. What is the difference in her energy at A and C had more gravitational pot. @ A?

7.P.2.2 - Explain how energy can be transformed from one form to another

- 19. The law of conservation of energy states that energy CANNOT be created nor destroyed. Must be transformed from one type to another
- 20. How do plants help to transform energy take electromagnetic energy (light/radiant) from sun and transfer to chemical energy

21. The purpose of a nuclear power plant is to transform nuclear energy into electricity. This is done in steps starting with a nuclear reaction which generates heat to produce steam. The steam in turn is used to turn a generator which finally produces electricity. Draw a flow chart to include the 4 energy transformations that occur.



22. What is a circuit?

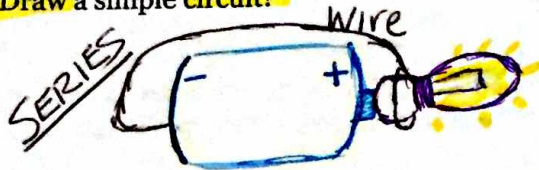
closed path through which electrons can flow

* 23. What are the 3 main parts of a circuit?

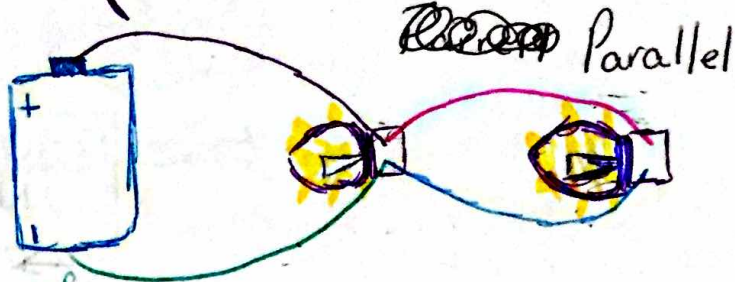
CONDUCTOR

POWER SOURCE (Battery)

24. Draw a simple circuit?



LOAD - (something that will use electricity → lightbulb)



25. What is the purpose of a switch in a circuit?

Allows for ability to turn flow of electricity on and off

26. What is work and how do we calculate it?

Work is when a force is applied to an object and moves it a certain distance

$$W = Fd$$

27. A 100N of force is applied to move a box 5m. How much work is being done on the box?

$$W = Fd \quad \text{Force} = 100\text{N} \\ \text{distance } 5\text{m}$$

$$W = (100 \times 5) \\ W = 500\text{J}$$

7.P.2.4 - Explain how simple machines such as inclined planes, pulleys, levers, and wheel and axles are used to create mechanical advantage and increase efficiency.

28. Simple machines may do one or more of the following to make work easier fill out the table below to show how each simple machine works to make work easier

	Lever	Wedge	Screw	Wheel and Axel	Incline plane	the pulley
Change the direction of force	✓					✓
Transfers the force		✓				
Increase the size of the force	✓	✓		✓		
Increase the distance of the force			✓		✓	

29. What is the efficiency of a simple machine and why?

Efficiency is comparison of work input to work output

No machine has 100% efficiency because of friction

30. Use the data set below to create a distance time graph. Graph must have a title, axes must be labeled with variable and units and the graph must have a scale that fits the data.

Distance vs. Time	
Time (s)	Distance (m)
0	0
2	5
4	5
6	10
8	15

Distance vs. Time Graph



I understand everything in this study guide and feel confident about the exam!

I am still struggling with
