Study Guide for 1st Semester Physical Science Final Exam

1. Define matter.
	1. Matter is anything that has mass and takes up space!
2. Define atom.
	1. Atoms make up matter. An atoms is the smallest whole unit of matter. It has mass and takes up space.
3. Draw a picture of an atom showing where protons, neutrons, and electrons are located.



1. How do we know the number of protons, neutrons and electrons in an atom?
	1. Protons = Atomic #
	2. Electrons = Atomic #
	3. Neutrons = Atomic mass – Atomic #
	4. Mass = Protons + Neutrons
2. Where is most of the mass of an atom located?
	1. The nucleus
3. What is the symbol for the following elements?
	1. Carbon = C
	2. Sodium = Na
	3. Chlorine = Cl
4. What charge does each part of an atom have?
	1. Electron has negative charge.
	2. Proton has positive charge.
	3. Neutron has neutron/no charge.
5. Define element.
	1. An element is made up of atoms of only one type. Elements are found on the periodic table.
6. Why are all of the substances on the periodic table classified as elements?
	1. Because they are made up of only one type of atom.
7. The atomic number of an element is the same as the number of protons and number of electrons.
8. Label the groups and columns on the following picture of the periodic table.



1. Color the boxes the appropriate color to delineate each group on the periodic table.
	1. Color the Alkali Metals blue
	2. Color the Alkaline Earth Metals Red
	3. Color the Transition Metals Pink
	4. Color the Halogens Yellow
	5. Color the Noble Gases Green
2. How is the periodic table organized?
	1. By groups (vertical columns) and periods (horizontal rows).
3. What do all elements in a period have in common?
	1. Same # of energy levels for their electrons
4. What do all elements in a group have in common?
	1. Same # of valence electrons in their outer energy level
5. Define compound.
	1. 2 or more elements that are jointed together by valence electron bonds
6. How is a compound made?
	1. Valence electrons are shared by two or more atoms
7. What two categories is all matter classified into? Make a tree map using the following words: pure substance, mixture, elements, and compounds, heterogeneous, homogeneous.
8. Define pure substance.
	1. A pure substance has a single kind of matter that makes it up. It always has a specific makeup or composition. Elements and compounds are pure substances.
9. Define mixture.
	1. A mixture is made of two or more substances that are physically mixed together but NOT chemically combined. Each substance in a mixture keeps its individual properties. No electrons are shared between the atoms!!
10. Which metal is not solid at room temperature?
	1. Mercury
11. How many total atoms are in the following chemical formulas?
	1. NaCl – 2 atoms
	2. C2H3Cl4 - 9 atoms
	3. Mg(C2H3O2)2 - 15 atoms
12. What is the chemical formula for the following compounds?
	1. CCCCCCHHHHHHHHOOOOOO – C6H8O6
	2. HHSOOOO – H2SO4
	3. CClClFF - CCl2F2
13. How many of each atom is in a unit of calcium phosphate? Ca3(PO4)2
	1. 3 Calcium Atoms
	2. 2 Phosphorus Atoms
	3. 8 Oxygen Atoms
14. Does each statement characterize nonmetals, metals, or metalloids?
	1. **Metal** Good conductors of electricity
	2. **Metal** Malleable and ductile
	3. **Metal** Good conductors of heat
	4. **Nonmetal**  Gases at room temperature
	5. **Nonmetal** Poor conductors of heat
	6. **Nonmetal**  Brittle
	7. **Nonmetal** Poor conductors of electricity
	8. **Metal** Good conductors of heat
	9. **Metal** To the left of the zigzag line
	10. **Nonmetal**  To the right of the zigzag line
	11. **Metalloid** Along the zigzag line
15. What is the law of conservation of matter?
	1. This law says that matter cannot be created or destroyed, but it can change forms. This means that matter is recycled. For example, a deer dies. Insects and wild animals eat the deer. Some of the deer decomposes into the ground. The deer did not “disappear” from Earth, rather the deer’s matter was recycled by Earth and become something new (part of another animal’s body by eating it or part of the soil).
16. Define homogeneous mixture.
