Chemistry Calendar: This contains Next Generation in the form of scales & vocab words

For daily goals, labs, School Forest & SAT Prep see Unit plans.

September

Chemistry Unit 1 Learning Goal (NGSS)

Grade Level: High School Chemistry Topic: Mathematical Tool Kit

State Standard HS-PS2-6: Communicate scientific and technical information about why the molecular -level structure is important in the functioning of designed materials.

Common Core State: connections: RST.9-10.7 Translate quantitative or technical information expressed in words, text, and translate information expressed mathematically.

Practice: Develop & Use Models Crosscutting Concept: Math & engineering

	Complete Scale
4.0	I can measure, convert, and identify unknown chemicals, using proper lab technique, and the metric system both macroscopically and microscopically.
3.0	I can measure, convert, and communicate within the metric system
2.0	I can describe matter using the metric system
1.0	I can make measurements using metric system tools

0	I mix the metric and English measuring systems with each other

Vocab Chemistry Unit 1

Chemistry

Qualitative
Quantitative
System International
Exponentials
Scientific Notation
Weight
Mass
Length
Time
Homogenous
Heterogeneous
Elements
Temperature
Kelvin
Deg. Celsius
Derived unit
Density
Volume
Area,
Matter
solution
Solute
Solvent
Organic
Inorganic

Precise
accurate
percent error
absolute value
literature value
significant digits
endothermic
exothermic
reactants
products
activation energy
calorimeter
specific Heat
Compounds

Physical change
Chemical change
Reactants
Products
Solid
Liquid
Gas

October

Learning Goal for Science (NGSS)

Chemistry Unit 2

Grade Level: High School Chemistry Topic: Structure & Properties of Matter

State Standard: **HS-PS1-1a.** Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

Practice: Develop & Use Models Crosscutting Concept: Patterns

	Complete Scale
4.0	I can explain how and why the properties of "electronegativity," "atomic radius," and "ionization energy" are related.
3.0	I can use the periodic table to predict and explain the reactivity of an element based on the patterns of electrons in the outermost energy level.

2.0	I can use the periodic table to determine the number of electrons in the outermost energy level of an element. I can compare different elements' "electronegativity," "atomic radius," and "ionization energy" based on their relative positions on the periodic table.
1.0	I can identify groups and periods on a periodic table. I can define the terms "electronegativity," "atomic radius," and "ionization energy," but I may need help.
0	I cannot yet use a periodic table to identify patterns in the properties of elements. I cannot yet define the terms "electronegativity," "atomic radius," and "ionization energy."

Vocabulary: Chemistry Unit 2

Chapter 3a

atom
element
nucleus
proton
neutron
electron
quark
lepton
isotop
atomic number
atomic mass
mass number
radiation
alpha

Chapter 3b

uncertainty
energy levels
electron clouds
quantum numbers (Principle -4)
electron DRAWING
electron configuration
electron diagram
Lewis Dot Diagram
valence electrons

beta gamma

decay peak

light trough

electromagnetic spectrum

frequency amplitude

wavelength lambda

excited electrons

chemical reaction

nuclear reaction

physical change

structure determines function

Rutherford Gold foil exp.

super collider

atomic theory

Heisenberg Uncertainty

Pauli Exclusion

momentum

Chapter 4-3

trend bond radius

ionization energy

electron shielding

electronegativity

period

family/group

November- December:

Learning Goal Unit 4 Chemistry (NGSS) unit 3 starts in November and is found after unit 4

Grade Level: HS Course: Chemistry Topic: Chemical Reactions

NGSS Performance Expectation: **HS-PS1-2.** Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

Science Practice: Constructing Explanations Crosscutting Concept: Patterns

	Complete Scale

4.0	I can use a periodic table to explain the outcome of a chemical reaction between elements, including transition metals and polyatomic ions. I can write the formula and name the product.
3.0	I can construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. I can predict products. If the elements do not react, I can explain why not.
2.0	I can explain why a chemical reaction needs to be balanced using the law of conservation of mass. I can describe how an element behaves to satisfy the "Octet Rule." I can predict an element's charge when it becomes an ion. I can balance a simple chemical reaction. I can use my knowledge of valence electrons to write chemical formulas for simple covalent and ionic substances.
1.0	I can define law of conservation of mass, ionic bonds, covalent bonds, diatomic molecules, metal, & nonmetal. I can distinguish types of reactions:double displacement & single replacement reaction, synthesis reaction, combustion reaction, decomposition. I can use the periodic table to determine the number of electrons in the outermost energy level of an element.
0	I cannot yet define law of conservation of mass, ionic bonds, covalent bonds, diatomic molecules, single replacement reaction, synthesis reaction, combustion reaction, (reactivity), and electronegativity.

