Name KEY Date Period

Physical Science - Mixed Review Word Problems for the EOCT Answer Key

Directions: Read each word problem.

- **Step 1:** Write down the correct number of the formula that you would use to solve the problem.
- **Step 2:** Solve the problems on the back of this paper. Show your work. Circle your answer.
- **Use circle diagrams to help you!!!!**

Formula #	Word Problem
1. F = ma	1. Calculate the force on an object that has a mass of 12 kg and an acceleration of 4 m/s^2.
2. PE =mgh	2. A bird carries a 25 g oyster to a height of 11 m. What is the gravitational potential energy of the oyster?
3. $D = \frac{m}{v}$	3. A loaf of bread has a volume of 2270 cm^3 and a mass of 454 g. What is the density of the bread?
4. $a = \frac{V_f - V_i}{t}$	4. During a race, a sprinter increases speed from 5.0 m/s to 7.5 m/s over a period of 1.25 s. What is the sprinter's average acceleration during this period?
5. Q=mcΔT	5. Calculate the specific heat capacity of an unknown substance given that 204.75 J of energy raises the temperature of 18g of copper from 32° to 48°C.
6. $s = \frac{d}{t}$	6. A sprinter runs the 100-meter race in 10 seconds. What is the sprinter's speed?
7. W = Fd	7. Your family is moving to a new apartment. While lifting a box 1.5m straight up to put it on a truck, you exert an upward force of 200 N. How much work did you do?
8. $s = \frac{d}{t}$	8. A car travels 500 miles east in 10 hours. What is the speed of the car?
9. F= ma	9. A 3,000-N force acts on a 200-kg object. The acceleration of the object is___.
10. F= ma	10. Given a force of 88 N and an acceleration of 4 m/s^2, what is the mass?
11. $D = \frac{m}{v}$	11. A block of wood has a density of 0.6 g/cm^3 and a volume of 1.2 cm^3. What is the mass of the block of wood? Be careful!
12. MA=$\frac{d_e}{d_r}$	12. Calculate the mechanical advantage of a ramp that is 6.0 m long and 1.5 m high.
13. $s = \frac{d}{t}$	13. Sally drove at a speed of 50 km /hr. south for 2 hours. How far did she travel?
14. w=mg	14. What is the weight of an object that has a mass of 25 kg?
15. W=Fd	15. A young man exerted a force of 9,000 N on a stalled car but was unable to move it. How much work was done?
16. F=ma	16. What is the acceleration of a 10 kg mass pushed by a 5 N force?
17. W=Fd	17. A crane uses an average force of 5200 N to lift a girder 25 m. How much work does the crane do on the girder?
18. $a = \frac{V_f - V_i}{t}$	18. A person is traveling at 20 m/s in a car when the car hits a tree. The person comes to a complete stop in 0.4 seconds. Calculate the acceleration.
19. W=Fd	19. A crane uses an average force of 5200 N to lift a girder 25 m, but the girder **does NOT** move. How much work does the crane do on the girder?
20. KE=1/2mv^2	20. A cheetah can run briefly with a speed of 31 m/s. Suppose a cheetah with a mass of 47 kg runs at this speed. What is the cheetah's kinetic energy?
21. w=mg	21. What is the mass of an object that weighs 58 N?
22. $s = \frac{d}{t}$	22. Find the speed of a long-distance runner who runs 30 miles in 6 hours.
23. Q=mcΔT	23. Calculate the amount of heat needed to increase the temperature of 155g of water from 23°C to 44°C. (The specific heat of water is 4.18 J/g°C)
24. $a = \frac{V_f - V_i}{t}$	24. A plane stops after traveling 125 mph in 0.5 hours. What is the plane's acceleration?
25. Q=mcΔT	25. 241 J of energy is required to raise the temperature of an unknown substance from 23° to 42°C. Calculate the mass of the substance. (Specific Heat Capacity of the substance is 0.90 J/g°C).

1. Calculate the force on an object that has a mass of 12 kg and an acceleration of 4 m/s^2.

Given:	***Formula:***
m = 12kg a = 4 m/s^2 F= ?	**F = m * a** ***Work:*** **F = 12kg * 4 m/s^2** **= 48 N**

2. A bird carries a 25 g oyster to a height of 11 m. What is the gravitational potential energy of the oyster?

Given:	***Formula:***
GPE = ? m = 25 g g = 9.8 m/s^2 h = 11 m	**GPE = mgh** ***Work:*** **GPE = (25g)(9.8 m/s^2)(11m)** **= 2695 J**

3. During a race, a sprinter increases speed from 5.0 m/s to 7.5 m/s over a period of 1.25 s. What is the sprinter's average acceleration during this period?

Given:	***Formula:***
v_i = 5.0 m/s v_f =7.5 m/s t = 1.25 s a = ?	**$a = \Delta v/\Delta t$ OR $a = \frac{v_f - v_i}{t}$** ***Work:*** **$a = \frac{(7.5\ m/s - 5.0\ m/s)}{1.25\ s} = \frac{2.5\ m/s}{1.25\ s} = 2\ m/s^2$**

4. Your family is moving to a new apartment. While lifting a box 1.5m straight up to put it on a truck, you exert an upward force of 200 N. How much work did you do?

