**Matter Unit Test Study Guide**

Name: \_\_Answer Key\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Core: \_\_\_\_\_

**Directions**: Please use your notes and/or the textbook to complete each of the questions below to the best of your ability. Make sure to also review your notes and any hand-outs from class in preparation for this test. The questions below are only meant to serve as a guide. Even if not listed on this sheet, all material from the notes, hand-outs, and other in-class activities will be used in the making of the unit test. Good Luck!

Define the following vocabulary words:

1. Atom: the smallest unit of an element that has the properties of that element
2. Thermal Energy: energy in the form of heat. Heat is the flow of energy from a hot object to a cooler one.
3. Boiling point: The specific point, or temperature, at which a liquid changes to the gaseous state.
4. Freezing point: The specific point, or temperature, at which a liquid changes to a solid.
5. Element: a pure substance that cannot be broken down into simpler substances by chemical reactions
6. Physical property: a characteristic that can be observed (intensive), such as texture, color, odor, melting point, boiling point, density, or measured (extensive) such as mass, length, volume, that is used to describe matter and can be observed or measured without changing its composition
7. Malleable: the ability of a material to be beaten into a thin sheet or to be shaped without breaking
8. Ductile: The ability of a material to be drawn out into a thin wire.
9. Melting point: The specific point, or temperature, at which a solid changes to a liquid.
10. Matter: everything that has mass (matter) and volume (takes up space).
11. Pure substance: a material with a particular chemical makeup
12. Compound: a chemical combination of two or more elements
13. Heterogeneous: a substance in which the parts are clearly different shapes and colors; different throughout
14. Homogeneous: a substance in which all of the parts are the same throughout
15. Mixture: a combination of substances that can be physically separated from one another
16. Solution: a mixture in which a solid and a liquid or two liquids are mixed so evenly, that it is not possible to see the separate particles
17. Solute: a substance that has the ability to be dissolved by a solvent to create a solution
18. Solvent: a substance that has the ability to dissolve a solute when forming a solution
19. Colloid: a type of heterogeneous mixture in which particles of moderate size are suspended in a liquid, solid, or gas medium
20. Atomic mass: The combined mass of all of the protons and neutrons of an atom. Since each proton and neutron has a mass of approximately one unit (called an atomic mass unit) the atomic mass is approximately equal to the number of protons and neutrons.
21. Atomic number: the number of protons in the nucleus of an atom; atomic number determines the chemical properties of the atom
22. Periodic table: the chart scientists use to organize and classify all the known elements
23. Molecule: two or more atoms joined together
24. Sublimation: The name of the phase change when a solid changes into a gas.
25. Deposition: The name of the phase change when a gas changes into a solid.
26. Condensation: The phase change when a gas goes to a liquid.
27. Evaporation: The phase change when a liquid goes to a gas.
28. What do we need to calculate to find out if an object is matter or not? Matter is defined as anything that has both mass and volume. To find the mass, you will need to measure it with a scale, and the unit will be in grams. To find the volume, you will need either a ruler (unit = cm3) or graduated cylinder (unit = mL).
29. Explain how and when to use the volume formula (length X width X height): The volume formula is used to find the volume of a REGULAR object. To use the volume formula, you will need the object and a ruler. Remember- always measure using the METRIC (centimeters) side! **First,** set the block on the desk and measure bottom edge that faces you. Write that number down as the length. **Second,** measure the edge on the side that is going away from you. Write that number down as the width. **Third,** measure how tall the object is. Write that number down as the height. **Finally,** MULTIPLY the numbers. Now you have the volume of your regular object.
30. Explain how and when to use the displacement method: The displacement method is used to find the volume of an IRREGULAR object. To use the displacement method, you need the object, water, and a graduated cylinder. **First**, you hold the object against the side of the cylinder to see how much water you will need. REMEMBER- the object must be submerged once it’s dropped in the cylinder. A good rule of thumb is to measure it against the side, then add at least 10. **Second**, add the WATER ONLY to the graduated cylinder up to the line you just calculated. Check to make sure the water is exactly at that line. Write that number down as your initial. **Third**, carefully drop the object into the cylinder. If any water spills out, you will need to start over. Measure the new height of the water and write that number down as your final. **Finally**, plug the numbers into the equation: final-initial. Now you have the volume of your irregular object. ☺
31. What is the difference between mass and weight? Mass is the amount of matter within an object. This number remains constant throughout the universe. Weight, however, also depends on the force of gravity pulling an object toward the ground. This changes based on location in the universe. For example, your mass will still be the same on the moon (you did not gain or lose matter) but your weight will change because the moon’s gravity is less than that of the Earth.
32. What is density? Make sure to use the formula in your explanation. Density is how much mass is within a given volume, or how much matter is within a space. The formula to calculate density is Density = Mass ÷ Volume, or D = M/V. Remember, the density of an object should be a small number. If there are numbers beyond the decimal point, you only need to write the first two or three digits. For example, if the calculator says “0.08522904828” you only need to write “0.085” as your answer. Don’t forget to include the units, though!
33. What determines whether an object will float or sink? Density. If the object’s density is greater than that of the gas or liquid around it, it will sink. If the object’s density is less than the gas or liquid surrounding it, the object will float.
34. What is a physical property of matter? Give at least 3 examples. A physical property is one that can be observed or measured without changing the type of matter. Density, malleability, ductility, and magnetism are all examples of physical properties.
35. Describe what happens to the particles (atoms) of a gas when heat energy is taken away. As the energy is taken away, the atoms begin to move slower and they start to condense, or move together. If they continue to lose heat energy, they will go through a phase change to liquid, called condensation. The atoms could also lose the energy efficiently enough to go straight to a solid, in a process called deposition.
36. What is the difference between a solution, suspension, and a colloid? Each of these is a type of mixture. In a solution, some of the key characteristics are that it is uniform throughout, light can easily pass through it, and it involves a solute being dissolved in a solvent. In a suspension, the solid does not get dissolved, but instead it settles out into layers. In a colloid, the solid remains suspended evenly throughout the mixture, and light cannot pass through it. Colloids typically do not settle out, or only settle after a long period of time has passed.
37. Why is the periodic table so important? The periodic table is important because it classifies all known elements in the universe by their atomic number and organizes them in a way that it is easy to detect patterns in the elements, which was, and still is, important for finding new elements.
38. What is the difference between an atom and an element? An atom is the general term for all of the atoms that make up all of the matter in the universe, but an element refers to a specific type of atom that has a specific atomic number, atomic mass, and physical and chemical properties.
39. Explain what happens when a solvent reaches it saturation point. (How do you know?) Once the saturation point has been reached, no more solute will dissolve in the solvent.
40. What is the difference between heat and temperature? Heat is the energy that flows due to a difference in temperature, where temperature is the average motion of atoms
41. Why do objects expand when heat is added to them and contract when heat is taken away?

