**Chemistry Notes: Chemical Reactions**

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| **What are Physical Properties?** | * Physical properties can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and measured without changing the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the substance. * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Changes:   + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Point: the temperature at which a substance \_\_\_\_\_\_\_\_ (or \_\_\_\_\_\_\_\_\_\_\_…they’re just the reverse of each other, and it happens at the same temperature!). The freezing/melting point of water is \_\_\_\_\_ degrees C.   + \_\_\_\_\_\_\_\_\_\_ Point: the temperature at which a liquid boils (substances changes from a liquid to a \_\_\_\_\_\_). The boiling point of water is \_\_\_\_\_ degrees C.   + Different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ melt and boil at different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, so we can use this to identify an unknown substance. * Density: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; how much mass is in a given amount of \_\_\_\_\_\_\_\_\_\_\_\_ (volume). Every substance has a \_\_\_\_\_\_\_\_\_\_\_\_\_ density that stays the same no matter how \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the sample is, so we can use this to identify an unknown substance. * Other physical properties: \_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_, color, smell, etc. |
| **Phases of matter: Solids** | * Solids: atoms are packed \_\_\_\_\_\_\_\_\_\_\_\_\_\_ together in a rigid \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. They still have some \_\_\_\_\_\_\_\_\_\_\_, so they \_\_\_\_\_\_\_\_\_\_\_\_\_\_ in place |
| **Phases of matter: Liquids** | * Liquid: at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ point, atoms acquire enough energy to \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_; the pattern loosens up, and the substance can \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Phases of matter: Gases** | * Gas: at the \_\_\_\_\_\_\_\_\_\_\_\_\_ point, atoms have enough energy to change to a \_\_\_\_\_\_\_\_. In a gas the atoms or molecules move about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ randomly with the walls of a container and with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The distance between molecules in a gas is much \_\_\_\_\_\_\_\_\_\_\_\_\_\_ than that in a solid or a \_\_\_\_\_\_\_\_\_. (In a gas, the particles have LOTS of \_\_\_\_\_\_\_\_\_\_ and bounce off the walls!) |
| **Phases of matter at the atomic level: Density** | * As a substance goes from a \_\_\_\_\_\_\_\_\_\_\_ to a liquid to a \_\_\_\_\_\_\_\_\_, the \_\_\_\_\_\_\_\_\_\_\_\_\_ of the substance \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This is because as the pattern gets \_\_\_\_\_\_\_\_\_\_\_, the atoms/molecules get \_\_\_\_\_\_\_\_\_\_\_\_\_\_ apart. * The exception is \_\_\_\_\_\_\_\_\_\_\_: ice \_\_\_\_\_\_\_\_\_\_\_\_ on liquid water, meaning ice (a solid) is \_\_\_\_\_\_\_\_\_\_ dense than water (a liquid) |
| **Draw the Phases of Matter** |  |
| **What are Chemical Properties?** | * Chemical properties can be observed only when substances \_\_\_\_\_\_\_\_\_\_\_ or do not react \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with one another, that is, when they undergo a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ in composition. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ property of one substance usually involves its ability to react or not react with another specific \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * Examples:   + Reacting with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: The ability of a substance to \_\_\_\_\_\_\_\_\_\_\_\_ is a chemical property that involves a substance reacting \_\_\_\_\_\_\_\_\_\_\_\_\_ with oxygen to produce light and heat (\_\_\_\_\_\_\_\_\_). Reacting with oxygen \_\_\_\_\_\_\_\_\_\_ occurs when iron \_\_\_\_\_\_\_\_\_.   + Reacting with an \_\_\_\_\_\_\_\_\_: some metals react with acids to form \_\_\_\_\_\_\_\_\_\_\_\_, while \_\_\_\_\_\_\_\_\_\_\_\_\_\_ solutions (we’ll talk about later) react with acids to form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ solutions. |
| **Chemical Properties: Acids, Bases, and Neutral solutions** | * Does it \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in water?   + Water is often called the “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_” because so many substances \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in it. * Solutions can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, basic, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   + Substances that form \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ must be dissolved in \_\_\_\_\_\_\_\_\_\_\_\_\_ before you can tell if they’re acids or bases. Once dissolved in water, the substances release \_\_\_\_\_\_\_\_\_\_\_.   + pH: a measure of how \_\_\_\_\_\_\_\_\_\_\_\_ or basic a solution is.     - The pH scale goes from 1 to \_\_\_\_\_\_\_. A pH of \_\_\_\_\_ is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ solution (neither an acid nor a base), a pH \_\_\_\_\_\_\_\_\_\_ than 7 is an \_\_\_\_\_\_\_\_\_, and a pH greater than \_\_\_\_\_\_\_ is a \_\_\_\_\_\_\_\_\_\_\_\_\_. |
