Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Chemistry Unit 6 – Basic Chemical Reactions**

Chemistry Daily Journal

|  |  |  |
| --- | --- | --- |
| Today’s Date | What did I accomplish yesterday? | What are my goals today? What sections, activities, and labs do I want to get done today? |
|  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Objective | Learning Opportunities | Suggested Due Date | Date Completed |
| 6.1 Identify the parts of a chemical equation. | * Read p. 321 – 323
* Podcast 7.1 – Chemical Reactions
* #1, p. 324 and #7, p. 329
* Law of Conservation of Mass Demos
* Word Equations
 | 12/10/12 |  |
| 6.2 Classify reactions as one of four basic types of reaction, or as a special type of reaction (Combustion, Redox, or Acid-Base) | * Read p. 330 – 341\* Especially Figure 11.10
* Podcast 7.2A – The Basic 4 Types
* Types of Reaction Demonstrations
* # 22, 23, 25, and 27 pg. 339
* Podcast 7.2B – Special Types
* Combustion Day Demos
 | 12/12/12 |  |
| 6.3 Balance Chemical Equations. | * Read p. 324 – 327 \*Especially “Rules for Writing and Balancing Equations”
* Podcast 7.3 Balancing Equations
* Keeping Track of Atoms
* More Balancing Problems
* #3, 4 pg. 327. #5-6 pg. 328, #8-12 pg. 329
* Chemical Equations – Balancing Equations
 | 12/14/12 |  |

WORD EQUATIONS: Translate the following chemical sentences into balanced chemical equations. HINT\* Pay attention to diatomic elements (Br I N Cl H O F)

1. Two molecules of hydrogen plus one molecule of oxygen yields two molecules of water.
2. One molecule of nitrogen plus three molecules of hydrogen yields two molecules of ammonia (NH3)
3. Two molecules of aluminum bromide plus three molecules of chlorine yields two molecules of aluminum chloride and three molecules of bromine.
4. One molecule of hydrochloric acid plus one molecule of sodium hydroxide yields one molecule of sodium chloride plus one molecule of water.
5. One atom of Iron plus one molecule of lead (II) sulfate react forming one molecule of iron (II) sulfate plus one atom of lead.
6. Two molecules of potassium chlorate when heated produces two molecules of potassium chloride plus three molecules of oxygen.
7. One molecule of sulfuric acid decomposes to form one molecule of sulfur trioxide gas plus one molecule of water.
8. One molecule sodium oxide combines with one molecule of water to make two molecules of sodium hydroxide.
9. Two molecules of potassium iodide reacts with one molecule of bromine forming two molecules of potassium bromide plus one molecule of iodine.
10. Two molecules of sodium phosphate reacts with three molecules of calcium nitrate to produce six molecules of sodium nitrate plus one molecule of calcium phosphate.

**Classifying Chemical Reactions**

**Classify the following reactions as synthesis, decomposition, single replacement, or double replacement.**

1. 2KClO3 🡪 2KCl + 3O2
2. HCl + NaOH 🡪 NaCl + H2O
3. Mg + 2HCl 🡪 MgCl2 + H2
4. 2Al + NiBr🡪 2AlBr3 + 3Ni
5. 4Al + 3O2 🡪 2Al2O3
6. 2NaCl 🡪 2Na + Cl2
7. CaCl2 + F2 -> CaF2 + Cl2
8. AgNO3 + KCl 🡪 AgCl + KNO3
9. N2 + H2 🡪 2NH3
10. 2H2O2 🡪 2H2O + O2
11. (NH4)2SO4 + Ba(NO3)2 🡪 BaSO4 + 2NH4NO3
12. 4C + 6H2 + O2 🡪 2C2H6O

**Match each type of chemical reaction in Column II with its description in Column I. Write the letter of the correct reaction in the space provided.**

Column I

\_\_\_\_\_12. A precipitate, water, or a gas forms when two

 ionic compounds are dissolved in a solution.

\_\_\_\_\_13. Two or more substances combine to form another

 substance.

\_\_\_\_\_14. One element replaces another in a compound.

\_\_\_\_\_15. A substance breaks down into two or more

 simpler substances.

