8th Grade Physical Science 1st

This Physical Science course will provide 8th grade students with an inquiry-based learning format including concept skills in chemistry and physics that will provide the student with a foundation for scientific literacy for the pursuit of subsequent science courses.

Most important idea of whole unit

The student should become familiar with characteristics of different states of matter, and the transitions between them. They should see a variety of reactions between substances that produce new substances very different from the reactants so that they might begin to understand the variety of different behaviors of matter. Also, they will begin to understand the basics of the atomic/molecular theory.

Objective 1.0 – 4 questions

1.0 Identify steps within the scientific process.

Applying process skills to interpret data fromgraphs, tables, and charts.
Identifying controls, variables, and hypothesis in a scientific investigation.
Identifying lab safety procedures.
Identifying appropriate laboratory glassware, balance, time measuring equipment, and optical instruments used to conduct an investigation.

Objective 1.1 - 5 questions

- Express measurements of dimension,
- volume and mass using *Système International d'Unités (*SI units).
- Converting from one prefix to another

Objective 2.0 – 5 questions

2.0 Describe the atomic structure of atoms, including the location of protons, neutrons, and electrons.

- Identifying the charge of each subatomic particle
- Identifying Democritus and Dalton as contributors to the atomic theory

Objective 3.0 – 4 questions

3.0 Determine the number of protons, neutrons, and electrons, and the mass of an element using the periodic table.

- Using data about the number of electrons in the outer shell of an atom to determine its reactivity.
- Comparing and contrasting isotopes with commonly occurring elements.

Objective 3.1 - 4 questions

3.1 Identify periods, families, and elements using the periodic table.

- Stating that the elements are defined by their number of protons.
- Locating elements within a period and family.

Objective 3.2 - 4 questions

3.2 Identify the first 3 levels of the electron cloud configuration and state how many electrons can fit in each level.

- Describing how the atomic number and mass number determines the amount of subatomic particles.
- Interpreting a Bohr diagram

Objective 3.3 – 4 questions

3.3 Identify the number of valence electrons an element has, (groups 1, 2, and 13 – 18 and periods 1, 2, & 3 only), using the periodic table.

- Describing how elements in a group share properties because their atoms have the same number of valence electrons.

Objective 3.4 - 4 questions

3.4 Locate metals, nonmetals, metalloids, and halogens on the periodic table.

Objective 5.0 – 6 questions

5.0 Differentiate between ionic and covalent bonds.

- Illustrating transfer or sharing of electrons using electron dot diagrams
- Identifying electron dot configuration of common elements (Periods 1, 2, & 3 only = Valence electrons).
- Recognizing simple formulas.
- Calculating the charge on ions.

PHASE 2: IDENTIFY CORE CONCEPTS & CONNECTIONS

KEY IDEA

1.0 Identify steps within the scientific process.

- Applying process skills to interpret data from graphs, tables, and charts
- Identifying controls, variables and hypotheses in a scientific investigation
- Identifying lab safety procedures
- Identifying appropriate laboratory glassware, balances, time measuring equipment, and optical instruments used to conduct an investigation

Connection to the PAST

The introduction of historical examples will help students see the scientific enterprise as more philosophical, social, and human.

Connection to NOW

Students should understand the difference between scientific and other questions as well as what science and technology can and cannot reasonably contribute to society.

Implications on FUTURE

Students' understanding of the scientific process is crucial to the development and implementation of new technologies.

Core Concept	Vocabulary
Scientific methods are the ways in which scientists answer questions and solve problems. As scientists look for answers, they often use the same steps, but there are multiple ways to use the steps. The results of this approach are universal in the sense that they can be reproduced by any skeptic.	problem, hypothesis, experiment, observation, variable, control, scientific method, theory, law,

Core Concept	Vocabulary
Technology used to gather data enhances accuracy and allows scientists to analyze and quantify results of investigations. Lab safety procedures such as wearing goggles, handling chemicals, wearing appropriate clothing, tying hair back, not eating in the lab, handling lab equipment and other general rules allow students to maintain a safe working environment.	data

Core Concept	Vocabulary

Core Concept	Vocabulary

PHASE 2: IDENTIFY CORE CONCEPTS & CONNECTIONS

KEY IDEA

1.1 Express measurements of dimension, volume, and mass using *Système International d'Unités* (SI units)

- Converting from one prefix to another prefix.