Given:	***Formula:***
W = ? f = 200 N d = 1.5 m	***W = f * d*** ***Work:*** **W = 200 N * 1.5 m** **= 300 J**

5. A block of wood has a density of 0.6 g/cm^3 and a volume of 1.2 cm^3. What is the mass of the block of wood? *Be careful!*

Given:	***Formula:***
D = 0.6g/cm^3 m = ? v = 1.2 cm^3	**D = m/v SO m = D * v** ***Work:*** **m = 0.6 g/cm^3 * 1.2 cm^3** **= 0.72 g**

6. Calculate the mechanical advantage of a ramp that is 6.0 m long and 1.5 m high.

Given:	***Formula:***
D_{input} = 6.0 m (length) D_{output} = 1.5 m (height) MA = ?	***MA*** **= $\frac{D_{in}}{D_{out}}$ OR $\frac{l}{h}$** ***Work:*** **MA = $\frac{6.0\ m}{1.5\ m}$ = 4**

7. What is the weight of an object that has a mass of 25 kg?

Given:	*Formula:*
w =?	$w = m * g$
m = 25 kg	
g = 9.8 m/s^2	*Work:*
	W = 25kg * 9.8 m/s^2
	= 245 N

8. A young man exerted a force of 9,000 N on a stalled car but was unable to move it. How much work was done?

Given:	*Formula:*
W =?	**W = f * d**
f = 9000N	
d = 0 m	*Work:*
	W = 9000N * 0 m
	= 0 N

9. A cheetah can run briefly with a speed of 31 m/s. Suppose a cheetah with a mass of 47 kg runs at this speed. What is the cheetah's kinetic energy?

Given:	*Formula:*
KE = ?	**KE = ½*m*v^2**
1/2	
m = 47 kg	*Work:*
v = 31 m/s	**KE = (½)(47kg)(31 m/s)^2**
	= (23.5)(961)
	= 22583.5 J

10. Find the speed of a long-distance runner who runs 30 miles in 6 hours.

Given:	*Formula:*
v = ?	**V = d / t**
d = 30 mi	
t = 6 hrs	*Work:*
	V = 30 mi / 6 hrs
	= 5 mph

11. Calculate the amount of heat needed to increase the temperature of 155g of water from 23°C to 44°C. (The specific heat of water is 4.18 J/g°C)

Given:	*Formula:*
Q = ?	**Q = m * c * ΔT**
m = 155g	
c = 4.18 J/g °C	*Work:*
ΔT = 44°C - 23°C	**Q = (155g)(4.18 J/g°C)(21°C)**
= 21°C	**= 13605.9 J**

12. 241 J of energy is required to raise the temperature of an unknown substance from 23° to 42°C. Calculate the mass of the substance. (Specific Heat Capacity of the substance is 0.90 J/g°C).

Given:	*Formula:*
Q = 241 J	**Q = m * c * ΔT so m = Q / c * ΔT**
m = ?	
c = 0.90 J/g °C	*Work:*
ΔT = 42°C - 23°C	**m = 241 J / (0.90 J/g°C)(19°C) = 14.09 g**
= 19°C	

Name: KEY Date: _____ Period: _____

Physics Vocabulary EOCT review part 2

What kind of thermal transfer?
1. Conduction, 2. Convection, 3. Radiation

3 From the sun
1 Touching something
2 In a pot of water
2 Liquids and gases become less dense when hot
3 from electromagnetic radiation
2 in moving fluids
1 putting your hand on a hot car
2 fan cooling you down.

Friction: Match term to description

1. Rolling Friction E
2. Air Friction B
3. Fluid Friction A
4. Sliding Friction C
5. Friction D

a. Resistance of a fluid on an object
b. Resistance of air pushing against object
c. Resistance of two object pushing against each other
d. Any force that resist motion
e. Resistance of a wheel.

Which of Newton's Three Laws Applies?

3 a paddle-wheel boat pushes on the water and the water pushed back to move the boat
2 a tractor trailer truck takes longer to accelerate
1 a rolling ball hit your leg hard to stop
2 a heaver animal has to use more muscle to speed up
3 you push on the wall and you don't move
2 Fighter pilot feels massive amount of force when their plane turns quickly
1 a ball won't move until it is kicked

1: Inertia, object will change motion w/o force 2: F = ma 3: action / reaction

Newton's Laws and Simple Machines Matching

1. Inertia E
2. Friction C
3. Gravity B
4. Net Force D
5. Force A

a. An action that causes motion
b. Force pulling all objects towards each other.
c. Any force that resist motion
d. Total of all forces on an object
e. Ability of an object to resist change of motion.