Vocabulary Chemistry Unit 4

Chapter 5 / Holt Modern: ch. 6 section 3,4,5 & ch. 7 sections 1-2
(Ions, Ionic formulas)

Chemical formula	symbols
Elements	neutral
Oxidation #	subscript
Coefficient	octet rule
Monoatomic	polyatomic
Compound	ionic bonds
metal	non-metal
Cation	anion
Crystal structure	isoelectric
Molecules	covalent bonds
Diatomic molecule	nomenclature
Salts	binary inorganic
Transition elements	polyatomic compounds
Organic compounds	molecular formula
Empirical formula	

Ch. 6 Covalent Bonds

Linear	single bonds
Pyramidal	double / triple bonds
Lewis structure	shared electrons
Polarity	covalent bonds
Electronegativity	polar/ non- polar
Polyatomic ions	VSEPR Theory
Resonance structure	mono-deca pre-fix naming
Chains	rings
Saturated	unsaturated

Unit 3 (November-March 1/week**)**

Learning Goal Template for Science

Grade Level: High School Chemistry Topic: SAT/ACT/State test prep

Standard: **This is an unique Unit used 1 time a week beginning in early November and continuing through the start of March. Students spend time practicing and refining techniques that help increase their complex data interpretation, SAT/ACT/STATE Test scores.**

Practice: Analyzing & Interpreting Data Crosscutting Concept: Cause & Effect

	Complete Scale
4.0	I have increased my pre/post test scores by 20%
3.0	I have increased my pre/post test scores by 15%
2.0	I have increased my pre/post test scores by 10%
1.0	I increased my pre/post test scores by under 5%
0	My pre/post test score did not go up

Pre & post tests are taken from SAT and ACT released samples

December-January

Unit 5-6 Learning Goal for Chemistry (NGSS)

Grade Level: High School Chemistry Topic: Chemical Reactions

State Standard: **HS-PS1-7.** Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

Practice: Using Mathematics Crosscutting Concept: Energy & Matter

	Complete Scale
4.0	When I'm given the masses of reactants in an unbalanced chemical equation, I can identify the limiting reactant and predict the masses of the products AND calculate the mass of any leftover reactants.
3.0	When I'm given the masses of reactants in an unbalanced chemical equation, I can identify the limiting reactant and predict the masses of the products.
2.0	I can perform mole-mass conversions, AND when I'm given an unbalanced chemical equation, I can balance it.
1.0	When I'm given the mass of a compound, I can calculate the number of moles, and when I'm given the number of moles of a compound, I can calculate its mass.
0	When I'm given the mass of a compound, I cannot yet calculate the number of moles, and when I'm given the number of moles of a compound, I cannot yet calculate its mass.

Begins February

Learning Goal #2 unit 5-6 Chemistry (NGSS)

Grade Level: High School Chemistry Topic: Structure and Properties of Matter

State Standard: **HS-PS1-3.** Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.

Practice: Investigation

Crosscutting Concept: Patterns

	Complete Scale
4.0	I can design a molecular structure lab where molecules are built based on their electromagnetic charges, bond energies, and Lewis Structure. I can name and write formulas for the molecules and compounds I build.
3.0	I can infer polarity based on charge, shape, and electronegativity. I can use the charge trends on the periodic table to write formulas.
2.0	I can name and write Empirical Formulas based on ion charges. I can name organic molecules and predict their polarity. I can predict chemical bond types based on electronegativities.
1.0	I can describe how Ionic, polar covalent, and nonpolar covalent bonds are formed. I can define our vocab words.

Chem unit 5-6 Vocab

Ch. 7: The Mole

Dimensional Analysis
Conversion factors
Molecular mass
MOLE
Molecular mass
% Composition
Scientific Notation
Avogadros's Constant
Compound
Molar Mass

Formula mass atomic mass
MOLARITY moles/Liter

February -finishes up February

Unit 7 Learning Goal for Chemistry (NGSS)

Grade Level: High School Chemistry Topic: Structure and Properties of Matter

State Standard: **HS-PS2-6.** Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.*

Practice: Obtaining, Evaluating & Communicating

Crosscutting Concept: Structure & Function

	Complete Scale
4.0	I can describe, draw, and design a lab to communicate why the molecular -level structure determines Solid, liquid, gas, & plasma. I can defend how this influences design in engineering.
3.0	I can develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects). **HS-PS3-2**
2.0	I can draw a model to illustrate each type of state change, and describe the particle arrangement and energy in each phase. I can compare homogeneous and heterogeneous solutions.

1.0	I can define the 4 states of matter, and explain why water is unique.

Chemistry Unit 7 Vocab:

Chapter 11

Solid
Liquid
Gas
Plasma
“Fixed”
Intermolecular forces
Dipole-Dipole
polar
Hydrogen bonds
non-polar
Crystal
London Dispersion Forces
Enthalpy
phase/state
Entropy
melt
Vaporization
freeze
Evaporation
condensation
Deposition
sublimation

Chapter 13 (12 New Book)

Homogenous
suspension
Heterogeneous
colloid
Solution
Molarity
Sovent
volume
Solute
ppm
Colligative property
emulsifying agent

MARCH

Learning Goal Chemistry Unit 8

Grade Level: High School Chemistry Topic: Chemical Reactions

State Standard: **HS-PS1-6.** Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.* - Describe Acids & Bases and their Equilibrium pH

Practice: Construct Explanations Crosscutting Concept: Patterns, Stability & Change

	Complete Scale
4.0	I can describe and explain multiple simultaneous design changes in a chemical reaction system that will increase the amount of product. I can perform titrations
3.0	I can describe and explain one design change in a chemical reaction system that will increase the amount of product. I can predict titration color changes with the addition of an acid or base.
2.0	I can predict the effect of a given change to the outcome of a chemical reaction without help.
1.0	I can define Acid/Base Titration and Equilibrium. I can describe specific changing conditions that will affect equilibrium.

