

Name _____ Date _____

Physical and Chemical Properties and Changes

Part I Directions: Identify if the following are Physical Properties (P) or Chemical Properties (C).

- | | |
|---------------------------------|-------------------------------|
| _____ 1. blue color | _____ 6. melting point |
| _____ 2. density | _____ 7. reacts with water |
| _____ 3. flammability (burns) | _____ 8. hardness |
| _____ 4. solubility (dissolves) | _____ 9. boiling point |
| _____ 5. Luster (shine) | _____ 10. reacts with an acid |

Part II Directions: Identify if the following are Physical Changes (P) or Chemical Changes (C).

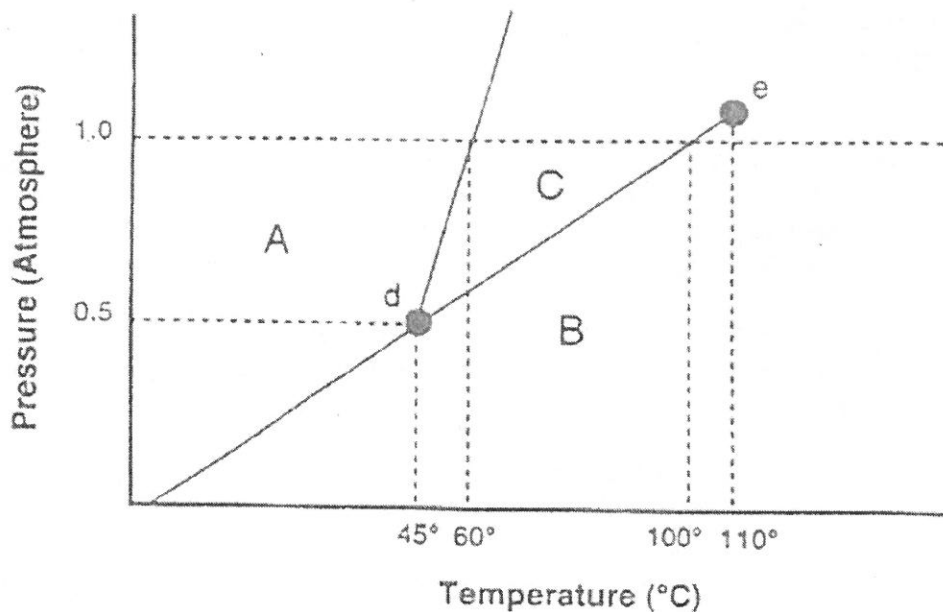
- | | |
|--|------------------------------------|
| _____ 1. NaCl (Table Salt) dissolves in water. | _____ 6. Milk sours. |
| _____ 2. Ag (Silver) tarnishes. | _____ 7. Sugar dissolves in water. |
| _____ 3. An apple is cut. | _____ 8. Wood rots. |
| _____ 4. Heat changes H ₂ O to steam. | _____ 9. Pancakes cook. |
| _____ 5. Baking soda reacts to vinegar. | _____ 10. Snow melts |

Part III Directions: Read each scenario. Decide whether a physical or chemical change has occurred and give **2 pieces** of evidence for your decision.

	Scenario	Physical or Chemical Change?	Evidence
1.	A student removes a loaf of bread hot from the oven. The student cuts a slice off the loaf and spreads butter on it.		
2.	Your friend decides to toast a piece of bread, but leaves it in the toaster too long. The bread is black and the kitchen is full of smoke.		
3.	A straight piece of wire is coiled to form a spring.		
4.	You blow dry your wet hair.		

PHASE DIAGRAM

Name _____



Answer the following questions using the chart above.

1. What section represents the solid phase? _____
2. What section represents the liquid phase? _____
3. What section represents the gas phase? _____
4. What letter represents the triple point? _____
5. What letter represents the critical point? _____
6. What is this substance's normal melting point? _____
7. What is this substance's normal boiling point? _____
8. Above what temperature is it impossible to liquify this substance no matter what the pressure? _____
9. At what temperature and pressure do all three phases coexist? _____
10. Is the density of the solid greater than or less than the density of the liquid?

11. Would an increase in pressure cause this substance to freeze or melt? _____

Constructing a Phase Diagram:

Name _____

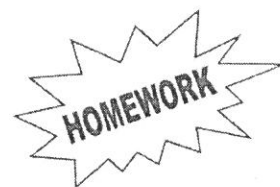
The normal boiling and freezing points of argon are 87.3 K and 84.0 K, respectively. The triple point is at 82.7 K and 0.68 atmosphere. The critical point is 150.86 K and 48.35 atmospheres.