1. Weight B
2. Equilibrium A
3. Mass E
4. Heat D
5. g C

a. When all forces on an object are balanced
b. Force of gravity on an object
c. Acceleration of gravity
d. Product of friction
e. Measure of the matter in an object

Work and Energy Vocabulary Matching

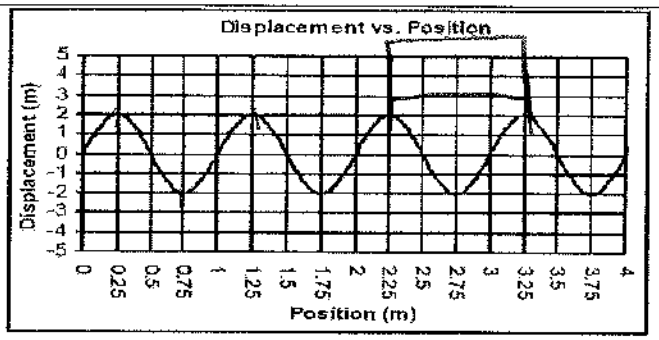
1. Energy E
2. Power D
3. Work A
4. Kinetic Energy B
5. Potential Energy C

a. Uses energy and can create energy
b. Energy of motion, dependent on mass an velocity
c. Energy of position, dependent on height, mass and gravity
d. The rate of doing work, how fast you do work
e. Has the ability to create forces, stored work.

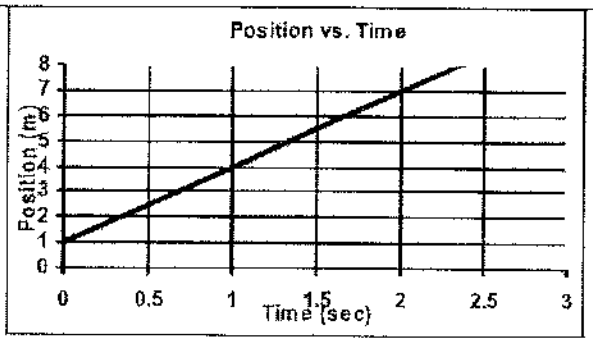
1. Thermal D
2. Nuclear A
3. Mechanical E
4. Law of Conservation of energy B
5. Chemical F
6. Electrical C

a. Energy of the atom being split or fused
b. Energy cannot be destroyed or created, just transformed
c. Energy of moving electrons
d. Heat energy
e. Energy store in objects and can do work
f. Energy of molecular bonds

Interpreting Graphs and Pictures



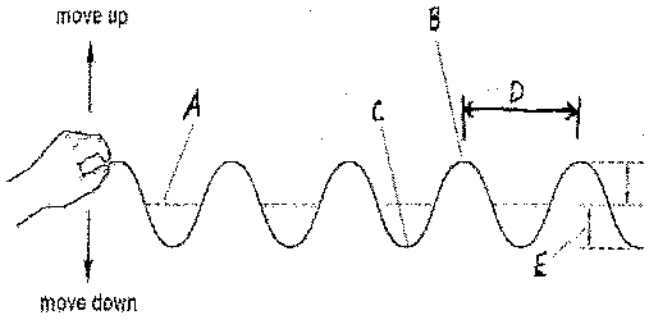
1. Mark one cycle on the wave above
2. Starting at 0.75m, where does the 2nd cycle end? 2.75
3. How many cycles are in the graph 4
4. Calculate the length of one wave 1m
5. Calculate Amplitude of wave 2m



1. What is the position of the object at 4s? 4s x 3m/s = 12m
2. When did the object reach 4m? 1 sec
3. Find the speed of the object (show work)

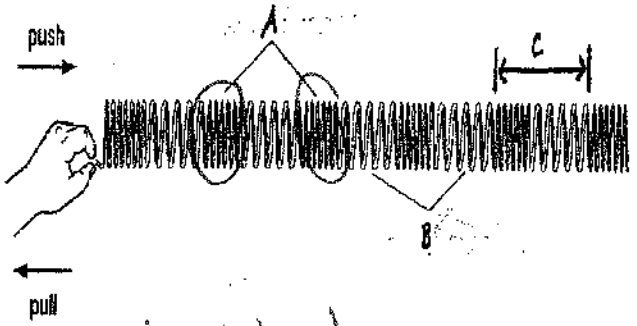
$\frac{4m}{1s} = 4m/s$ $\frac{7-4}{2-1} = \frac{3}{1} = 3m/s$

Waves: identify type of wave and label the parts of each wave.



