

Reactions Notes

1. In a chemical reaction, sometimes _____ and sometimes _____, and sometimes both happen.

Every time a reaction occurs _____.

These new substances have their own _____ that are not like the properties of the reactants. There are 5 of kinds of reactions that we learn about.

The first kind of reaction is called the _____ REACTION.

Sometimes it's called a _____ reaction

2. In a synthesis reaction, _____ reactants combine to form larger products.

3. The "ABSTRACT" is _____

4. The _____.

Let's review some vocabulary so we can all talk properly

5. _____ are the substances that we _____ with, they react together and form the _____.

6. _____ are what we end up with.

7. In a synthesis reaction, we have 2 or more reactants that form into _____.

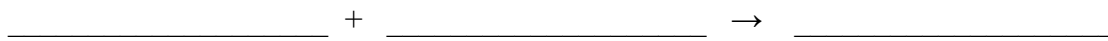
8. It takes _____ to start all chemical reactions.

9. If more energy comes out of the reaction with the products we call these EXOTHERMIC reactions. If it requires more energy to start than comes out with the products, those reactions are called ENDOTHERMIC reactions.

10. A _____ describes the reaction with words, no symbols, no numbers, as simply as possible.

11. Write out the word equation for the synthesis of water on the line.

12. The “skeleton” reaction for hydrogen and oxygen make water is



13. Skip this one!

14. Glinda the Good Witch from the Wizard of Oz tells us the best way to balance an equation. Her advice:

15. Rewrite the skeleton reaction from above again. Then we’ll balance it.



16. There are the _____ of atoms on the reactant side as the product side. Matter can’t be created or destroyed in a chemical reaction (or physical change).

17. Now re write the balanced chemical equation with the “energy” showing the balanced thermochemical equation. We will not need to redo this in steps again.



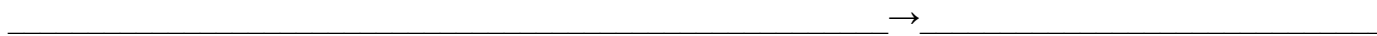
18. An important chemical adage: _____

19. It’s reverse is cool too: _____

20.

21.

22. Sodium and chlorine make sodium chloride (balance this now)



23. Word equation: Iron + Oxygen synthesizes to iron III oxide (rust) write the skeleton, then balance it:



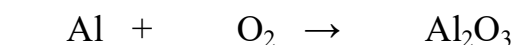
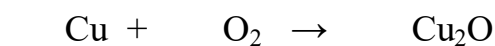
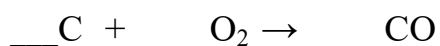
24. Word equation: Aluminum + sulfur synthesize into aluminum sulfide write the skeleton, then balance it:



25. Word equation: Potassium and bromine make potassium bromide write the skeleton, then balance it:



26. Balance these skeleton reactions, put the coefficients on the dashes. Do NOT write in any "ones".

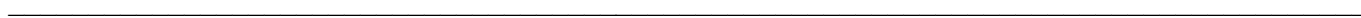


27. Decomposition Reactions...

Example: Lead II oxide decomposes into lead and oxygen



28. Decomposition reactions require _____ to break down into



29. Example of the Abstract: _____

30. Word equation for our demonstration: hydrogen peroxide decomposes into water & oxygen gas

31. Skeleton _____ → _____ + _____

32. Balance it now.

33. How do we make chemical reactions go faster? We can add a _____

34. Show where you add the catalyst in the equation above, put it where it belongs.

35. The...

36. With no catalyst, a reaction will _____

With a catalyst the same reaction will occur, just _____

The catalyst is _____ !!!

37. Magnesium nitride decomposes into magnesium & nitrogen. Write the skeleton, then balance it:

_____ → _____ + _____

38. Magnesium carbonate decomposes into carbon dioxide & magnesium oxide. Write the skeleton, + balance

_____ → _____ + _____

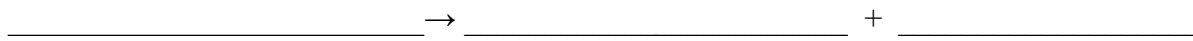
39. Iron (II) oxide decomposes. Write the skeleton, then balance it:

_____ → _____ + _____

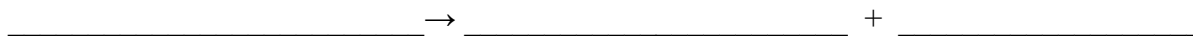
40. Ammonia gas decomposes. Write the skeleton, then balance it:

_____ → _____ + _____

41. Hydrogen monochloride gas decomposes. Write the skeleton, then balance it:



42. Dinitrogen Pentoxide Decomposes into nitrogen and oxygen. Write the skeleton, then balance it:



43. Single Replacement reactions (SR) start with you...

44. Aqueous means _____.
We will only use ionic compounds dissolved in water for these reactions.

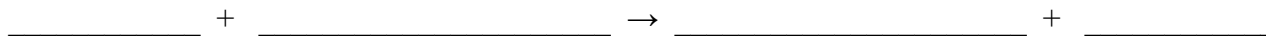
45. Ionic compounds have _____ and _____
that dissolve into water, AND they will _____ this way:

Example:

46. The salt disappears and dissolves. At the atomic level, the NaCl separates into positive and negative ions,
which swim in the water. This is a _____ : _____ → _____

47. Water is _____.

48. Another ionic compound that dissolves and ionizes in water is SILVER NITRATE. Let's put some
atoms of COPPER into that solution, which is a nice single replacement reaction set up.



