
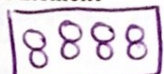




Name Key

Period \_\_\_\_\_

## Unit 2 I Can Statements: Matter + Energy

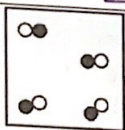
<p>___ 1. I can draw particle diagrams to represent an atom, an element, a molecule, a compound, a mixture</p>	<p>Element</p> 	<p>Diatomic Element</p> 
	<p>Compound</p> 	<p>Mixture of two Compounds</p> 
<p>___ 2. I can classify substances as a pure substance (element or compound) or as a mixture.</p>	<p>Put each of the following examples into the correct column.</p> <p>Examples <math>C_{12}H_{22}O_{11}</math>, <math>NaCl</math>, Fe, salt water, air, <math>CO_2</math>, <math>H_2</math>, Ar, soda</p>	
	<p><u>Element</u></p> <p>Fe <math>H_2</math> Ar</p>	<p><u>Compound</u></p> <p><math>C_{12}H_{22}O_{11}</math> NaCl <math>CO_2</math></p>
<p>___ 3. I can define homogeneous mixture and heterogeneous mixture in terms of particle distribution.</p>	<p><b>Definitions:</b></p> <p>homogeneous mixture: same throughout but consistent composition (physical combo)</p> <p>heterogeneous mixture: physically combined, irregular composition</p>	
<p>___ 4. I can give an example of homogeneous and heterogeneous mixtures.</p>	<p>Two examples of homogeneous mixtures:</p> <p>a. Air</p> <p>b. Milk</p> <p>Two examples of heterogeneous mixtures:</p> <p>a. Salad</p> <p>b. Soil</p>	
<p>___ 5. I can classify a property as physical or chemical.</p>	<p>Write "P" for physical or "C" for chemical on the line provided.</p> <p><u>P</u> copper (II) sulfate is blue.</p> <p><u>C</u> copper <u>reacts</u> with oxygen.</p> <p><u>P</u> copper can be made into wire.</p> <p><u>P</u> copper has a density of <math>8.96 \text{ g/cm}^3</math>.</p>	

6. I can classify a change as physical or chemical.

Write "P" for physical or "C" for chemical on the line provided.

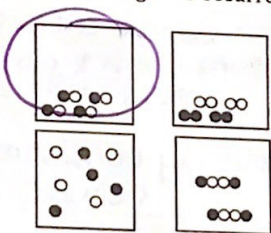
- P copper (II) sulfate dissolves in water.
- C copper reacts with oxygen to form solid copper (I) oxide.
- P solid copper is melted.
- P a chunk of copper is pounded flat.
- P copper and zinc are mixed to form brass.
- P a large piece of copper is chopped in half.
- C copper reacts with bromine to form copper (II) bromide.

7. In a particle diagram, I can distinguish between a physical change and a chemical change.



Substance A

Circle the particle diagram that best represents Substance A after a physical change has occurred.



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?

$$7.87 = D \text{ of iron}$$

$$D = \frac{M}{V}$$

~~$$7.87 = \frac{48.3}{V}$$~~

$$\frac{48.3}{7.87} = \frac{7.87V}{7.87}$$

$$6.14 \text{ ml} = V$$

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.

~~$$\frac{P}{V} \times 100$$~~



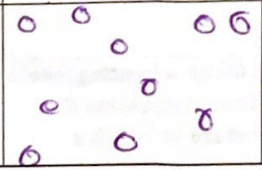


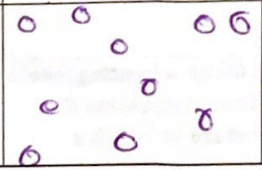


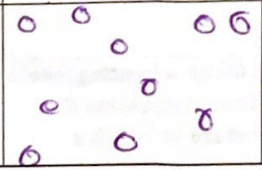
$$\frac{mV - Av}{Av} \times 100 \quad \uparrow mV$$