Wave type: transverse

A rest
B crest
C trough
D wavelength
E amplitude

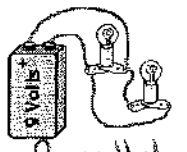


Wave Type: longitudinal

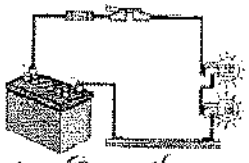
A compression
B rarefraction
C wavelength

Electricity and Machines

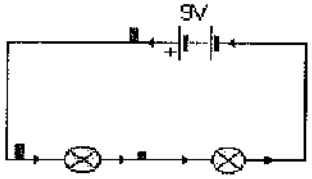
Identify circuits as Series or Parallel



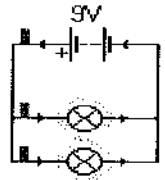
a. Parallel



b. Series



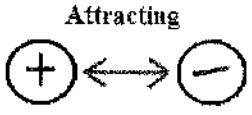
c. Series



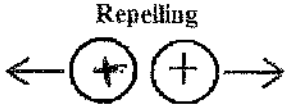
d. Parallel

Complete Charges

Attracting



Repelling



Name and give an example of each simple machine

1. Screw — Example: spiral stair case
2. wheel & axel — Example: roller skates
3. wedge — Example: knife, door stop
4. lever — Example: crow bar, hammer
5. inclined plane — Example: plain + ramp
6. Pully — Example: flag on flag pole, Stage curtains

Name: _____ Date: _____ Period: _____

Chemistry - Chemical Reactions and Properties of Matter EOCT Review part 3

1. Find the density of the following objects:

Object	Mass	Volume	Density	Object	Mass	Volume	Density
Large cylinder	28 g	5 ml	5.6 g/ml	Large cube	45 g	10 cm3	4.5 g/cm3
Small cylinder	15 g	3 ml	5 g/ml	Large circle	22 g	5 ml	4.4 g/ml
Small cube	27 g	6 cm3	4.5 g/cm3	Small circle	11 g	2 ml	5.5 g/ml

Work: shown in chart

$\text{Density} = \frac{\text{mass}}{\text{volume}}$

2. Which two samples of the three types of items above (cylinder, cube, or circle) do you think is made of the same material? Why? small & large cube, b/c they have same density

3. What is the difference between an ionic compound and a covalent compound?
   metal + nonmetal → 2 nonmetals

4. What is a valence electron?
   electron in outer energy level, equals 1 digit of group #

5. What is an oxidation #?
   charge element forms

6. What is the difference between a cation and an anion?
   cation = + charge, formed by metals ; anion = − charge, formed by nonmetals

7. Fill in the missing information:

1st element	2nd element	Chemical formula	Chemical Name
Na^{+1}	Cl^{-1}	NaCl	Sodium Chloride
K^{+1}	S^{-2}	K_2S	potassium sulfide
Ca^{+2}	Cl^{-1}	$CaCl_2$	calcium chloride
C	O	CO_2	Carbon dioxide
N	O	N_2O_5	dinitrogen pentaoxide
Mg^{+2}	O^{-2}	MgO	Magnesium oxide
S	O	SO_3	Sulfur trioxide
Mg^{+2}	P^{-3}	Mg_3P_2	magnesium phosphide
Al^{+3}	O^{-2}	Al_2O_3	aluminum oxide
O	F	OF_3	Oxygen triflouride
C	Cl	CCl_4	carbon tetrachloride
Al^{+3}	Cl^{-1}	$AlCl_3$	aluminum chloride
Ca^{+2}	O^{-2}	CaO	calcium oxide
P	O	P_2O_5	diphosphorous pentaoxide
Na^{+1}	S^{-2}	Na_2S	sodium sulfide

Ionic MUST balance charges. No prefixes in name

Covalent MUST have prefixes in name

1 mono	6 hexa
2 di	7 hepta
3 tri	8 octa
4 tetra	9 nona
5 penta	10 deca

8. Balance the following equations and tell what type of reaction it is

a) 2 $NaBr$ + 1 $Ca(OH)_2$ → 1 $CaBr_2$ + 2 $NaOH$ reaction type double replacement

b) 2 NH_3 + 1 H_2SO_4 → 1 $(NH_4)_2SO_4$ reaction type synthesis

c) 4 C_5H_9O + 27 O_2 → 20 CO_2 + 18 H_2O reaction type combustion

d) 3 Pb + 2 H_3PO_4 → 3 H_2 + 1 $Pb_3(PO_4)_2$ reaction type single replacement

e) 1 Li_3N + 3 NH_4NO_3 → 3 $LiNO_3$ + 1 $(NH_4)_3N$ reaction type double replacement

f) 3 HBr + 1 $Al(OH)_3$ → 3 H_2O + 1 $AlBr_3$ reaction type double replacement

Classify the following chemical reactions

1. $C_4H_8 + 6O_2 \rightarrow 4CO_2 + 4H_2O$ Combustion	2. $HCl + NaOH \rightarrow H_2O + NaCl$ double replacement
3. $2KNO_{3(s)} \rightarrow 2KNO_{2(s)} + O_{2(g)}$ decomposition	4. $AgNO_3 + NaCl \rightarrow NaNO_3 + AgCl$ double replacement
5. $2Mg + O_2 \rightarrow 2MgO$ Synthesis	6. $2Ag + S \rightarrow Ag_2S$ Synthesis
7. $MgCO_{3(s)} \rightarrow MgO_{(s)} + CO_{2(g)}$ decomposition	8. $Cl_2 + 2KBr \rightarrow 2KCl + Br_2$ Single replacement

