

Name \_\_\_\_\_ date \_\_\_\_\_ period \_\_\_\_\_

**Physical Science EOCT Review**  
**Physics – Energy, Force and Motion**

*Write what energy transformations are taking place in each of the following examples.*

1. burning match \_\_\_\_\_
2. radio \_\_\_\_\_
3. walking \_\_\_\_\_
4. solar panels on a space satellite \_\_\_\_\_

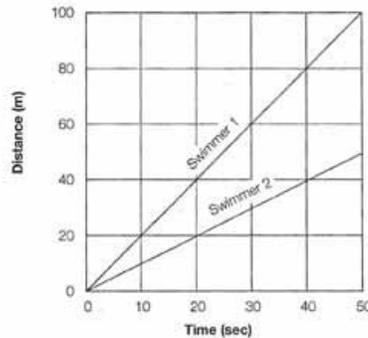
*Answer the following questions.*

5. How can you increase the amount of kinetic energy in a small ball of clay you are throwing to a friend?
  
6. How can you increase the amount of potential energy in a book sitting on a bookshelf?
  
7. How is energy transferred during convection?
  
8. Does convection occur in solids? Why or why not?
  
9. Give three examples of each:
  - a. Conduction:
    - i.
    - ii.
    - iii.
  - b. Convection
    - i.
    - ii.
    - iii.
  - c. Radiation
    - i.
    - ii.
    - iii.
10. The specific heat of water is  $4.2 \text{ J/g } ^\circ\text{C}$ . If it takes 31,500 joules of heat to warm 750 g of water, what was the temperature change?
  
11. Explain how **kinetic energy** and **potential energy** vary as a girl swings on a playground swing-set.
  
12. A roller coaster car rapidly picks up speed as it rolls down a slope. As it starts down the slope, its speed is 4 m/s. But 3 seconds later, at the bottom of the slope, its speed is 22 m/s. What is its average acceleration?

13. A lizard accelerates from 2 m/s to 10 m/s in 4 seconds. What is the lizard's average acceleration?

14. A car traveled 1025 km from El Paso to Dallas in 13.5 hr. What was its average velocity?

15. USING SCIENCE SKILLS: Interpreting a Diagram



- a. How many meters can Swimmer 1 cover in 30 sec? \_\_\_\_\_
- b. How far will Swimmer 2 go in 30 sec? \_\_\_\_\_
- c. Predict the number of m Swimmer 1 can go in 60 sec. \_\_\_\_\_
- d. Predict the number of m Swimmer 2 can go in 60 sec. \_\_\_\_\_
- e. Which swimmer has the greatest speed? \_\_\_\_\_
- f. Calculate the speed of Swimmer 1. \_\_\_\_\_
- g. Calculate the speed of Swimmer 2. \_\_\_\_\_

16. Inertia can best be described as \_\_\_\_\_.

- a. the force which keeps moving objects moving and stationary objects at rest.
- b. the willingness of an object to eventually lose its motion
- c. the force which causes all objects to stop
- d. the tendency of any object to resist change and keep doing whatever its doing

17. A physics book is motionless on the top of a table. If you give it a hard push with your hand, it slides across the table and slowly comes to a stop. Use Newton's first law of motion to answer the following questions:

- a) Why does the book remain motionless before the force is applied?
- b) Why does the book move when the hand pushes on it?
- c) Why does the book eventually come to a stop?
- d) Under what conditions would the book remain in motion at a constant speed?

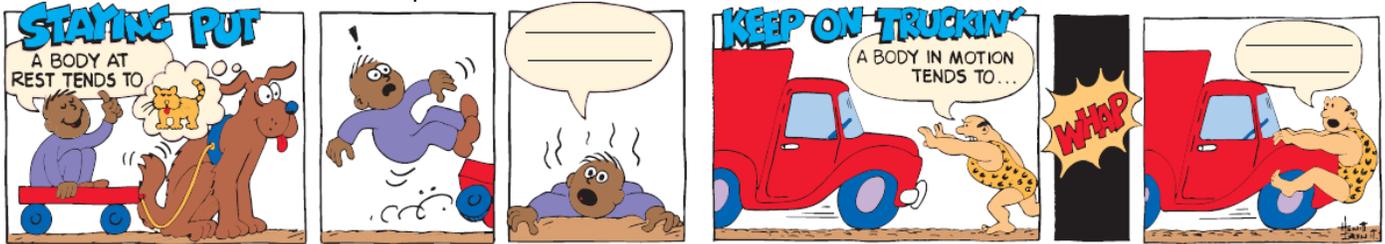
18. Why does a package on the seat of a bus slide backward when the bus accelerates quickly from rest?

