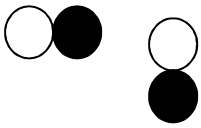
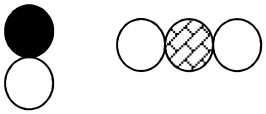
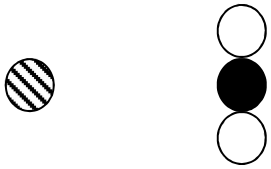
Station1 Review Midterm: Matter

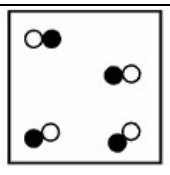
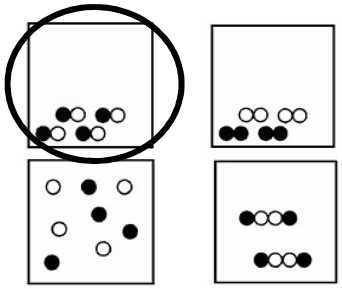
Identify which learning objectives you need to review before your midterm. ONLY do the last column after you've checked the answer key.

<table>
<tr><th>I can statement</th><th colspan="2">Question that you must answer
Only check one of the boxes to the right after you've doe the question and checked it.</th><th>YES. Got it.</th><th>Needs review</th><th>NOPE. Not yet.</th></tr>
<tr><td>1. I can define the following: atom, element, compound, mixture</td><td colspan="2"><u>Definitions:</u>
atom – smallest particle of matter that retains the properties of an element

element –a substance that cannot be broken down into a simpler substance

compound – two or more elements chemically combined in a fixed ratio

mixture – two or more substances physically combined in a variable ratio</td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">2. I can draw particle diagrams to represent an atom, an element, a molecule, a compound, a mixture</td><td>2 Atoms of 1 Element
  </td><td>2 Molecules of 1 Compound
  </td><td></td><td></td><td></td></tr>
<tr><td>Mixture of 2 elements
  </td><td>Mixture of 2 compounds
  </td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Mixture of an element and a compound
  </td><td></td><td></td><td></td></tr>
<tr><td>3. I can classify substances as a pure substance (element or compound) or as a mixture.</td><td colspan="2">Put each of the following examples into the correct column.
Examples: $C_{12}H_{22}O_{11}$, NaCl, Fe, salt water, air, CO_2, H_2, Ar, soda
<table><tr><th>Element</th><th>Compound</th><th>Mixture</th></tr><tr><td>Fe
H_2
Ar</td><td>$C_{12}H_{22}O_{11}$
NaCl
CO_2</td><td>salt water
air
soda</td></tr></table></td><td></td><td></td><td></td></tr>
</table>

I can statement	Question that you must answer	YES. Got it.	Needs review	NOPE. Not yet.
4. I can define homogeneous mixture and heterogeneous mixture in terms of particle distribution.	**Definitions:** homogeneous mixture – **two or more substances physically combined with a uniform distribution of particles** heterogeneous mixture– **two or more substances physically combined with a non-uniform (clumpy) distribution of particles**			
5. I can give an example of homogeneous and heterogeneous mixtures.	Two examples of homogeneous mixtures: a. **brass** b. **a pitcher of Kool-Aid** Two examples of heterogeneous mixtures: a. **snickers bar** b. **soil**			
6. I can classify a property as physical or chemical.	Write "P" for physical or "C" for chemical on the line provided. ___P__copper (II) sulfate is blue. ___C__copper reacts with oxygen. ___P__copper can be made into wire. ___P__copper has a density of 8.96 g/cm^3. ___P_ copper melts at 1358K. __C__copper reacts with nitric acid. ___P__copper doesn't dissolve in water.			
7. 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.			
8. 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. 			