9. In the following examples identify the solute and the solvent.

a) Sugar dissolved in water - solute Sugar solvent water

b) Salt dissolved in water - solute salt solvent water

c) Carbon dioxide in soda - solute CO_2 solvent soda

10. What are the three things that will increase the rate of solubility of a solid in a liquid?

crush it (increase surface area), stir it, heat solvent

11. What are the two things that will increase the rate of solubility of a gas into a liquid?

cool it (low temps), Add pressure, don't stir

12. List 3 properties specific to acids:

a) sour

b) low pH < 7

c) produce hydrogen ions H^{+1}

13. List 3 properties specific to bases:

a) bitter, slippery

b) high pH > 7

c) produce hydroxide (OH^{-1})

14. List 2 properties that acids and bases share:

a) change color of indicators

b) are electrolytes

15. Explain what happens when an acid neutralizes a base.

acid + base → salt + water

16. Indicate whether the following substances are strong acids, weak acids, neutral, weak bases, or strong bases based on their pH.

a) WB Baking soda pH = 8

b) WB Liquid plumber pH = 12

c) WA Pepsi pH = 2.6

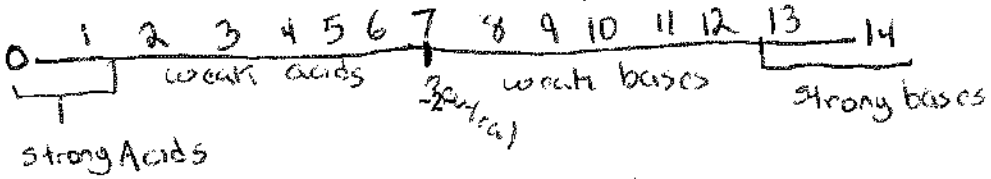
d) WA Pickle juice pH = 5

e) SB Lye pH = 13

f) WB Ajax liquid pH = 7.8

g) WA Nail polish Remover pH = 6.5

h) N Purified water pH = 7



Chemistry Vocabulary Matching

1. Neutralize B 2. Neutral C 3. Acid rain A 4. Acid E 5. Base D	a. When pollution causes rain to be acidic (pH of less than 5.6). b. To mix acids and bases to cancel each other out and make salt and water. c. Equal number of H+ and OH– ions; water is an example. d. A compound that adds OH– ions to water. e. A compound that adds H+ ions to water.
1. Weak acid C 2. pH a 3. Strong Acid D 4. Salt Water B 5. Weak Base E	a. The measure of acids and bases. b. The product of a neutralization reaction between an acid and a base. c. A compound that adds a few H+ ions to water. d. A compound that adds a lot of H+ ions to water. e. A compound that adds a few OH– ions to water.
1. Alpha Particle D 2. Gamma Ray E 3. Beta Particle B 4. Radioactive C 5. Uranium A	a. The largest natural element. Fuel for fission reactors. b. Can be stopped by wood; occurs when a neutron breaks into a proton and electron. c. An atom that emits energy or a particle. d. A helium nucleus (2 protons and 2 neutrons); low in energy. e. Powerful radiation that can cause biological damage; takes many feet of concrete to stop.
1. Chain reaction C 2. Fission B 3. Fusion A 4. Half-life E 5. Carbon Dating D	a. Combining smaller atoms into larger atoms. b. Splitting large atoms into smaller ones. Toxic by-products. c. When one fission causes another and another, etc… d. Using the known decay of an isotope to determine the age of objects. e. The time necessary for 50% of a radioactive sample to decay.
1. Solution C 2. Alloy B 3. Dissolve D 4. Suspension F 5. Colloid E 6. Insoluble A	a. When a substance cannot be dissolved into a solution. b. A mixture of two metals. c. A mixture that is homogeneous at the molecular level. d. When something seems to disappears into a solution. e. A mixture that scatters light and the particles do not settle out. f. A temporary mixture; the particles will settle into layers.
1. Supersaturated C 2. Saturated B 3. Unsaturated A 4. Solute E 5. Solvent D	a. When a solution can hold more solute. b. When a solution can't hold more solute. c. When a solution has more solute than it can hold. d. The part of a solution that is biggest. (The water in salt water.) e. The part of a solution that is smallest. (The salt is salt water.)
1. Ion B 2. Cation E 3. Anion A 4. Neutral C 5. Octet Rule D	a. A negatively charged ion: non-metals b. A positively or negatively charged atom because electrons have been gained or lost c. An atom with the same number of protons and electrons d. Says the atoms will gain, loses, or share electrons in order to have 8 valance electrons e. A positively charged ion: metals

Draw Lewis diagram for following elements:

Calcium 

Oxygen 

Silicon 

Indium 

Identify as Acid, Base, or Neutral

A pH below 7	B pH above 7
N pH of 7	B taste bitter
A taste sour	B feels slippery
N pure water	A lemon juice
B bleach	B hydrogen acceptor
B produces OH^{-1}	A hydrogen donor
A produces H^{+1}	N equal # of H^{+1} and OH^{-}

