**Name**_____                                    **Period** _____

# Unit 2 I Can Statements: Matter + Energy
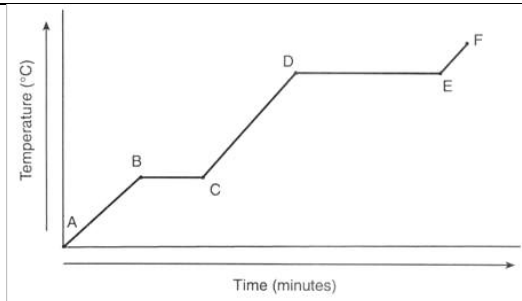
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| ____**1. I can draw particle diagrams to represent an atom, an element, a molecule, a compound, a mixture** | Element | Diatomic Element |
| | Compound | Mixture of two Compounds |

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| ____**2. I can classify substances as a pure substance (element or compound) or as a mixture.** | **Put each of the following examples into the correct column.**<br><br>Examples: $C_{12}H_{22}O_{11}$, NaCl, Fe, salt water, air, $CO_2$, $H_2$, Ar, soda<br><br>_Element_     _Compound_     _Mixture_ |

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| ____**3. I can define homogeneous mixture and heterogeneous mixture in terms of particle distribution.** | **Definitions:**<br><br>homogeneous mixture:<br><br><br>heterogeneous mixture: |

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| ____**4. I can give an example of homogeneous and heterogeneous mixtures.** | Two examples of homogeneous mixtures:<br><br>a.<br><br>b.<br><br>Two examples of heterogeneous mixtures:<br><br>a.<br><br>b. |

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| ____**5. I can classify a property as physical or chemical.** | Write "P" for physical or "C" for chemical on the line provided.<br><br>____copper (II) sulfate is blue.<br><br>____copper reacts with oxygen.<br><br>____copper can be made into wire.<br><br>____copper has a density of 8.96 $g/cm^3$. |

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| \_\_\_\_**6. I can classify a change as physical or chemical.** | Write "P" for **physical** or "C" for **chemical** on the line provided.<br><br>\_\_\_\_copper (II) sulfate dissolves in water.<br><br>\_\_\_\_copper reacts with oxygen to form solid copper (I) oxide.<br><br>\_\_\_\_solid copper is melted.<br><br>\_\_\_\_a chunk of copper is pounded flat.<br><br>\_\_\_\_copper and zinc are mixed to form brass.<br><br>\_\_\_\_a large piece of copper is chopped in half.<br><br>\_\_\_\_copper reacts with bromine to form copper (II) bromide. |
| \_\_\_\_**7. In a particle diagram, I can distinguish between a physical change and a chemical change.** | <br><br>**Substance A**<br><br>Circle the particle diagram that best represents Substance A after a physical change has occurred.<br><br> |
| \_\_\_**8. I can use Table S and the density formula to solve word problems.** | What is the volume of a sample of iron with a mass of 48.3 g? |
| \_\_\_**9. Calculate Percent Error** | A student determines the density of a sample of silver to be $10.81 \text{g/cm}^3$. Determine the percent error of this measurement. |

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| ____10. I can determine how matter will be separated using filtration. | When a mixture of sand, salt, sugar, and water is filtered, what passes through the filter? |
| ____11. I can describe how matter can be separated using distillation. | Which physical property makes it possible to separate the components of crude oil by means of distillation? |
| ____12. I can state which separation process (decanting, filtering, distilling, chromatography, or evaporating) is best for a given situation. | To separate a mixture of salt and water, the best method of separation would be_____.<br><br>To separate a mixture of ethanol and water, the best method of separation would be _____.<br><br>To separate a mixture of food coloring dyes, the best method of separation would be _____.<br><br>To separate a mixture of oil and water, the best method of separation would be_____. |
| ___13. I can use particle diagrams to show the arrangement and spacing of atoms/molecules in different phases. | Draw a particle diagram to represent atoms of Li in each phase.<br><br>| **Solid** | **Liquid** | **Gas** |<br>|---|---|---|<br>| | | | |
| ____14. I can state the change of phase occurring in fusion, solidification, condensation, vaporization, melting, boiling, sublimation, deposition, and freezing. | During fusion a substance changes from _____ to _____.<br><br>During solidification a substance changes from _____ to _____.<br><br>During condensation a substance changes from _____ to _____.<br><br>During vaporization a substance changes from _____ to _____.<br><br>During melting a substance changes from _____ to _____.<br><br>During boiling a substance changes from _____ to _____.<br><br>During sublimation a substance changes from _____ to _____.<br><br>During deposition a substance changes from _____ to _____.<br><br>During freezing a substance changes from _____ to _____. |

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| **____ 15.I can use the Law of Conservation of Mass to solve problems.** | A student conducted an experiment in which he placed 100 grams of hydrochloric acid (HCl) into a container with 48.3 grams of Magnesium (Mg).  When the reaction was complete, there was 32.5 grams of Magnesium chloride (MgCl₂) in the container.<br><br>How many grams of hydrogen gas were released from this reaction? Show all work for credit.<br><br>$$Mg(s) \;+\; 2\,HCl(aq) \rightarrow H_2(g) \;+\; MgCl_2(aq)$$ |
| **____16. I can indicate if a phase change is exothermic or endothermic.** | For each phase change listed, indicate whether the change is exothermic or endothermic.<br><br>fusion/melting_____<br><br>solidification/freezing_____<br><br>condensation_____<br><br>vaporization/boiling_____<br><br>sublimation_____<br><br>deposition_____ |
| **____17. Given a heating/cooling curve, I can determine the temperature at which a substance freezes/melts or condenses/vaporizes.** | <br><br>What is the freezing point of this substance?<br><br>What is the boiling point of this substance? |
| **____18. Given a heating/cooling curve, I can determine which sections of the curve show changes in potential energy.** | <br><br>On the graph, circle the sections that show a change in potential energy. |

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| **____19. Given a heating/cooling curve, I can determine which sections of the curve show changes in kinetic energy.** | On the graph, circle the sections that show a change in kinetic energy. |
| **____20. I can use Reference Table T to determine which "heat" equation is needed for a given problem.** | Which heat equation should be used in each of the following:<br><br>a. How much heat is needed to vaporize 100.0 g of water at 100°C?<br><br>b. How much heat is needed to raise the temperature of 100.0 g of water by 35°C?<br><br>c. How much heat is needed to melt 100.0 g of ice at 0°C? |
| **____21. I can use the "heat" equations to solve for any variable, if I am given the other variables.** | How many grams of water can be heated by 15°C using 13,500 J of heat?<br><br>It takes 5210 J of heat to melt 50.0 g of ethanol at its melting point. What is the heat of fusion of ethanol? |