I can statement	Question that you must answer	YES. Got it.	Needs review	NOPE. Not yet.
9. 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? **salt, sugar, and water**			
10. 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? **difference in boiling points**			
11. 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_evaporation_. To separate a mixture of ethanol and water, the best method of separation would be ___distillation____. To separate a mixture of food coloring dyes, the best method of separation would be _____chromatography_____. To separate a mixture of oil and water, the best method of separation would be_____decanting____.			
12. I can define allotrope. (diamond and graphite are examples)	**Defintion:** allotrope – **different forms of the same element that possess different molecular structures**			
13. I can state the differences between two allotropes of the same element.	Two allotropes of the same element have different molecular structures and therefore have different _physical___ and ___chemical_____ properties.			

Station 2 Review Midterm: Gases & phases of matter (subtopic within Matter unit)

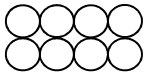
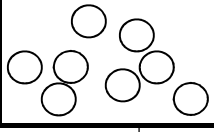
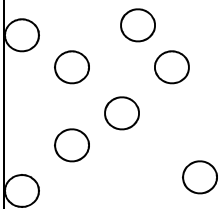
Identify which learning objectives you need to review before your midterm. ONLY do the last column after you've checked the answer key.

I can statement	Question that you must answer	Only check one of the boxes to the right after you've doe the question and checked it.	**YES. Got it.**	**Needs review**	**NOPE. Not yet.**
1. I can state the 5 parts of the Kinetic Molecular Theory.	The five parts of the Kinetic Molecular Theory are: a. Gases consist of tiny particles. b. The size of the particles is so small compared to the space between the particles that the volume of the actual gas particles is negligible. c. Gas particles are in constant, random, straight-line motion, colliding with the walls of the container. These collisions create pressure. d. Gas particles have no intermolecular forces (IMF). e. The average kinetic energy of gas particles is directly proportional to their Kelvin temperature.				
2. I can define an ideal gas.	Definition: ideal gas –any gas that conforms to all of the parts of the KMT. Ideal gases are theoretical although some gases are close. Hydrogen and helium are the closest to ideal gases at all temperatures and pressures.				
3. I can state the conditions of pressure and temperature under which a gas will act "ideally".	A gas will act most "ideally" under the conditions of __low___ pressure and ___high_____ temperature.				
4. I can state the two elements that act ideally most of the time.	The two elements that act ideally most of the time are ___hydrogen_____ & _____helium_____.				
5. I can explain how pressure is created by a gas.	What causes gas molecules to create pressure? **Collisions with the walls of the container.**				
6. I can state the relationship between pressure and volume for gases (assuming constant temperature).	At constant temperature, as the pressure on a gas increases, the volume ____decreases_____.				
7. I can state the relationship between temperature and volume for gases (assuming constant pressure).	At constant pressure, as the temperature on a gas increases, the volume _____increases_____.				

<table>
<tr><th>I can statement</th><th>Question that you must answer</th><th>YES. Got it.</th><th>Needs review</th><th>NOPE. Not yet.</th></tr>
<tr><td>8. I can state the relationship between temperature and pressure for gases (assuming constant volume).</td><td>In a fixed container (AKA “has constant volume), as the temperature on a gas

increases, the pressure____increases_____.</td><td></td><td></td><td></td></tr>
<tr><td>9. I can state Avogadro’s Hypothesis.</td><td>Avogadro’s Hypothesis says two samples of an ideal gas, if they have the same temperature, pressure, and volume, will contain the same number of molecules.</td><td></td><td></td><td></td></tr>
<tr><td>10. I can remember to convert ^{o}C to K when using the Combined Gas Law to determine changes in V, P, or T of a gas.</td><td>A gas originally occupies 2.3L at 56^{o}C and 101.3 kPa. What will its volume be at 100^{o}C and 105.7 kPa?