Give Valance Electrons for:

Lithium 1 Nitrogen 5 Chlorine 7 Calcium 2

Phosphorous 5 Aluminum 3 Selenium 6

Give oxidation number (charge) for:

Lithium +1 Nitrogen -3 Chlorine -1 Calcium +2

Phosphorous -3 Aluminum +3 Selenium -2

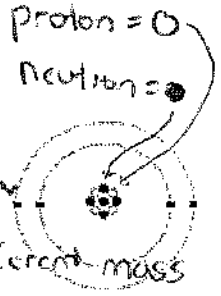
Name Key Date Period

Chemistry—Atomic and Nuclear Theory and the Periodic Table EOCT Review part 4

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

Particle	location	charge
Proton	in nucleus	+
Neutron	in nucleus	0
electron	in electron cloud	−

2. Label the parts of the beryllium (Be) atom to the right ----------→



3. What is an isotope? atom w/ same # of protons but different # of neutrons + different mass
4. How are the elements arranged in the periodic table? atomic #
5. valence electrons determine how an atom will react.
6. What does the atomic number tell you? # of protons, + in neutral atom # of electrons
7. How do you find the number of neutrons an atom of an element would have? atomic mass − atomic # = neutrons
8. What are valence electrons and how do you find out how many valence electrons an element has?
   → electrons in outer energy level → look at 1's digit of group #
   Al in group 13 has 3 valence electrons
9. Give the number of protons, neutrons and electrons in the following isotopes:

	# of protons	#of neutrons	# of electrons
a. Mg-24	12	24-12 = 12	12
b. Mg-26	12	26-12 = 14	12
c. N-15	7	15-7 = 8	7
d. O-18	8	18-8 = 10	8
e. Si-30	14	30-14-16	14
f. S-34	16	34-16 = 18	16

Mg-24 → is atomic mass of isotope

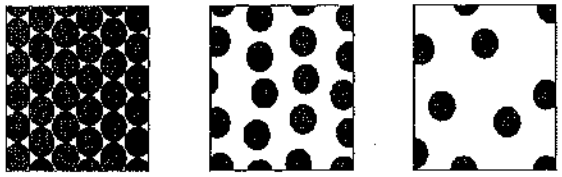
atomic # = P^+ = ● e^-

10. 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
^{23}Na	11	23	11	11	12
K	19	40	19	19	21
F	9	19	9	9	10
Ca^{+2}	20	41	20	18	21
Sn	50	119	50	50	72
^{131}I	53	131	53	53	69
$^{109}_{47}Ag^{+1}$ or Ag^{+1}-109	47	109	47	46	62
$^{2}_{1}H$ or H-2	1	2	1	1	1
^{36}S	16	36	16	16	20

11. What is radioactivity? process that unstable atoms release energy or particles to become stable
12. What is half-life? amount of time it takes for 50% of a radioactive substance to decay
13. If we start with 400 atoms of a radioactive substance, how many would remain after one half-life? 200 atoms after two half-lives? 100 atoms after three half-lives? 50 atoms after four half-lives 25 atoms ?
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? half-life of C-14 is 5730 years

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? $100/2 = 50 \;/2 = 25 \;/2 = 12.5/2 = 6.25/2 = \boxed{3.125\text{ g}}$ (life 1, life 2, life 3, life 4, life 5)
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? $20/2 = 10 \;/2 = 5/2 = 2.5/2 = 1.75/2 = \boxed{0.875\text{ mg}}$ (1, 2, 3, 4, 5) $40 \div 8 = 5$ lifes passed
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 $0.8\text{g}/2 = 0.4\text{g} \div 2 = 0.2\text{g}$ (1 life, 2 lifes passed) $\frac{10.5\text{ yr}}{2\text{ lifes}} = 5.25\text{ yr}$
18. The three most common states of matter are solid, liquid & gas.
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 slower / less than do the particles that makes up a gas.
22. Matter that has a definite volume but no definite shape is a liquid.
23. Matter that has a definite volume and a definite shape is a solid
24. If you move a substance from one container to another and its volume changes, the substance is a gas.



25. In the above picture, which substance is a liquid? B
26. In the above picture, which substance is a solid? A
27. In the above picture, which substance is a gas? C
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? C gases

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

melting pt = freezing pt

boiling pt = condensation pt

29. Based on the information in the table above, the melting point of acetic acid is 16.6 °C.
30. Based on the information in the table above, the freezing point of nitrogen is −210.0 °C
31. Based on the information in the table above, which substances would be a gas at 0°C? would need Boiling pt < 0°C so Hydrogen, Nitrogen

32. A solution is a homogeneous mixture of two or more components.

33. The solvent is the component in the greatest amount.

34. The solute is the component in the least amount

35. In a mixture, the solvent dissolves in the solute.

36. If you dissolve sugar in water, which is the solvent and which is the solute? Water = solvent Sugar = solute

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? water

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 = solvent Oxygen = solute

Classification of Matter—Know definition of Matter; Be able to give examples of and tell difference between: Mixtures and substances (non-mixtures); Homogenous and heterogeneous mixtures; Elements vs. Compounds.

