**Chemistry Notes: Chemical Reactions**

|  |  |
| --- | --- |
| **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.
 |