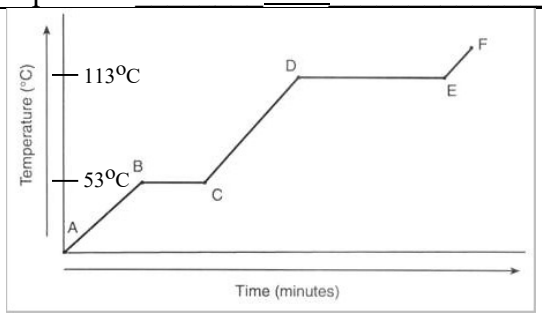
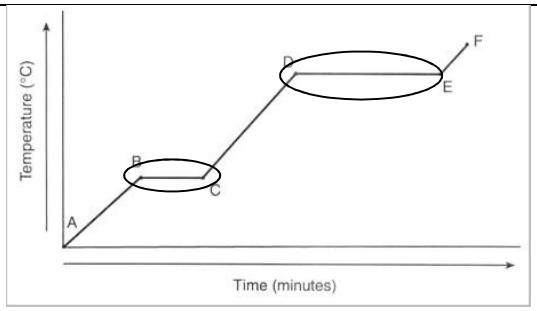
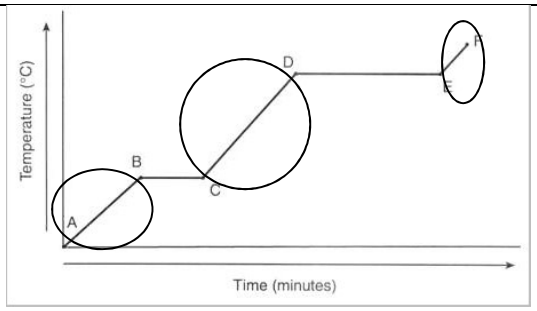
2.5 L</td><td></td><td></td><td></td></tr>
<tr><td>11. I can use particle diagrams to show the arrangement and spacing of atoms/molecules in different phases.</td><td>Draw a particle diagram to represent atoms of Li in each phase.

<table><tr><th>Solid</th><th>Liquid</th><th>Gas</th></tr><tr><td>  </td><td>  </td><td>  </td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td>12. I can compare solids, liquids, and gases in terms of their relative kinetic energy, type of molecular motion, ability to completely fill a container, ability to change shape.</td><td><table><tr><th></th><th>Solid</th><th>Liquid</th><th>Gas</th></tr><tr><td>Relative Kinetic Energy</td><td>low</td><td>moderate</td><td>high</td></tr><tr><td>Type of Molecular Motion</td><td>vibrations, only</td><td>vibration and rotation</td><td>vibration, rotation, and translation</td></tr><tr><td>Ability to Completely Fill Any Container</td><td>no</td><td>no</td><td>yes</td></tr><tr><td>Ability to Change Shape</td><td>no</td><td>yes</td><td>yes</td></tr></table></td><td></td><td></td><td></td></tr>
</table>

Station 3 Vapor Pressure and Heating curves

Identify which learning objectives you need to review before your midterm. ONLY do the last column after you've checked the answer key.

I can statement	Question that you must answer	Only check one of the boxes to the right after you've doe the question and checked it.	**YES. Got it.**	**Needs review**	**NOPE. Not yet.**
1. I can define boiling point and vapor pressure.	**Definition:** boiling point – **the temperature at which the vapor pressure of a liquid equals the pressure surrounding the liquid** vapor pressure – **the pressure exerted by a vapor in equilibrium with its condensed phases (solid or liquid) at a given temperature in a closed system**				
2. I can state the condition of pressure that is used for "normal" boiling points.	The normal boiling point of a substance occurs at a pressure of ___1_____atm/_____101.3_____kPa.				
3. I can state the relationship between atmospheric pressure and boiling point.	As the atmospheric pressure increases, the boiling point ___increases_____.				
4. I can determine the vapor pressure of ethanol, ethanoic acid, propane, or water at a given temperature.	What is the vapor pressure of ethanol at 56ºC? **39 kPa (38 or 40 is ok too)**				
5. I can state the relationship between the strength of IMF and vapor pressure.	As the strength of IMF ___increases_____, vapor pressure _____increases_____.				
6. 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 _solid__ to __liquid___. During solidification a substance changes from _____liquid___ to ____solid_____. During condensation a substance changes from ____gas_____ to ___liquid____. During vaporization a substance changes from ___liquid_____ to ___gas_____. During melting a substance changes from _____solid_____ to ____liquid_____. During boiling a substance changes from ____liquid_____ to ____gas_____. During sublimation a substance changes from ___solid_____ to ____gas_____. During deposition a substance changes from ____gas_____ to ___solid_____. During freezing a substance changes from _____liquid____ to ___solid_____.				