Label as Mixture or Pure Substance		
Salt Water M	Chicken Soup M	
Water PS	Salt PS	
Silver PS	Chex mix M	
Label as Homogenous or Heterogeneous		
Sugar Water Hom	Vegetable Soup Het	
Chex Mix Het	Jello w/ fruit Het	
Milk Hom	Plain Jello Hom	

1. Pure substance F	(a.) Made up of two types of matter that can be physically separated.
2. Mixture A	b. Two samples might not be the same.
3. Heterogeneous Mixture B	c. Two samples will have the same makeup.
4. Matter G	~~d.~~ Has only one kind of atom in the sample.
5. Element D	~~e.~~ Contains two kinds of atoms that *cannot* be physically separated.
6. Homogeneous Mixture C	~~f.~~ Cannot be separated by physical means.
7. Compound E	~~g.~~ A classification of anything that has mass and takes up space.

Write the metric prefixes in order from largest to smallest:

Kilo hecta deca base deci centi milli
K h da d c m

Convert the Following

3.2 kilometers = 3200 meter

0.23 centimeters = 2.3 millimeters

0.12 liter = 120 milliliters

2500 milliliters = 2.5 liters

4500 grams = 4.5 kilograms

9 kilograms = 9000 grams

~~54 megaliters~~ = did not learn meters centiliters

Identify Physical or Chemical Change

Sugar dissolved in water Phy

Wood burning Chem

Digestion Chem

Water Boiling Phy

Two liquids bubble when mixed Chem

Cooking food Chem

Melting butter Phy

Circle the acids and underline the bases

$H_2(PO_4)$ HF $Ca(OH)_2$

$Ca(OH)_2$ NaOH HNO_3

Circle the indicators of physical changes
Underline the indicators of a chemical change

Melts	Produces gas	Changes in color
Changes Smell	Ripped	Cutting
Boils	Turns cloudy	Changes taste
Breaks	Dissolves	Freezing

1. Proton C	a. Particles with no charge that exists in the nucleus of most atoms.
2. Neutron A	b. Center of the atom, contains most of the atom's mass.
3. Electron F	c. Positively charged particle in the nucleus of the atom.
4. Nucleus B	d. The smallest part of an element or molecule.
5. Atom D	e. ~~Negative particles in the nucleus of the atom~~
	f. Negatively charged particle that exists in the space around the nucleus.

1. Atomic Number B/F	a. Total number of protons and neutrons in the nucleus of an atom.
2. Molecule E	b. Number of protons in an atom; also the way the elements are numbered.
3. Compound D	c. An atom with a different number of neutrons
4. Mass Number A	d. Two or more elements combined.
5. Isotope C	e. Two or more atoms that are combined
	f. Number of electrons in an atom.

Solution (So); Colloid (C); Suspension (Sp)

Milk in water Sp Doesn't settle; scatters light C

Vinegar in water So Doesn't scatter light or settle So

Sand in water Sp Settles and scatters light Sp

Oil and water Sp Fog C Milk C

The temperature at which a solid turns to liquid is called: melting pt

The temperature at which a liquid turns to a gas is called: boiling pt or vaporization

The temperature at which a gas turns to liquid: condensation

The temperature at which a liquid turns to a solid: freezing

When a solid turns straight to a gas is called: sublimation

At what temperature does water melt? 0°c 32°F

At what temperature does water boil? 100°c 212°F

Endothermic or Exothermic

Endo = the reaction or container/ reaction cools

1. If it gets cold Endo
2. If it gets hot Exo
3. Condensation: Exo
4. Vaporization: Endo
5. If it absorbs heat Endo
6. If it releases heat Exo
7. Melting Endo
8. Freezing Exo

Give the group/family name for the following groups on periodic table

Group 1: alkali metals

Group 2: alkaline earth metals

Group 13: boron

Group 14: Carbon

Group 15: nitrogen

Group 16: oxygen

Group 17: halogens

Group 18: noble gases

Reading Chemical Equations

$Li_2O + MgCl_2 \rightarrow 2\ LiCl + MgO$

Write the second reactant: $MgCl_2$

Write the first product: LiCl

How many Lithium atoms are on the product side? 2

What is coefficient for lithium chloride? 2

Type of reaction: double replacement

$2\ C_3H_7OH + 9\ O_2 \rightarrow 6\ CO_2 + 8\ H_2O$

Write the first product: CO_2

How many carbons on the reactant side? 6

How many hydrogens on the product side? 16

What is the coefficient for carbon dioxide? 6

Type of reaction: Combustion

Physical Science Reference Sheet

Formulas

Force, Mass and Motion

Velocity = $\frac{\text{displacement}}{\text{time}}$ $\left(v = \frac{d}{t}\right)$