49. The copper...

50. Since the nitrate anion basically "hangs out" we call it the _____

51. A single replacement reaction always has _____ parts,
the _____, the _____ and the _____.

52. 2 of these 3 are ALWAYS on one side of table J or the other side of table J.

In this reaction, see that both COPPER and SILVER are on the LEFT SIDE of Table J.

53. Copper is _____ than silver, so it _____ the silver out of solution and takes the copper's place in the solution.

54. Copper is MORE REACTIVE than silver, so it will bump the silver out of solution, and takes it's place dancing with the nitrate ion. Draw the reaction with the arrows to show that.

55. Single Replacement Reaction #2 Magnesium metal into HYDROCHLORIC ACID

But first let's look at table K, the acids.

Show how table salt ionizes in water _____

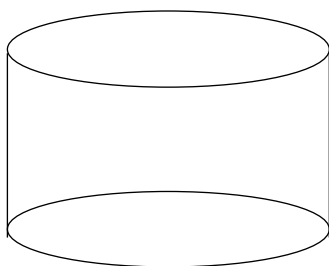
56. Show how $\text{HCl}_{(g)}$ ionizes in water _____

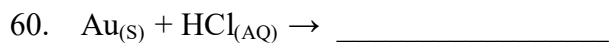
57. Show the skeleton for Magnesium metal into Hydrochloric Acid, then balance the equation

_____ + _____ \rightarrow _____ + _____

58. State what happened (copy the blue text in the slide show)

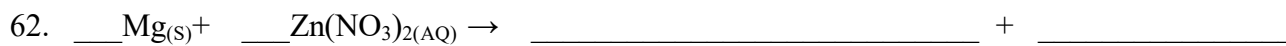
59. Draw the diagram



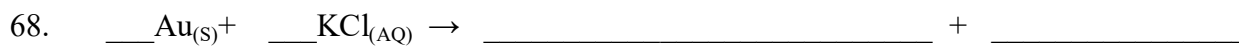
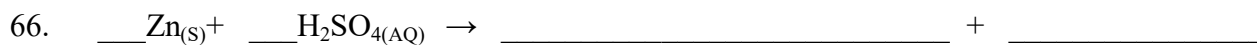


61. Why is there no reaction? _____

Balance these three SR reactions



65. That last one is special!



Double Replacement Reactions

69. It takes _____ solutions to start a double replacement reaction.

70. The _____ with each other.

71. In the abstract: _____ → _____

72. The reaction occurs if a _____ forms in the products.

73. If no precipitate forms, a _____ formed, but no chemical reaction happened.

Copper (II) nitrate solution + Lithium chromate solutions combine...

74. Write out the reactant side of this skeleton reaction to start. Write small! (underline just the cations)

_____ + _____ → _____ + _____

Switch the cations/anions; FIX the products; Balance the equation; Check Table F to decide AQ or S.

What is table F? Let's look before we can finish this up. Label the tops of the four columns as shown.

75. Table F tells us if an ionic compound will be...

76. The second product here, the CuCO_3 is _____ or _____

77. Make sure your #74 is PERFECTLY balanced and has FOUR phase symbols, that are correct now.

78. Second Word equation: Sodium chloride + lead (II) acetate solutions combine... (*finish the word equation*)

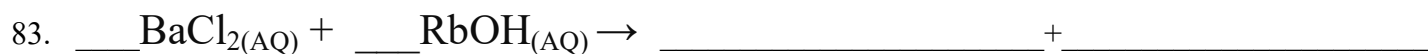
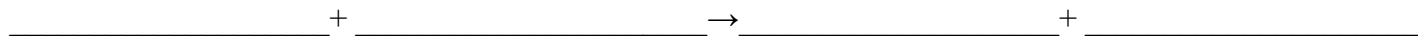
into _____ and _____

79. and 80. Balance this word equation, with phase symbols now.

81. Write the IONS and FORMULAS. Are these AQ or S in water?

Compound	IONS	FORMULA	AQ or S ?
Silver chloride	$\text{Ag}^{+1} \text{Cl}^{-1}$	AgCl	S
Magnesium nitrate			
Sodium hydroxide			
Strontium sulfate			
Calcium nitrate			
Barium acetate			
Aluminum chlorate			
Lead (II) bromide			
Lithium sulfide			
Ammonium chromate			
Barium sulfate			

82. Potassium phosphate + calcium chloride solutions combine into... write out the reactant symbols, and then switch em', fix 'em, and table F 'em! Write small, ALL ON ONE LINE!