$$Av = 10.5$$

$$\frac{10.81 - 10.5}{10.5} \times 100 =$$

$$2.95\%$$

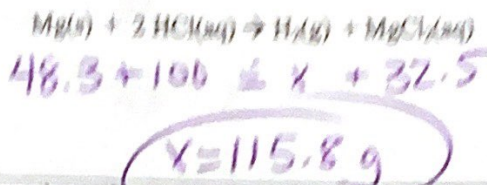


<p>___ 10. I can determine how matter will be separated using filtration.</p>	<p>When a mixture of sand, salt, sugar, and water is filtered, what passes through the filter?</p> <p style="text-align: center;"><u>Salt, sugar + water</u></p>						
<p>___ 11. I can describe how matter can be separated using distillation.</p>	<p>Which physical property makes it possible to separate the components of crude oil by means of distillation?</p> <p style="text-align: center;"><u>Boiling pt</u></p>						
<p>___ 12. I can state which separation process (decanting, filtering, distilling, chromatography, or evaporating) is best for a given situation.</p>	<p>To separate a mixture of salt and water, the best method of separation would be <u>distillation</u></p> <p>To separate a mixture of ethanol and water, the best method of separation would be <u>distillation</u></p> <p>To separate a mixture of food coloring dyes, the best method of separation would be <u>chromatography</u></p> <p>To separate a mixture of oil and water, the best method of separation would be <u>sep. funnel</u></p>						
<p>___ 13. I can use particle diagrams to show the arrangement and spacing of atoms/molecules in different phases.</p>	<p>Draw a particle diagram to represent atoms of Li in each phase.</p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th data-bbox="613 966 857 1018">Solid</th> <th data-bbox="857 966 1109 1018">Liquid</th> <th data-bbox="1109 966 1369 1018">Gas</th> </tr> </thead> <tbody> <tr> <td data-bbox="613 1018 857 1186">  </td> <td data-bbox="857 1018 1109 1186">  </td> <td data-bbox="1109 1018 1369 1186">  </td> </tr> </tbody> </table>	Solid	Liquid	Gas			
Solid	Liquid	Gas					
							
<p>___ 14. I can state the change of phase occurring in fusion, solidification, condensation, vaporization, melting, boiling, sublimation, deposition, and freezing.</p>	<p>During fusion a substance changes from <u>l</u> to <u>s</u>.</p> <p>During solidification a substance changes from <u>l</u> to <u>s</u>.</p> <p>During condensation a substance changes from <u>g</u> to <u>l</u>.</p> <p>During vaporization a substance changes from <u>l</u> to <u>g</u>.</p> <p>During melting a substance changes from <u>s</u> to <u>l</u>.</p> <p>During boiling a substance changes from <u>l</u> to <u>g</u>.</p> <p>During sublimation a substance changes from <u>s</u> to <u>g</u>.</p> <p>During deposition a substance changes from <u>g</u> to <u>s</u>.</p> <p>During freezing a substance changes from <u>l</u> to <u>s</u>.</p>						

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 (MgCl<sub>2</sub>) in the container.

How many grams of hydrogen gas were released from this reaction? Show all work for credit.

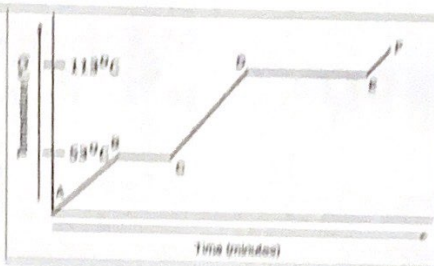


16. I can indicate if a phase change is exothermic or endothermic.

For each phase change listed, indicate whether the change is exothermic or endothermic.

fusion/melting endo  
 solidification/freezing exo  
 condensation exo  
 vaporization/boiling endo  
 sublimation endo  
 deposition exo

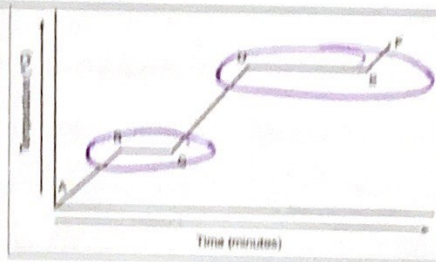
17. Given a heating/cooling curve, I can determine the temperature at which a substance freezes/melts or condenses/vaporizes.



What is the freezing point of this substance? 53°C

What is the boiling point of this substance? 113°C

18. Given a heating/cooling curve, I can determine which sections of the curve show changes in potential energy.

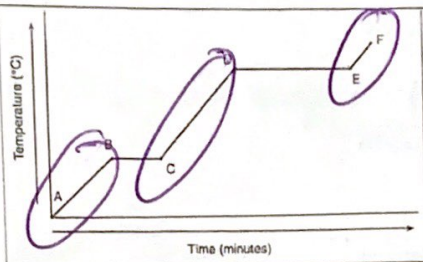


On the graph, circle the sections that show a change in potential energy.

BC  
DE



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:

a. How much heat is needed to vaporize 100.0 g of water at 100°C?

$$Q = mh_v$$

b. How much heat is needed to raise the temperature of 100.0 g of water by 35°C?

$$Q = mc\Delta T$$

c. How much heat is needed to melt 100.0 g of ice at 0°C?

$$Q = mh_f$$

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?

$$m = ?$$

$$Q = mc\Delta T$$

$$13,500 = m(4.18)(15)$$

$$215.3g = m$$

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?

$$Q = mh_f$$

$$\frac{5210}{50} = \frac{50 h_f}{50}$$

$$h_f = 104.2 \text{ J/g}$$