Acceleration = $\frac{\text{final velocity} - \text{initial velocity}}{\text{time}}$ $\left(a = \frac{v_f - v_i}{t}\right)$

Weight = mass × acceleration of gravity $(w = mg)$

Force = mass × acceleration $(F = ma)$

Work = force × distance $(W = Fd)$

Mechanical advantage =

$\frac{\text{effort distance}}{\text{resistance distance}} = \frac{\text{resistance force}}{\text{effort force}}$ $\left(\text{MA} = \frac{d_e}{d_r} = \frac{f_r}{f_e}\right)$

Chemical Reactions and Properties of Matter

Density = $\frac{\text{mass}}{\text{volume}}$ $\left(D = \frac{m}{V}\right)$

Volume of a rectangular solid = length × width × height $(V = lwh)$

Heat lost or gained =
mass × specific heat capacity × change in temperature $(Q = mc\Delta T)$

Waves, Electricity and Magnetism

Voltage = current × resistance $(V = IR)$

Constants and Relationships

Kelvin = °Celsius + 273 (K = °C + 273)

Acceleration due to gravity: $g \approx 10 \frac{m}{sec^2}$

newton: 1 N = 1 kg • $\frac{m}{s^2}$

joule: 1 J = 1 N • m

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Turn over for the Periodic Table of the Elements.

Georgia Physical Science End-of-Course Test

Periodic Table

Key

Atomic number — 29
Element symbol — Cu
Element name — Copper
Average atomic mass — 63.55

1																	18
1 H Hydrogen 1.01	2											13	14	15	16	17	2 He Helium 4.00
3 Li Lithium 6.94	4 Be Beryllium 9.01											5 B Boron 10.81	6 C Carbon 12.01	7 N Nitrogen 14.01	8 O Oxygen 16.00	9 F Fluorine 19.00	10 Ne Neon 20.18
11 Na Sodium 22.99	12 Mg Magnesium 24.31	3	4	5	6	7	8	9	10	11	12	13 Al Aluminum 26.98	14 Si Silicon 28.09	15 P Phosphorus 30.97	16 S Sulfur 32.07	17 Cl Chlorine 35.45	18 Ar Argon 39.95
19 K Potassium 39.10	20 Ca Calcium 40.08	21 Sc Scandium 44.96	22 Ti Titanium 47.87	23 V Vanadium 50.94	24 Cr Chromium 52.00	25 Mn Manganese 54.94	26 Fe Iron 55.85	27 Co Cobalt 58.93	28 Ni Nickel 58.69	29 Cu Copper 63.55	30 Zn Zinc 65.39	31 Ga Gallium 69.72	32 Ge Germanium 72.61	33 As Arsenic 74.92	34 Se Selenium 78.96	35 Br Bromine 79.90	36 Kr Krypton 83.80
37 Rb Rubidium 85.47	38 Sr Strontium 87.62	39 Y Yttrium 88.91	40 Zr Zirconium 91.22	41 Nb Niobium 92.91	42 Mo Molybdenum 95.94	43 Tc Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.91	46 Pd Palladium 106.42	47 Ag Silver 107.87	48 Cd Cadmium 112.41	49 In Indium 114.82	50 Sn Tin 118.71	51 Sb Antimony 121.76	52 Te Tellurium 127.60	53 I Iodine 126.90	54 Xe Xenon 131.29
55 Cs Cesium 132.91	56 Ba Barium 137.33	57-71 ☆	72 Hf Hafnium 178.49	73 Ta Tantalum 180.95	74 W Tungsten 183.84	75 Re Rhenium 186.21	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.97	80 Hg Mercury 200.59	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.98	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)
87 Fr Francium (223)	88 Ra Radium (226)	89-103 ☆☆	104 Rf Rutherfordium (261)	105 Db Dubnium (262)	106 Sg Seaborgium (266)	107 Bh Bohrium (264)	108 Hs Hassium (269)	109 Mt Meitnerium (268)	110 Ds Darmstadtium (281)	111 Rg Roentgenium (272)	112 Uub Ununbium (285)	113 Uut Ununtrium (284)	114 Uuq Ununquadium (289)	115 Uup Ununpentium (288)			

☆ Lanthanide series	57 La Lanthanum 138.91	58 Ce Cerium 140.12	59 Pr Praseodymium 140.91	60 Nd Neodymium 144.24	61 Pm Promethium (145)	62 Sm Samarium 150.36	63 Eu Europium 151.96	64 Gd Gadolinium 157.25	65 Tb Terbium 158.93	66 Dy Dysprosium 162.50	67 Ho Holmium 164.93	68 Er Erbium 167.26	69 Tm Thulium 168.93	70 Yb Ytterbium 173.04	71 Lu Lutetium 174.97
☆☆ Actinide series	89 Ac Actinium (227)	90 Th Thorium 232.04	91 Pa Protactinium 231.04	92 U Uranium 238.03	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (259)	103 Lr Lawrencium (262)