

Chemistry Unit Outline

Below is an outline or 20 lesson elementary chemistry unit for a full break down of the lessons with links to videos and resources check out: hatchingcuriosity.com/blog/2022/5/18/chemistry-unit



1. Introduction to Chemistry and the Scientific Method
2. Phases of Matter Review
3. Elements Atoms and Molecules
4. The Atomic Structure and Periodic table (the organization of the elements)
5. Element Reports
6. Mixtures and Pure Substances
7. Crystals (Boron Elements)
8. What is Air (Nitrogen Elements, Halogens)
9. Molecules, Compounds, and Chemical Bonding
10. Molecule Building
11. Unique Properties of Water
12. Chemical and Physical Changes
13. Oxidation (Transition metals, Oxygen Elements)
14. Acids & Bases
15. Large Chemical Reactions (Alkali Metals)
16. Alkaline Earth Metals (Fireworks)
17. Organic Chemistry (Carbon Elements)
18. DNA & RNA
19. Marie Curie (Lanthanides & Actinides)
20. Element Game

Chemistry Unit Outline

Week#1 Introduction to Chemistry and the Scientific Method

What is Chemistry

Safety Equipment and Practices

Review of Measuring

Scientific Method

Chemist: Mikhail Tsvet bio

Lab: Chromatography with markers, and coffee filters

Week #2 Phases of Matter Review

"What is the World Made of?" by Kathleen Weider Zoehfeld

States of Matter video demo

Glue solids, liquids, and gas poster in the science notebook

Science Demo of solids, liquids, and gases

Changes in the state (melting, evaporating, condensation, sublimation) with demo

Water cycle review with mat

Effects of Pressure on states of matter

Dry ice fun

Chemist: Jabir Ibn Hayyan's bio

Week#3 Elements, Atoms, and Molecules

Magic School Bus Molly Cule Episode

Define Elements with legos

Define Atoms and their parts

Chemist: Maria Goppert-Mayer bio

Make an edible model of an atom

Isotopes with free isotope game from elemental science

Week #4 Atomic Structure and the Periodic Table

Review Subatomic particles

Chemist: Neils Bohr bio

Orbitals from Theodor Grey's Molecules book

Bohrs model of the atom with Mirus Toys

Chemist: Dmitri Mendeleev's bio

Mendeleev's Organization

Build a periodic table with Mirus Toys

Element Families with The Lesson Hub

Element Report Assignment found here

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Week #5 Element Reports

Element Reports

Build Models of Atoms

Explore the table of the elements/ Elements book

Week #6 Mixtures and Pure Substances

Define Mixtures, solutions, and pure substances

Make lunch with a mixture & a solution

A salad for a mixture

Lemonade for a Solution

Separating Mixtures

Evaporation

Filtration

Chemical & Physical properties

Sorting game

Lab: Sugar Crystals to be continued until next week

Week #7 Crystals

What are Crystals?

Chemist: Margaret Cairns Etter bio

Boron Elements

Define, and color the periodic table

Lab: Boron crystals

Open Geodes

Particulate is a sign of Chemical Change

Lab: Milk & Coke-a-cola experiment

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Week #8 What is Air?

Elements found in the air we breathe

Air has mass

Air density

Lab: Helium car experiment

Plant Respiration vs Human Respiration

Demo: Plant respiration underwater or in a spinach container

Nitrogen Elements

Define

Color periodic table

Halogens

Define

Color Periodic Table

Go downtown to see neon lights and identify different halogens used for the different colors

Week #9 Molecules, Compounds, and Chemical Bonding

Molecules, compounds, and ions review

Types of Bonds

Covalent, Ionic, and metallic bonding

Polar vs Nonpolar

Noble Gases

Define

Color in the periodic table

How to graph a chemical bond

Week #10 Molecule Building

Happy Atoms Set

Molecule Book

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Week #11 Unique Properties of water

Water as a solvent

Dissolve candy

Surface tension

Floating paper clips

Pond Skitters walking on water video

Attractive properties of water

Cohesion (water dropper and penny)

Adhesion (make a star out of toothpicks and drop water until it sticks to each other and the toothpicks)

Less dense as solid than liquid

Ice floats in water...but why? (Critical thinking question)

Chemist: Angas Pockels bio

Week# 12 Chemical and Physical Changes

Review Chemical and Physical Properties

Physical vs Chemical Changes

Physical changes

Break up cookie

Chemical changes

Make cookies

Chemist: Joseph Priestly bio

Types of Reactions

Synthesis

Decomposition

Combustion

Single Replacement

Double Replacement

Law of Conservation of Mass memory work

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Week #13 Oxidation

Transition Metals

Define

Color periodic table

Oxygen Elements

Define

Color periodic table

Why do transition metals react so often with oxygen?

Chemist: Antoine Lavoisier's bio

Oxidation Experiment

Turn a penny green

Statue of liberty video

Catalysts and Inhibitors

Define

Talk about applying zinc to iron, painting metal, etc. to slow rust vs how in wet places like near the ocean things rust faster since water is a catalyst.

Week #14 Acids & Bases

Review chemical reaction evidence

Review law of conservation of mass

Chemist: Svante August Arrhenius bio

Define acids and bases

Lab: Baking soda and vinegar experiment

Chemist: S.P.L. Sorensen bio

PH scale

Lab: Red cabbage as a PH indicator

Salt Ions

Week #15 Large Chemical Reactions

Alkali Metals

Define

Watch videos of reactions to water

Color on the periodic table

Acids and Bases Review

WHY are they so reactive?

Nuclear Bombs

How they are made, why they are so violent

Lab: Elephant Toothpaste experiment

Identify the acid, base, catalyst, and product in the reaction

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Week #16 Alkaline Earth Metals

Catch up on Element families on the periodic table if you missed coloring any so far

Alkaline earth metals

Define

Color in the periodic table

Fireworks history and display (or video)

Optional time filler: Magic School Bus: Ready, Set, Dough episode

Week #17 Organic Chemistry

Define organic chemistry

Atoms to humans (atom, element, molecule, compound, cell, tissue, organ, being)

Map it out in the science notebook cut/glue activity

Biomolecules (macronutrients)

Carbohydrates

Lipids

Proteins

Nucleic Acids

Chemist: Gerty Cori bio

Lab: Cori Cycle Experiment

Alcohols & Esters

Happy Atom Set

Hydrocarbons

Often used as fuels, colorless, odorless, and combustible!

Teach kids how to identify a gas leak and the importance of carbon dioxide detectors as some harmful gases are not detectable to our senses.

Bonus: Fun with bubbles

How bubbles work

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Week #18 DNA & RNA

Review biomolecules

Define DNA & RNA

Make a model of DNA

Gumdrops and toothpicks

Lab: Milk into “plastic” experiment

Polymers and Plastics

Pencils into a plastic bag full of water demo

Week #19 Marie Curie

Documentary or biography

Define Radioactivity

Half-Life demo with cereal being divided in half and eaten every 1 minute.

Lanthanides and Actinides

Define

Color on the periodic table

Week #20 Element Game

Play Periodic and Ion games for review

Recite memory work

Check out the blog post for links!

Get links to books, games & videos that help with these lessons at: hatchingcuriosity.com/blog/2022/5/18/chemistry-unit