	1. A mixture in which you cannot see the “parts” that make up the mixture because it is so well mixed. For example, in Kool Aid the powder, sugar and water are so well mixed that you can no longer see the powder and sugar.
17. Define heterogeneous mixture.
	1. A mixture in which you can still see the individual parts that make up the mixture. For example, a tossed salad. You can see the tomatoes, lettuce, dressing, cheese, etc.
18. What is volume?
	1. Is the space that something takes up. We measure it in milliliters using a graduate cylinder.
19. What is a chemical change?
	1. A change in the form or look of matter AND the chemical formula DOES change. Atoms are rearranged to make something completely new!
20. What is a physical change?
	1. A change in the form or look of matter BUT the chemical formula does NOT change. No new matter is formed.
21. Are the following statements examples of chemical or physical changes?
	1. Physical - Bending a coke can
	2. Physical - Evaporation of water
	3. Physical - Candle left in a hot car melting
	4. Chemical - Burning paper
	5. Chemical - Tarnish on a coin
	6. Physical - Shredding a piece of paper into hundreds of tiny strips
	7. Physical - Dropping a dinner plate on the floor
	8. Physical - Melting ice cups in a glass of juice
	9. Chemical - Burning a piece of paper into ashes in the fireplace
	10. Chemical - Different kinds of molecules are present after this type of change
	11. Chemical - A tree growing/living
22. What is the law of conservation of mass?
	1. Same as the law of conservation of matter. Matter/Mass (because all matter has mass) is not created or destroyed, but can change forms. This means that during a chemical reaction, whatever we start with (our reactants) must be equal to our products (what we end up with) in mass. Reactants and products have to have the same mass.
23. In a chemical equation, what are the substances called that are on the left side of the chemical equation? Right side?
	1. Left side of equation are the reactants. Rights side of equation are the products.
24. What is the coefficient of the hydrogen reactant in the following equation? N2 + 3H2 🡪 2NH3
	1. 3
25. Balance the following equations.
	1. \_\_2\_\_H2 + \_\_\_\_O2 🡪 \_\_2\_\_H2O
	2. \_\_2\_\_S + \_\_3\_\_\_O2 🡪 \_\_2\_\_\_SO3
	3. \_\_2\_\_KClO3 🡪 \_\_\_2\_\_KCl + \_\_\_3\_\_O2
26. Are the following elements, compounds, or mixtures?
	1. Compound - H2O
	2. Element - Na
	3. Compound - Salt
	4. Compound - Water
	5. Element - Aluminum
	6. Compound - Carbon Dioxide
	7. Mixture - Fruit Salad
	8. Mixture - Salsa
	9. Compound - Sodium Chloride
27. Are the following homogeneous or heterogeneous mixtures?
	1. Homogeneous - Sugar
	2. Heterogeneous - Spaghetti
	3. Homogeneous - Apple juice
	4. Heterogeneous - Vegetable soup
	5. Heterogeneous - Ranch dressing
	6. Homogeneous – Cheerios (with no milk….just the cereal!)
	7. Homogeneous - Chocolate ice cream
28. Are the following statements characteristics of a gas, liquid, or solid?
	1. Solid - Indefinite/not fixed volume
	2. Solid - Particles are very close together
	3. Liquid - Particles are close together
	4. Gas - Particles are free moving
	5. Solid - Particles vibrate
29. Changes in forms of energy are called \_\_transformations\_\_\_\_\_\_\_. (Hint: starts with a “T”)
30. What two things does kinetic energy depend on?
	1. Mass and speed
31. What two things does potential energy depend on?
	1. Position and composition (what it is made of)
32. When you see a change in the environment you know that \_\_ENERGY\_\_\_\_\_ has been transferred.
33. Determine the primary type of energy (Choices: stored mechanical, electrical, nuclear, chemical, radiant, electrical, gravitational, thermal)
	1. Nuclear - Atom bomb
	2. Stored Mechanical - Stretched bow and arrow
	3. Chemical - Food
	4. Thermal - Heated oven
	5. Electrical - Wall socket/outlet
	6. Gravitational - Book on a shelf
	7. Chemical - Fossil Fuels (coal, oil and natural gas)
	8. Chemical - Batteries
34. Draw and label the energy transfer that takes place in a pendulum.



1. Draw and label the energy transfer that takes place in a roller coaster that has a large hill followed by a small hill.