- a) Use the data above to draw a phase diagram for argon. Label the axes and label the regions in which the solid, liquid, and gas phases are located. On the phase diagram, show the position of the normal boiling and freezing points. Label the triple point. Label the critical point (this point will not be to scale).
- b) Describe the changes that would occur in a sample of solid argon as the temperature increases from 40 K to 169 K at a constant pressure of 0.50 atmosphere.
- c) Describe the changes that would occur in a sample of liquid argon as the pressure is reduced from 10 atmospheres to 1 atmosphere at a constant temperature of 100. K. This is well below the critical point.

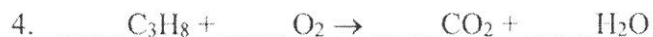
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Name _____ Period _____ Date _____

Balancing Equations – Ch. 8



Balance the following chemical equations.



Write and balance the following chemical equations.

5. Nitrogen plus hydrogen produce ammonia. (Remember diatomic elements!)

6. Sodium oxide combines with water to form sodium hydroxide.

7. Sodium sulfate reacts with calcium nitrate to produce sodium nitrate and calcium sulfate.

8. Zinc reacts with iron(III) chloride yielding zinc chloride plus iron.

Combustion of Fuels

Name _____

In the complete burning of fuels, the fuel combines with oxygen (O_2) from the air to form carbon dioxide (CO_2) and water (H_2O). A balanced chemical equation for the complete burning of methane is



For each fuel listed below, write a balanced chemical equation for its complete burning (combustion).

1. Butane C_4H_{10} _____

2. Propane C_3H_8 _____

3. Ethanol C_2H_5OH _____

4. Methanol CH_3OH _____

5. Ethylene C_2H_4 _____

6. Ethane C_2H_6 _____

7. Propylene C_3H_6 _____

8. Benzene C_6H_6 _____

9. Acetylene C_2H_2 _____

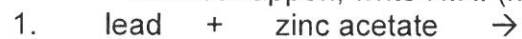
*10. Gasoline C_8H_{18} _____

Worksheet #4: Single-Replacement Reactions

Step 1 - Write the formulas of the reactants on the left of the yield sign

Step 2 - Look at the Activity Series on page 333 to determine if the replacement can happen

Step 3 - If the replacement can occur, complete the reaction and balance it. If the reaction cannot happen, write N.R. (no rxn) on the product side.



Predicting Precipitates

Name _____

Predictions: Use your solubility table to predict the precipitate product for each reaction. Write the net ionic equation for each.

1. Barium Nitrate and Potassium Chromate

2. Strontium Bromide and Ammonium Carbonate

3. ^{iron(III)} ~~Ferric~~ Nitrate and Barium Hydroxide

4. Lithium Sulfide and ^{copper(II)} ~~Cupric~~ Chloride

5. Zinc Acetate and Potassium ^{oxide} ~~Oxalate~~

6. Aluminum Sulfate and Lithium Hydroxide

7. Silver Nitrate and Calcium Bromide

8. Cobalt Iodide and Sodium Sulfide

9. Lead Acetate and Magnesium Sulfate

10. Zinc Chloride and Sodium Hydroxide

Types of Reactions – Ch. 8 (p. 256-267)

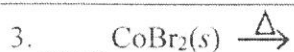
For each of the following reactions, identify the reaction type, predict the products and balance the equation. Include physical states. Word equations must first be converted to formulas.



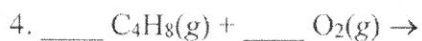
Reaction Type: _____



Reaction Type: _____



Reaction Type: _____



Reaction Type: _____

5. Aqueous solutions of potassium bromide and silver nitrate react to form a white precipitate.

Reaction Type: _____

6. Solid nickel is added to an aqueous solution of iron(II) sulfate.

Reaction Type: _____

Complete the word equation for the following chemical equations. Then, write the balanced chemical equation. Indicate the type of reaction on the line to the left of the equation. Classify each reaction as single displacement (SD), double displacement (DD), decomposition (D), or synthesis (S).

- _____ 1. aluminum sulfate + calcium phosphate →
- _____ 2. magnesium chloride + silver nitrate →
- _____ 3. sodium chlorate →
- _____ 4. hydrogen gas + oxygen gas →
- _____ 5. zinc metal + copper(II) nitrate →
- _____ 6. sulfurous acid, H_2SO_3 →
- _____ 7. copper(II) oxide + sulfuric acid, H_2SO_4 →
- _____ 8. nitrogen gas + hydrogen gas →
- _____ 9. sodium iodide + chlorine gas →
- _____ 10. copper(II) hydroxide →
- _____ 11. ammonia gas, NH_3 + hydrochloric acid, HCl → (hint: single product)
- _____ 12. potassium metal + water (hint: H^+OH^-) →