Why does it slide forward when the driver applies the brakes?

19. If you are in a car that is struck from behind, you can receive a serious injury called whiplash.

- a) Using Newton's laws of motion, explain what happens.
- b) How does a headrest reduce whiplash?

20. Fill in the end slide in each picture:



a) Explain what happened in the first comic:

b) Explain what happened in the second comic:

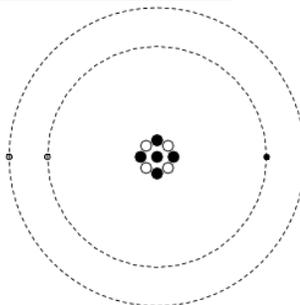
21. The tablecloth trick is an example of “objects at rest tend to stay \_\_\_\_\_”.
22. If you slide a hockey puck along an air table (where there is virtually no friction), it slides in a straight line with no apparent loss in \_\_\_\_\_. This is an example of “objects in motion tend to stay \_\_\_\_\_”.
23. All freely falling objects fall with the same \_\_\_\_\_ because the net force on an object is only its weight, and the ratio of weight to mass is the same for all objects.
24. A 10-kg cannonball and a 1-kg stone dropped from an elevated position at the same time will fall together and strike the ground at practically the \_\_\_\_\_ time.
25. Answer the following questions, using either **mass** or **weight**.
- The amount of matter in an object is called its \_\_\_\_\_.
  - The force of gravity on an object is called its \_\_\_\_\_.
  - If you take a spaceship into space, your \_\_\_\_\_ stays the same.
  - If you take a spaceship into space, your \_\_\_\_\_ changes.
  - The force of gravity when one object has a much larger \_\_\_\_\_ than the other object.
  - If you double the mass of an object, you double the object’s \_\_\_\_\_.
  - On Earth you can compare the masses of different objects by comparing their \_\_\_\_\_.
  - \_\_\_\_\_ is measured in grams or kilograms.
  - \_\_\_\_\_ is measured in Newtons.
26. If you drop a 50cent piece (halfdollar) and a 10 centpiece (a dime) from a tall building...
- Do the objects have the **same mass**? \_\_\_\_\_
  - Will both coins hit the ground at the same time? \_\_\_\_\_
27. It takes 100 N to pull an object up an inclined plane. The gravitational force on the object is 600 N.
- What is the load force in this case? \_\_\_\_\_ N
  - What is the effort force in this case? \_\_\_\_\_ N
  - Calculate the **Mechanical Advantage (MA)**
28. Calculate the **work** done when the object is moved 14 meters up the ramp using a force of 100 N.

## Chemistry—Atomic and Nuclear Theory and the Periodic Table

1. List the three subatomic particles, tell where they are found and what charge they have.

Particle	location	charge

2. Label the parts of the beryllium (Be) atom below.



3. What is an isotope?

4. Give the number of protons, neutrons and electrons in the

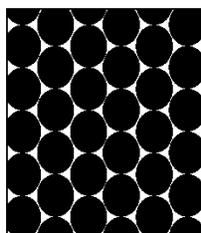
	# of protons	# of neutrons	#	
a) Mg-24	_____	_____	_____	following isotopes: of electrons
b) Mg-25	_____	_____	_____	
c) Mg-26	_____	_____	_____	
d) N-15	_____	_____	_____	
e) O-18	_____	_____	_____	
f) Si-30	_____	_____	_____	
g) S-34	_____	_____	_____	
h) S-36	_____	_____	_____	
i) Ca-48	_____	_____	_____	