Column II

1. synthesis reaction
2. decomposition reaction
3. single replacement reaction
4. double replacement reaction

**Keeping Track of Atoms**

*Before looking at the equations, determine the number of atoms of each element in the following compounds.*

1. CaCO3 = \_\_\_\_\_Ca, \_\_\_\_\_C, \_\_\_\_\_O
2. Ba(NO3)2 = \_\_\_\_Ba, \_\_\_\_N, \_\_\_\_O
3. 4 Mg(OH)2 = \_\_\_\_Mg, \_\_\_\_O, \_\_\_\_H
4. 3 H2 = \_\_\_\_H
5. (NH4)2SO4 = \_\_\_\_N, \_\_\_\_H, \_\_\_\_S, \_\_\_\_O

*For each of the following, show the number of each type of atom on each side of the reaction. This is called an* **ATOM INVENTORY***. Decide if the chemical equation is balanced or not. You do NOT need to balance these equations!*

1. 2 Na + 2 H2O 🡪 2 NaOH + H2

\_\_\_\_\_\_\_\_\_\_\_ Na \_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_ H \_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_ O \_\_\_\_\_\_\_\_\_\_\_ Balanced? Yes\_\_\_\_\_ No\_\_\_\_\_

1. 4 NH3 + 6NO 🡪 5 N2 + 6 H2O

\_\_\_\_\_\_\_\_\_\_\_ N \_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_ H \_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_ O \_\_\_\_\_\_\_\_\_\_\_ Balanced? Yes\_\_\_\_\_ No\_\_\_\_\_

1. NaCl + F2 🡪 NaF + Cl2

\_\_\_\_\_\_\_\_\_\_\_ Na \_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_ Cl \_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_ F \_\_\_\_\_\_\_\_\_\_\_ Balanced? Yes\_\_\_\_\_ No\_\_\_\_\_

1. 3 NaBr + H3PO4 🡪 2 HBr + Na3PO4

\_\_\_\_\_\_\_\_\_\_\_ Na \_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_ Br \_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_ H \_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_ P \_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_ O \_\_\_\_\_\_\_\_\_\_\_ Balanced? Yes\_\_\_\_\_ No\_\_\_\_\_

*Same thing but now practice doing your own atom inventories. DON’T GET LAZY!*

1. N2H4 + N2O4 🡪 3 N2 + 4 H2O

Balanced? Yes\_\_\_\_\_ No\_\_\_\_\_

1. 4 Ag + 4 H2S + O2 🡪 2 Ag2S + 4 H2O

Balanced? Yes\_\_\_\_\_ No\_\_

1. 2 Bi + 3 F2 🡪 2 BiF3

Balanced? Yes\_\_\_\_\_ No\_\_\_\_\_

1. Al + Ni(NO3)2 🡪 Al(NO3)3 + Ni

Balanced? Yes\_\_\_\_\_ No\_\_\_\_\_

1. 3 NaBH4 + 4 BF3 🡪 2 B2H6 + 3 NaBF4

Balanced? Yes\_\_\_\_\_ No\_\_\_\_\_

1. 4 C3H5(NO3)3 🡪 6 N2 + O2 + 12 CO2 + 10 H2O

Balanced? Yes\_\_\_\_\_ No\_\_\_\_\_

1. Ca10F2(PO4)6 + 7 H2SO4 🡪 2 HF + 3 Ca(H2PO4)2 + 7 CaSO4

Balanced? Yes\_\_\_\_\_ No\_\_\_\_\_

*Now practice writing an equation using the given information. Determine if your written equation is balanced or not.*

1. Natural gas contains methane (CH4), which burns with oxygen (O2) in the air to produce (🡪) carbon dioxide (CO2) and water (H2O)

Equation:

 Balanced? Yes\_\_\_\_\_ No\_\_\_\_\_

1. When hydrobromic acid (HBr) reacts with magnesium metal (Mg), hydrogen gas (H2) and magnesium bromide (MgBr2) is produced.

Equation:

 Balanced? Yes\_\_\_\_\_ No\_\_\_\_\_

# **More Balancing Problems**

Balance the following equations with the correct coefficients to balance them. Do an atom inventory before the equation is balanced to give you an idea of a good starting point. Then do an atom inventory after it has been balanced to check your answers.

1. \_\_\_C + \_\_\_S8 🡪 \_\_\_CS2

|  |  |
| --- | --- |
| C | C |
| S | S |

1. \_\_\_Na + \_\_\_O2 🡪 \_\_\_Na2O2

|  |  |
| --- | --- |
| Na | Na |
| O | O |

1. \_\_\_K + \_\_\_H2O 🡪 \_\_\_KOH + \_\_\_H2

|  |  |
| --- | --- |
| K | K |
| H | H |
| OH | OH |

1. \_\_\_KOH + \_\_\_HBr 🡪 \_\_\_KBr + \_\_\_H2O

|  |  |
| --- | --- |
| K | K |
| OH | OH |
| H | H |
| Br | Br |

1. \_\_\_Al + \_\_\_Pb(NO3)2 🡪 \_\_\_Al(NO3)3 + \_\_\_Pb

|  |  |
| --- | --- |
| Al | Al |
| Pb | Pb |
| NO3 | NO3 |

1. \_\_CH3CH2CH2CH3+\_\_\_O2🡪\_\_\_CO2+ \_\_\_H2O

|  |  |
| --- | --- |
| C | C |
| H | H |
| O | O |

Continue balancing the following equations. Be sure to double check your answers to make sure the reactants equal the products.