I can statement	Question that you must answer	YES. Got it.	Needs review	NOPE. Not yet.
7. 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_____			
8. 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			
9. 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.			
10. 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.			

Station 4 Heat & temperature with a review of math concepts

Identify which learning objectives you need to review before your midterm. ONLY do the last column after you've rotated to the next station

I can statement	Question that you must answer	Only check one of the boxes to the right after you've doe the question and checked it.	**YES. Got it.**	**Needs review**	**NOPE. Not yet.**
1. I can state the temperature at which water freezes in ^{o}C and K.	What is the freezing point of water in ^{o}C and K? **0^{o}C and 273K**				
2. I can state the temperature at which water melts in ^{o}C and K.	What is the melting point of water in ^{o}C and K? **0^{o}C and 273K**				
3. I can state the temperature at which water vaporizes/boils in ^{o}C and K.	What is the boiling point of water in ^{o}C and K? **100^{o}C and 373K**				
4. I can state the temperature at which water condenses in ^{o}C and K.	What is the condensing point of water in ^{o}C and K? **100^{o}C and 373K**				
5. 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^{o}C? **$Q = mH_V$** b. How much heat is needed to raise the temperature of 100.0 g of water by 35^{o}C? **$Q=mC\Delta T$** c. How much heat is needed to melt 100.0 g of ice at 0^{o}C? **$Q = mH_f$**				
6. I can solve heat equations given the question and information on table T.	Solve each of the equations above (show work and answer here) **a. (100)x2260= 226000J** b. **Q= (100)(4.18)(35)=14630 J** c. **(100)(334)= 33400J**				
7. I can define specific heat capacity, heat of fusion, heat of vaporization.	**<u>Definitions:</u>** specific heat capacity – **the amount of heat required to increase the temperature of one gram of substance by 1^{o}C (or K)** heat of fusion - **the amount of heat required to melt one gram of substance at its melting point** heat of vaporization - **the amount of heat required to vaporize one gram of substance at its boiling point**				

I can statement	Question that you must answer	**YES. Got it.**	**Needs review**	**NOPE. Not yet.**
8. 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 15.0^{o}C using 13,500 J of heat? **215 g** 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? **104 J/g**			
9. I can determine the number of significant figures in a measurement.	How many significant figures are there in 30.50 cm? **4** How many significant figures are there in 400.0 sec? **4**			
10. I can determine the answer to a math problem to the correct number of significant figures.	To the correct number of significant figures, what is the answer to 5.93 mL + 4.6 mL? **10.5 mL** To the correct number of significant figures, what is the answer to 5.93 cm * 4.6 cm? **27 cm^{2}**			
11. I can convert numbers into scientific notation from standard notation.	Convert 87,394,000,000,000 to scientific notation. **8.7394 x 10^{13}** Convert 0.0000040934 to scientific notation. **4.0934 x 10^{-6}**			
12. I can convert numbers into standard notation from scientific notation.	Convert 5.8 x 10^{9} to standard notation. **5,800,000,000** Convert 4.3 x 10^{-5} to standard notation. **0.000 043**			
13. I can convert between different metric units by using "King Henry died by drinking chocolate milk".	9.3 km = ? m **9300 m** 39,983 mL = ?kL **0.039983 kL**			