What happened here?

Combustion Reactions

84. Combustion reactions require a _____ to combine rapidly with _____, forming _____ + _____ and lots of energy.

There is little challenge recognizing these reactions, the only difference is the TYPE of hydrocarbon you start with. They always combine with oxygen to form CO₂ and H₂O and energy. .

85. Hydrocarbon: a compound made of _____ + _____ only.

86. Every single combustion reaction looks like this:

87. Hydrocarbon examples gases _____ liquids _____ solid _____

88. First practice example: the simplest of all hydrocarbons, methane combusts.
We write out the skeleton reaction, then balance it...

_____ + _____ → _____ + _____

89. Balance these two in a row. Put coefficients on the dashes, do NOT write ones.

____ C₂H_{6(G)} + ____ O_{2(G)} → _____ + _____

____ C₃H_{8(G)} + ____ O_{2(G)} → _____ + _____

90. Sometimes we find ourselves BURNING (combusting) an OXYGENATED HYDROCARBON.

91. Combustion reactions require a hydrocarbon (*or oxygenated hydrocarbon*) to combine with oxygen, and
ALWAYS forming: _____ and _____ + HEAT

92. Word Equation: Methanol + oxygen yields carbon dioxide & water

(Methanol is an alcohol, but NOT the “alcohol” in wine and beer) WRITE THE SKELETON on the line

_____ + _____ → _____ + _____

93. Balance this equation.

94. Butane (C₄H₁₀) combusts. WRITE THE SKELETON, balance this equation.

_____ + _____ → _____ + _____

95. Octane (C₈H₁₈) combusts. WRITE THE SKELETON, balance this equation.

_____ + _____ → _____ + _____

Review of All Chemical Reactions...

96. Write out two balanced chemical equations with phase symbols for these two word equations.

Phosphorous + chlorine gas form into phosphorous pentachloride gas.

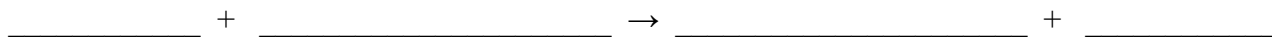
_____ + _____ → _____

Manganese VII oxide forms manganese and oxygen gas

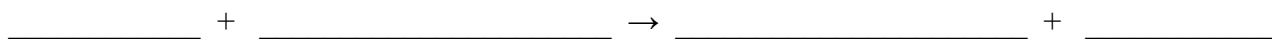
_____ → _____ + _____

Write out the balanced chemical equations for these set ups for SINGLE REPLACEMENT REACTIONS

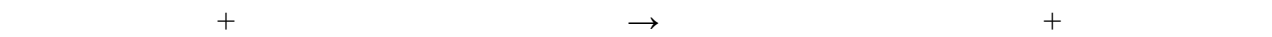
97. Sodium goes into silver nitrate solution



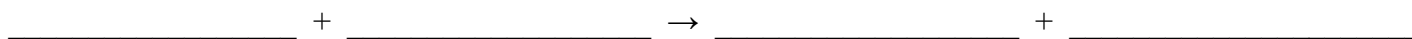
98. Bromine is added to lithium iodide solution



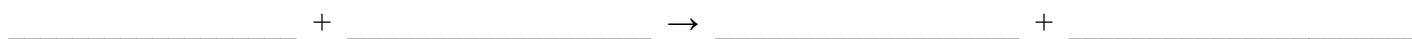
99. Tin is added to barium nitrate solution



100. Lithium nitrate and potassium chloride solutions are poured together

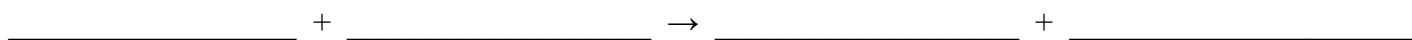


101. Lead (II) hydrogen carbonate and Cobalt (III) sulfate solutions are poured together

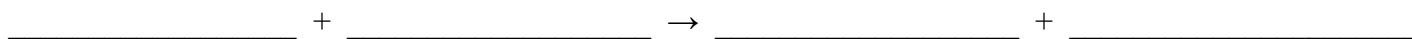


Write out the balanced chemical equations for these COMBUSTION REACTIONS

102. Hexane combusts (C₆H₁₄)



103. Propanol combusts (C₃H₅OH) this is a type of alcohol.



104. In complete combustion, only _____ forms.

105. In an incomplete combustion reaction, where there is INSUFFICIENT oxygen to react normally, the formation of _____ is possible. This carbon monoxide is poison, breathing it can cause death. There are MANY different equations showing the formation of CO_(G).