

8 Grade 8 Science for STAAR™

DynaNotes™ Review Guide



DYNA NOTES™
 TOOLS FOR EXPLOSIVE LEARNING

Copyright © 2011 DynaStudy, Inc. and/or its licensors. All rights reserved. May not be reproduced or transmitted in any form without written permission from the publisher. www.dynanotes.com ISBN 978-1-935005-09-4

STAAR is a trademark of the Texas Education Agency. These materials have not been reviewed or approved by the Texas Education Agency.

Symbol indicates section aligns to Texas College and Career Readiness Standards.

Category 1 – Matter and Energy

STRUCTURE OF ATOMS

matter: anything that has mass and takes up space
atom: smallest complete part (building block) of matter
element: substance made of only one kind of atom

Atom Part	Location within Atom	Atomic Mass	Electrical Charge
proton	nucleus	+1 amu	positive, +
neutron	nucleus	+1 amu	none, 0
electron	electron cloud	-1/2000 amu	negative, -

Example: Lithium atom model shows 3 electrons, 3 protons, and 4 neutrons.



electron cloud: part of an atom surrounding the nucleus; consists mostly of empty space in which electrons move
nucleus: central part of an atom; contains most of its mass

IDENTITY AND PROPERTIES OF ELEMENTS

chemical symbol: element's abbreviation; first letter is capitalized and second letter (if it has one) is lowercase

Examples: Au for gold, O for oxygen, C for carbon, and He for helium

reactivity: chemical property that describes the likelihood and rate at which a substance undergoes a chemical reaction

valence electrons: outermost electrons in the atom; an element's valence electrons determine its chemical properties (characteristics like reactivity and flammability)

atomic number: number of protons that an element has; determines the identity of an element; this number also equals the number of electrons in a neutral atom

PERIODIC TABLE

periodic table: chart that organizes elements with similar properties in the same **period** (horizontal row) and elements with increasing atomic number in the same **group** (vertical column); elements in the same group have similar properties

Example: Neon (Ne) and Argon (Ar) are in the same group.

Period 1																			
1	2	Period 2										18							
H	He	Li	Be	B	C	N	O	F	Ne	Na	Mg	Al	Si	P	S	Cl	Ar		
Group 1		Group 2		Transition Metals										Group 16		Group 17		Group 18	
Period 3																			
Period 4																			
Period 5																			
Period 6																			
Period 7																			

PROPERTIES AND CHANGES

property: characteristic that helps identify or classify a substance

Property	Description	Examples
physical	can be observed without changing the substance into a different substance	boiling point, state of matter (solid, liquid, gas), density (D) $D = \frac{m}{V}$ (e.g., $\frac{3g}{1ml} = 3 \frac{g}{ml}$)
chemical	observed when a substance undergoes a chemical change into a different substance	reactivity with other substances, flammability, toxicity

Example: In the human digestive system, breaking down food's carbohydrates into simple sugars is a chemical change.

Certain physical properties are used to classify an element.

Type of Element	Physical Properties
metals	shiny (lustrous), good conductor of heat and electricity, malleable (can be bent or shaped), ductile (can be drawn into wires), solid at room temperature (except Hg), high melting point (except Hg)
nonmetals	poor conductor of heat and electricity, brittle, low melting point, gas or liquid at room temperature, low density

CHEMICAL REACTIONS

chemical reaction: process in which the atoms of an original substance rearrange to produce a new substance(s); the new substance(s) has different properties from the original substance; reactions can be **exothermic** (produce heat) or **endothermic** (absorb heat)

signs of a chemical reaction: color change, temperature change, gas formation, or precipitate (solid) formation is often observed when a chemical reaction occurs

Example 1: $2H_2O(l) + \text{energy} \rightarrow 2H_2(g) + O_2(g)$
 This is an endothermic chemical reaction. The atoms in liquid water (H₂O) rearrange to produce hydrogen (H₂) and oxygen (O₂) gas molecules.

Example 2: $H_2O(l) + \text{heat} \rightarrow H_2O(g)$
 This is **not** a chemical reaction. Water changes state from lower-energy liquid to higher-energy gas, but remains H₂O (no new substance is made).

CHEMICAL EQUATIONS

reactant: starting substance in a chemical reaction

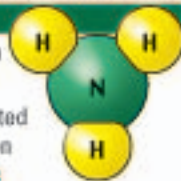
product: final substance in a chemical reaction

law of conservation of mass: mass is neither created nor destroyed during an ordinary chemical reaction
total mass of reactants = total mass of products

coefficient: number placed in front of an element symbol or chemical formula; for the number 1, no coefficient is shown; multiply the coefficient by the element's subscript to find the total number of atoms

Example: There are 4 molecules of NH₃ in 4NH₃, because the coefficient is 4. Each molecule of NH₃ has 1 atom of nitrogen (N) and 3 atoms of hydrogen (H). Therefore, 4NH₃ has 4 atoms of N and 12 atoms of H.

chemical equation: shows the number and kind of substances involved in a reaction; reactants are shown to the left of the arrow and products are shown to the right of the arrow; a balanced



SAMPLE PAGE -- MAY NOT BE COPIED. MAY NOT BE REPRODUCED.

SAMPLE PAGE -- Page 1 of 6
 Read reviews and create an eQuote online.
 These student course notes are also available via the *DynaNotes Plus* app for student iPads and Android tablets.