Connection to the PAST

In 1795, France becomes the first country to adopt the metric system.
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Connection to NOW

U.S. used English system of measurement. In 1994, the Fair Packaging and Labeling Act (FPLA) was amended to require the use of dual units (inch-pound and metric) on all consumer products.

Implications on FUTURE

So we can export products to Europe, U.S. should require metric-only labeling as a step towards meeting EU requirements for SI only labels in 2009. (Dual labeling will not be permitted in Europe).

Core Concept

Scientists use the metric system which is the international system (SI) of measurement. The metric system is based on units of ten. The meter is the basic unit of length of the metric system. A meter stick is used to measure length.

Vocabulary

SI, meter, centimeter, millimeter, unit

Core Concept

Mass is the amount of matter in an object. The basic unit of mass in the metric system is the kilogram. Weight is a measure of the pull of gravity on an object. The weight of the object can change but the mass remains the same. A balance is used to measure mass.

Vocabulary

kilogram, mass, weight, triple beam balance, kilo, hecto, deca, deci, centi, milli, gram

Core Concept

Volume is the amount of space an object takes up. The basic unit of volume is liter. A graduated cylinder is used to measure the volume of a liquid. The curved surface of a liquid is called the meniscus. Volume can be measured in cubic centimeters or milliliters.

Vocabulary

liter, meniscus, volume, cubic centimeter

Core Concept

Temperature is a measure of the average kinetic energy of an object and is measured with a thermometer. The international system of temperature measurement is Celsius.
The freezing point of freshwater at sea level is 0 degrees Celsius, and the boiling point of freshwater at sea level is 100 degrees Celsius.

Vocabulary

degree, Celsius, temperature, thermometer

PHASE 2: IDENTIFY CORE CONCEPTS & CONNECTIONS

KEY IDEA

2.0 Describe the atomic structure of atoms, including the location of protons, neutrons, and electrons.

- Identifying the charge of each subatomic particle
- Identifying Democritus and Dalton as contributors to the atomic theory

Connection to the PAST

Around 460 B.C., Democritus developed the idea of atoms. Democritus thought an atom was the smallest possible bit of matter. He called these basic matter particles atoms.

Connection to NOW

Today, we know that for every atom there are subatomic particles. This knowledge of subatomic particles leads to major advances in science.

Implications on FUTURE

Scientists are looking at another subatomic theory called the quark theory. If this is true, there are an infinite number of possibilities for what makes matter.

Core Concept

Greek philosophers laid the groundwork for the modern atomic theory. Democritus was a Greek philosopher and leading advocate of the theory that all phenomena in nature could be understood in terms of movements of particles called atoms.

Vocabulary

atom
theory

Core Concept

John Dalton developed his atomic theory from observations gathered from many experiments.
The main parts of Dalton's atomic theory are

1) All elements are composed of atoms. Atoms cannot be divided or destroyed.
2) Atoms of the same element are exactly alike. Atoms of different elements are different.
3) The atoms of two or more elements can join together to form compounds.

Vocabulary

model

Core Concept

Each atom has a positively charged nucleus, composed of protons and neutrons, surrounded by negatively charged electrons. Electrons are located in the energy levels. Electrons exist in a cloud that surrounds the atoms. The electric force between the nucleus and electrons holds the atom together.

Vocabulary

nucleus, proton, neutron,
electron,
electron cloud

Core Concept

Vocabulary

PHASE 2: IDENTIFY CORE CONCEPTS & CONNECTIONS

KEY IDEA

3.0 Determine the number of protons, neutrons, and electrons, and the mass of an element using the periodic table.

- Using data about the number of electrons in the outer shell of an atom to determine its reactivity
- Comparing and contrasting isotopes with commonly occurring elements

Connection to the PAST

Mendeleev published his periodic table in 1869 and forecasted the properties of missing elements.

Connection to NOW

Today, the periodic table is arranged according to the atomic number. Additionally, it has been reconfigured by placing the actinide series below the lanthanide series.

Implications on FUTURE

Blank places on the periodic tablereepresent elements have not been discovered. Elements 113, 115, & 117 not known, but included to show their expected atomic structure.

Core Concept

The number of protons is the atomic number of the atom on the periodic table. The atomic number identifies atoms of a particular element. The mass number is the sum of the protons and neutrons in the atom. Isotopes are atoms that have the same number of protons but have different numbers of neutrons. The atomic mass is the average weight of the masses of all the naturally occurring isotopes of an element. The key within the periodic table will indicate the mass number of an element.