1. \_\_\_N2 + \_\_\_H2 🡪 \_\_\_NH3
2. \_\_\_Cs + \_\_\_N2 🡪 \_\_\_Cs3N
3. \_\_\_HCl + \_\_\_NaOH 🡪 \_\_\_NaCl + \_\_\_H2O
4. \_\_\_Cu + \_\_\_AgNO3 🡪 \_\_\_Cu(NO3)2 + \_\_\_Ag (*hint: keep the polyatomic atom together*)
5. \_\_MnO2+\_\_\_HCl🡪\_\_\_MnCl2+\_\_Cl2+ \_\_H2O
6. \_\_\_Cl2 + \_\_\_LiI 🡪 \_\_\_LiCl + \_\_\_I2
7. \_\_\_Ca(OH)2 + \_\_\_HCl 🡪 \_\_\_CaCl2 + \_\_\_H2O
8. \_\_\_CH4 + \_\_\_O2 🡪 \_\_\_CO2 + \_\_\_H2O
9. \_\_\_N2 + \_\_\_O2 🡪 \_\_\_N2O5
10. \_\_\_KOH + \_\_\_H3PO4 🡪 \_\_\_K3PO4 + \_\_\_H2O
11. \_\_Al(NO3)3+\_\_H2SO4 🡪\_\_Al2(SO4)3+\_\_HNO3
12. \_\_Na2SO3+\_\_HCl🡪\_\_NaCl+\_\_H2O+\_\_SO2
13. \_\_\_(NH4)2SO4 + \_\_\_KOH 🡪 \_\_\_K2SO4 + \_\_\_NH3 + \_\_\_H2O
14. \_\_\_FeS2 + \_\_\_O2 🡪 \_\_\_Fe2O3 + \_\_\_SO2

**Chemical Equations: BALANCING EQUATIONS**

1. \_\_ZnS + \_\_HCl → \_\_ZnCl2 + \_\_H2S

2. \_\_HCl + \_\_Cr → \_\_CrCl2 + \_\_H2

3. \_\_Al + \_\_Fe3O4 → \_\_Al2O3 + \_\_Fe

4. \_\_H2 + \_\_Br2 → \_\_HBr

5. \_\_Na2S2O3 + \_\_I2 → \_\_NaI + \_\_Na2S4O6

6. \_\_LaCl3 + \_\_Na2CO3 → \_\_La2(CO3)3 + \_\_NaCl

7. \_\_NH4Cl + \_\_Ba(OH)2 → \_\_BaCl2 + \_\_NH3 + \_\_H2O

8. \_\_Ca(OH)2 + \_\_H3PO4 → \_\_Ca3(PO4)2 + \_\_H2O

9. \_\_La2(CO3)3 + \_\_H2SO4 → \_\_La2(SO4)3 + \_\_H2O + \_\_CO2

10. \_\_Na2O + \_\_(NH4)2SO4 → \_\_Na2SO4 + \_\_H2O + \_\_NH3

11. \_\_C4H10 + \_\_O2 → \_\_CO2 + \_\_H2O

12. \_\_C7H6O2 + \_\_O2 → \_\_CO2 + \_\_H2O

13. \_\_P4O10 + \_\_H2O → \_\_H3PO4

14. \_\_FeS2 + \_\_O2 → \_\_Fe2O3 + \_\_SO2

15. \_\_NH3 + \_\_O2 → \_\_NO + \_\_H2O

16. \_\_Fe + \_\_HCl → \_\_H2 + \_\_FeCl2

17. \_\_PbO2 + \_\_HCl → \_\_H2O + \_\_PbCl2 + \_\_Cl2

18. \_\_Fe2O3 + \_\_H2SO4 → \_\_Fe2(SO4)3 + \_\_H2O

19. \_\_NO2 + \_\_H2O → \_\_NO + \_\_HNO3

20. \_\_C2H6S + \_\_O2 → \_\_CO2 + \_\_H2O + \_\_SO2

Complete combustion:

21. C6H14

22. C2H5OH

23. C3H7OH

24. C6H6

25. C17H35COOH

**Unit 7 – Stoichiometry**

Test Review

1. Define **AND KNOW HOW TO APPLY** the following words and terms:
* Law of Conservation of Mass
* Chemical reaction
* Catalyst
* Coefficients
* Subscript
* Balanced equation
* Skeleton equation
* Word equation
* Synthesis reaction
* Decomposition reaction
* Single replacement reaction
* Double replacement reaction
* Combustion reaction
* Acid/Base reaction
1. What do (s), (l), (aq), and (g) stand for in a chemical reaction?
2. Using the equation CS2 + O2 🡪 CO2 + SO2
	1. Balance the equation.
	2. What type of reaction is this?