5. Complete the table. There is enough information given for each element to determine all missing numbers

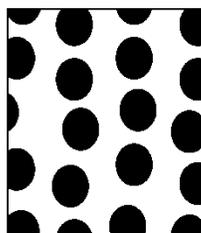
Symbol	Atomic Number	Mass Number	Number of Protons	Number of Electrons	Number of Neutrons
<sup>23</sup> Na					
K		40		19	
			38	38	52
F					10
	20	41		18	
	50			50	72
<sup>131</sup> I					
<sup>26</sup> Mg					
		109	47	46	
	1	2		1	
<sup>36</sup> S					
	26			23	32
<sup>27</sup> Al					
	2	4		2	
Cr		53			

6. How are the elements arranged in the periodic table?
7. \_\_\_\_\_ electrons determine how an atom will react.
8. What does the atomic number tell you?
9. How do you find the number of neutrons an atom of an element would have?
10. What are valence electrons and how do you find out how many valence electrons an element has?
11. What is radioactivity?
12. What is half-life?
13. If we start with 400 atoms of a radioactive substance, how many would remain after one halflife? \_\_\_\_\_ after two half-lives? \_\_\_\_\_ after three half-lives? \_\_\_\_\_ after four halflives  
\_\_\_\_\_?

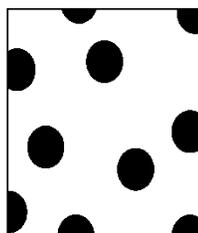
14. A paleontologist discovered fossil remains of ancestral mammal, and in order to have basis of comparison to other ancestral mammals, he needed the age of the fossil. The carbon-14 analysis indicates that only half of the original amount is present. How old is this fossil?
15. The half-life of hydrogen-3 is 12.3 years. Given 100 g of hydrogen-3, how many grams will be left after 5 half-lives?
16. A patient is administered 20 mg of iodine-131. How much of this isotope will remain in the body after 40 days if the half-life for iodine-131 is 8 days?
17. The mass of cobalt-60 in a sample is found to have decreased from 0.8 g to 0.2 g in a period of 10.5 years. From this info, calculate the half-life of cobalt-60
18. The three most common states of matter are \_\_\_\_\_, \_\_\_\_\_ & \_\_\_\_\_.
19. The kinetic theory states that the higher the temperature, the (faster / slower) the particles that make up a substance move
20. As a sample of matter is cooled, its particles move more (slowly / quickly).
21. The particles that make up a solid move \_\_\_\_\_ than do the particles that make up a gas.
22. Matter that has a definite volume but no definite shape is a \_\_\_\_\_.
23. Matter that has a definite volume and a definite shape is a \_\_\_\_\_.
24. If you move a substance from one container to another and its volume changes, the substance is a \_\_\_\_\_.



Substance A



Substance B



Substance C

25. In the above picture, which substance is a liquid?
26. In the above picture, which substance is a solid?
27. In the above picture, which substance is a gas?
28. In the above picture, which substance are the forces of attraction among the particles so weak that they can be ignored under ordinary conditions?

Melting and Boiling Points of Some Substances		
Substance	Melting Point	Boiling Point
Hydrogen	-259.3°C	-252.9°C
Nitrogen	-210.0°C	-195.8°C
Acetic Acid	16.6°C	117.9°C
Gold	1064.2°C	2856°C

29. Based on the information in the table above, the melting point of acetic acid is \_\_\_\_\_.
30. Based on the information in the table above, the freezing point of nitrogen is \_\_\_\_\_.
31. Based on the information in the table above, which substances would be a gas at 0°C?
32. A solution is a \_\_\_\_\_ mixture of two or more components.
33. The \_\_\_\_\_ is the component in the greatest amount
34. The \_\_\_\_\_ is the component in the least amount
35. If you dissolve sugar in water, which is the solvent and which is the solute?  
Water = \_\_\_\_\_ Sugar = \_\_\_\_\_
36. In a mixture, the \_\_\_\_\_ dissolves in the \_\_\_\_\_.
37. Soft drinks consist of a mixture of water, sugar, and flavoring, with carbon dioxide gas bubbled through it. Which of these ingredients would be considered the solvent?
38. Dry air is primarily made up of nitrogen (78.09%) and oxygen (20.95%). Which of these is the solvent and which is the solute? Nitrogen = \_\_\_\_\_ Oxygen = \_\_\_\_\_