0	I cannot yet predict the effect of a given change to the outcome of a chemical reaction.

Vocab Unit 8

Ch. 14 Equilibrium

Chemical Equilibrium
Constant rate
Alternator
Reversible
Precipitate
Gas
Outside source
Le Chatelier's Principle
Complex ion Equilibrium: Color
Coordinate covalent bond
Titration

Equilibrium
- Temperature
- Concentration
- % each state

STRESS
Dynamic
Static

Ch. 15: Acids, Bases, Salts

pH Scale
Hydroxide
Solution
Acid
Salt
Organic
Pickling
Corrosive
Solution
Strength
pH paper
Acid Rain
End point
Neutralization
Logarithmic

Hydronium
ion
neutral
base
indicator
dehydrating agent
COOH
electrolyte

Concentration - dilute

fossil fuels
equivalence point
equilibrium

Labs September-June: 3 major chunks are: September, March, April- May

Learning Goal Unit 9 Chemistry (NGSS)

Grade Level: HS Course: Chemistry Topic: Chemical Reactions

NGSS Performance Expectation: **HS-PS1-2.** Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. LAB UNIT

Science Practice: LABS Crosscutting Concept: Patterns

	Complete Scale
4.0	I can design labs to demonstrate five classifications of chemical reactions. I can predict products, write and balance these chemical reactions.
3.0	I can follow directions in a lab to complete chemical reactions in a safe way. I can predict products.
2.0	I can use electronic balance, lab burner, graduated cylinders and our equipment safely and accurately

1.0	I can name all of our equipment in our metal and glass drawers

Vocab Unit 9

Funnel	spatula
Stirring rod	test tube clamp
Erlenmeyer flask	iron file
Graduated cylinder	iron ring
Beaker	sparker
Watch glass	test tube holder
Glass plate	Bunsen burner with tubing
Evaporating dish	wash bottle
Crucible	forceps
Microplates	Test tube brush
Burette holder	

May & June - this unit is interspersed with Unit 9 11, depending on Weather

Learning Goal Unit Goal 10 for Chemistry (NGSS)

Grade Level: High School Chemistry Topic: Engineer and Design
State (NGSS) Standard: Planning and Carrying out Investigations
Practice: Constructing Explanations
Crosscutting Concept: Obtaining, Evaluating, and communicating Information

	Complete Scale

4.0	I can evaluate soil and water data collected at our school forest, and describe the best type of plants/animals that would thrive with these elements/compounds present. I can defend why this is healthy long term or not.
3.0	I can design and explain graphs to represent soil and water data collected at our school forest.
2.0	I can perform soil and water tests for nitrogen, phosphorus, potassium, Dissolved oxygen, and pH at our school forest.
1.0	I can use soil and water kits. I can identify 10 specific plants native to our school forest.
0	I can not identify plants or use kits to test soil and water.

School Forest Vocab:

Dissolved Oxygen
Biological Oxygen Demand
Maple
Oak
Trillium
Water plants
Basic/ alkaline
Rich soil
Succession
Selectively cut
Jack in the Pulpit
Cedar
Beach
Fern
Lady Slipper
acidic
turbidity
depleted soil
clear cut

May-June:

Unit 11 Learning Goal for Science

Grade Level: High School Chemistry Topic: Gases

State Standard: NEXT GEN. **HS-PS1-5.** Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature...

Describe gases, their make up, energy & particle interactions.

Defend the Ideal Gas Law, Charles & Boyle's Law

Practice: Constructing Explanations Crosscutting Concept: Patterns

	Complete Scale
4.0	I can design a lab to collect data to support Charles' Law, Boyle's Law, and the Ideal Gas Law. I can graph my results and communicate their implications in written form. I can compare Three Environmental issues, causes, & solution potentials.
3.0	I can state the Kinetic -Molecular Theory, The Gas Laws, and I can calculate volume, Temperature, and pressure using these laws.
2.0	I can define inverse, direct, gases, kinetic- molecular theory….all of our vocab. I can describe three environmental issues.
1.0	I can define a gas

Unit 11 Vocab:

Chapter 12 Gases:

Gas	Fluid
Density	compressible
Kinetic-Molecular Theory	force
Boyle's Law	Inverse
Charles' Law	Direct
STP	Pressure
Greenhouse gases	CFC's
Ozone Depletion	Acid Rain
Antarctica	Aerosols
Freon	infrared
Ozone	free radical
Newton	Pascal