*For those of you paying attention, you may make a 3x5 hand-written note card for the test.*

1. Using the equation Sn + HF 🡪 SnF2 + H2:
	1. Balance the equation.
	2. What type of reaction is this?

**Unit 7: Chemical Reactions Test**

**Evaluating Your Test Results**

* Please have this page with you when you ask your teacher to type in the password for your test. You may write your scratchwork for the test on the back of this page.
* For each question, decide whether you feel confident in your answer or are unsure about it and mark the corresponding box.
* After your test has been graded, review each question and decide “What helped the most?” for questions you answered correctly and “Error Category” for questions you got wrong. Test corrections must be done before attempting a retake.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Problem #** | **Learning Target** | **Confident** | **Unsure** | **Right** | **What helped the most?** | **Wrong** | **Error Category** |
| **1** | 7.1 |  |  |  |  |  |  |
| **2** | 7.4 |  |  |  |  |  |  |
| **3** | 7.1 |  |  |  |  |  |  |
| **4** | 7.2 |  |  |  |  |  |  |
| **5** | 7.3 |  |  |  |  |  |  |
| **6** | 7.3 |  |  |  |  |  |  |
| **7** | 7.3 |  |  |  |  |  |  |
| **8** | 7.4 |  |  |  |  |  |  |
| **9** | 7.6 |  |  |  |  |  |  |
| **10** | Unit 7 (LAB) |  |  |  |  |  |  |

**Analyzing My Results:**

*After your test has been corrected, identify which problems you got right and which you got wrong by putting X's in the "Right" and "Wrong" columns. Of the problems you got wrong, decide which ones were due to simple mistakes and mark the "Simple Mistake" column. For all of the remaining wrong answers, mark the "Don't Get It" column.*

|  |  |
| --- | --- |
| **Learning Targets #** | **Description of Learning Target** |
| 7.1 | Identify the parts of a chemical equation. |
| 7.2 | Classify reactions as one of four basic types of a special type of reaction. |
| 7.3 | Balance chemical equations. |
| 7.4 | Predict the products of chemical reactions.  |
| 7.5 | Predict solubility in double replacement reactions |
| 7.6  | Recognize spectator ions in complete ionic equations. |

**What Helped the Most**

For each question you answered correctly: Why of the following do you think helped you to answer the question correctly? Include all the apply

1. Previewed the assigned reading material before coming to class
2. Attended all classes
3. Reviewed last class’s notes before the next class
4. Rewrote the notes
5. Integrated the class notes with the text book
6. Organized basic concepts using charts, lists, outlines, tables, graphic organizers, etc
7. Self-tested on material to be covered on the exam
8. Practiced explaining or “teaching” concepts to a friend/ studied with friends
9. Got extra help from the instructor or tutoring session
10. Studied material regularly instead of waiting til the last minute or not studying at all
11. Ate healthy prior to the exam
12. Got plenty of sleep the night before the exam

**Error Categories**

**Type One Error: Known as the “D’oh!”**

These types of errors are usually followed by statements like “I can’t believe I clicked A when I wrote B on my paper!” “I don’t know why I marked C when I knew that D was the answer!” This type of error can also be followed by “I knew the answer, but I changed it at the last minute.” Usually, it is just a matter of slowing down when reading and responding to the test item.

**Type Two Error: Something about the question**

This category error is followed by a statement like, “I understood the concept of the question, but something about the way the question was worded confused me.” Usually when answering higher level questions, the result is not fully understood by the student who may have superficial study skills or only memorized notes. Sometimes though, the question is just not worded fairly by the teacher and it is misleading.

**Type Three Error: I don’t know it**

This particular concept wasn’t studied well enough or was not present when the material was covered, is not reading the textbook, or didn’t pay enough attention in class to understand the concepts. Spend more time working in class and review on a daily basis rather than cramming for the test the night before (or not at all).

**Test Corrections**

For each question you missed on the test:

1. Restate the question and the correct answer.
2. List the incorrect answers and explain why they cannot be correct (if multiple choice)
3. Explain why you missed the question
	1. Misread the question or didn’t understand what it was asking
	2. Used incorrect logic
	3. Didn’t know enough about it to answer correctly