As heat energy is added, the atoms of a substance begin to move faster and spread out. As heat energy is taken away, they begin to move slower and get closer together.

1. Can cold be transferred to objects? Explain. No, only heat can be transferred. Cold is simply the absence of heat. Objects feel cold because heat has been transferred from them.
2. What is convection? Convection when thermal energy is transferred by the circulation, or movement, of liquids or gases due to uneven heating.
3. What is conduction? Conduction is heat transfer that occurs through direct contact.
4. What is radiation? Radiation is when heat is transferred through waves. An important thing to note about radiation is that it is the ONLY type of heat transfer that can occur within a vacuum (space).

**Read the following statements and decide if they are convection, conduction, or radiation and put the best answer on the line.**

1. A huge rock in the sun at the state park gets hot on a sunny day: \_\_\_Radiation\_\_\_\_\_\_
2. Hot coffee is stirred with a spoon and the spoon gets hot: \_\_\_\_\_Conduction\_\_\_\_\_\_\_
3. The cause of weather systems on Earth: \_\_\_\_\_\_Convection\_\_\_\_\_\_\_
4. You are in the top bunk of a bunk bed and you want to turn the air conditioner on while your friend on the bottom bunk is fine is caused by: \_\_\_\_\_Convection\_\_\_\_\_\_\_
5. A house burns down. On the house beside it, all of the siding is twisted and warped by the heat. The heat was transferred to this house by: \_\_\_\_Radiation\_\_\_\_\_\_

**51-60 Fill in the diagram below using the following terms: boiling point, freezing point, melting point, sublimation, evaporation, melting, deposition, freezing, condensation. Each word is worth one point.**

1. Sublimation
2. Deposition
3. Melting
4. Freezing
5. Condensation
6. Evaporation
7. Boiling Point
8. Freezing Point
9. Melting Point
10. Plasma is the other main state of matter where a gas has become highly charged, or ionized.