| **Substances can Change** | * Substances change in \_\_\_\_\_ ways:   + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Change: a change that occurs that does not change the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the substance (it’s still the same “stuff”)     - \_\_\_\_\_\_\_\_\_\_\_\_\_\_ change, \_\_\_\_\_\_\_\_\_\_\_\_\_\_ change, change in size or shape, change in physical properties   + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Change: a change that occurs that changes the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the substance (turns it into something else). Results in the formation of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.     - \_\_\_\_\_\_\_\_\_\_\_\_\_\_ paper, digesting food, change in chemical properties     - When a chemical change occurs, it is called a chemical \_\_\_\_\_\_\_\_\_\_\_\_ |
| **What is a Chemical Reaction?** | * Chemical Reaction: when 2 or more substances \_\_\_\_\_\_\_\_\_\_\_\_\_ (interact) to form a \_\_\_\_\_\_\_\_\_\_\_ substance.   + Happens when substances (compounds or elements) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (hit each other) and interact. * In a chemical reaction, a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ change takes place (the substances you \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with become \_\_\_\_\_\_\_\_\_ substances). * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ react to form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   + Reactants: the substances you \_\_\_\_\_\_\_\_\_\_\_\_\_ with   + Products: the substances you \_\_\_\_\_\_\_\_\_\_\_ with * Abbreviation for reaction: \_\_\_\_\_\_\_\_\_\_\_ |
| **How do I know if a Chemical Change or Reaction has occurred?** | * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a chemical reaction:   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Change      + Iron turns red-brown when it reacts with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (rust)      + exceptions: food coloring or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ something   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Change      + Wood \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—increased temperature      + Exceptions: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ water, sunshine heating water in a lake   3. Formation of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_      + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ form      + Exception: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ liquid   4. Formation of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_      + Precipitate: a \_\_\_\_\_\_\_\_\_\_\_\_\_ that forms from combining 2 \_\_\_\_\_\_\_\_\_ |
| **What is a Reaction Rate?** | * Reaction \_\_\_\_\_\_\_\_\_\_\_: how \_\_\_\_\_\_\_\_\_\_\_\_\_ it takes for the reaction to occur.   + Reactions occur at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rates, from very \_\_\_\_\_\_\_\_\_\_ to very \_\_\_\_\_ * The reaction rate can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by:   + Changing the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the reactants     - As concentration increases, reaction rate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (speeds up)     - Increase in concentration means more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ present that can react, leading to a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and/or \_\_\_\_\_\_\_\_\_\_\_\_\_\_ reaction.   + Changing the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the reaction mixture     - As temperature increases, reaction rate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_     - Increased temperature makes the particles of a substance \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ This increase in motion allows reactants to \_\_\_\_\_\_\_\_\_\_\_\_\_ and interact more frequently (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reaction rate).   + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the reactants     - Increased surface area=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reaction rate     - If there’s more surface area, there’s more particles that can \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and interact   + Presence of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_     - Catalyst: something that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a reaction, but is not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the reaction. |