Vocabulary

Vocabulary
Isotope, atomic mass
atomic number
mass number

Core Concept

John Dalton developed his atomic theory from observations gathered from many experiments.
The main parts of Dalton's atomic theory are

4) All elements are composed of atoms. Atoms cannot be divided or destroyed.
5) Atoms of the same element are exactly alike. Atoms of different elements are different.
6) The atoms of two or more elements can join together to form compounds.

Vocabulary

model

Core Concept

Metals in Group 1 have 1 valence electron and metals in Group 2 have 2 valence electrons. The energy needed to remove electrons from metals in groups 1 and 2 is low. These elements react very easily. The nonmetals in Groups 15-17 have almost full outermost levels so these atoms gain electrons. The halogens are extremely reactive nonmetals because they release a large amount of energy when they gain electrons. Noble gases have full outer most energy levels and therefore are unreactive.

Vocabulary

metal
nonmetal
noble gases

Core Concept

Vocabulary

Key Ideas of Unit

Unit | The Great Depression

Is about …

A time when the world economy collapsed & its impact on people and the world

Most important idea of whole unit

The ripple effects of an economic depression impacts all aspects of life (attitudes toward others, social conditions, local, national, and world politics, arts & entertainment, inventions, scientific research)

Key Idea 1

ECONOMICS: Economies drive politics / politics drive economies; poorly regulated banking practices can create conditions that can lead to economic collapse

Key Idea 2

SOCIAL: "ISMs" dominate American culture (Racism, Anti-Semitism, anti-Catholicism, anti-feminism, anti-immigrants, anti-Hispanics, etc.)

Key Idea 3

INVENTIONS: The US policies to combat the depression = 1st time in history gov. policies targeted the individual needs of citizens (e.g., Social Security)

Key Idea 4

SCIENCE: Primary focus = mass communications (radio. TV); later, focus shifted to development of military-related technology (rockets, new airplanes, fire-power)

Key Idea 5

SOCIAL: Poverty can be easily exploited to become a form of bondage via poor working conditions, restricted opportunities, and low pay

Key Idea 6

ARTS & ENTERTAINMENT: Shift away from being centered around church/synagogue / community due to mass marketing by movie, radio, & automobile industry

Key Idea 7

POLITICS: Politicians / countries attempt control of their destinies by manipulating opportunities & resources of citizens /other countries

Key Idea 8

EDUCATION: Greater education = enhanced opportunity & power; (un)intentionally limiting a group's opportunities to gain an education controls the group's destiny

Key Idea 9

SOCIAL: Limited opportunities → economic fear →need to control potential competition & exploitation → diminished respect of people being manipulated → erroneous beliefs @ them → hate & violence

PHASE 2: IDENTIFY CORE CONCEPTS & CONNECTIONS

KEY IDEA

ECONOMICS: ECONOMICS: Economies drive politics / politics drive economies; poorly regulated banking practices can create conditions that can lead to economic collapse

Connection to the PAST

Reconstruction laws restricted South's post-war economy. so business were slow to develop, few had jobs, little $$

Connection to NOW

Auto-sell computers when stock price drops below a certain level nearly caused stock market crash in 1990s

Implications on FUTURE

Many want to reduce government. regulations – we have to be careful about removing too many of them

Critical Concept

Speculators bought stocks on margin, artificially inflating prices. When stocks would not sell, prices crashed.. Investors couldn't repay banks. Paniced people rushed to banks to withdraw savings, but banks could not pay because they had loaned the money to investors. Money stopped circulating; people had no money to buy stuff, businesses closed.

Vocabulary

stocks stock market
speculator depression
buying on margin

Critical Concept

Farmers borrowed money to purchase farms, tractors, etc., but could not pay it back because cost more to grow crops than crops would sell for. Banks foreclosed on loans, took farms away to sell to someone else → many farming families became jobless, homeless, & destitute

Vocabulary

mortgage
foreclose
destitute

Critical Concept

Businessmen borrowed money from banks to build factories. Because few people had money to purchase things, factories couldn't sell their products. Since they couldn't sell their products, factories couldn't repay their loans or even pay their employees, they had to close. Employees become jobless.

Vocabulary

laid off

Critical Concept

Many rich people lost their fortunes. Some had to cut way back on their life style (move to smaller houses, etc.). Some committed suicide, leaving their families to try to survive without them. Many remained rich even though they may have lost a lot of money. Some exploited people in difficult circumstances and became rich.

Vocabulary

exploit

Debate Content Mini-planner

Content-learning ***INSTRUCTIONAL OBJECTIVE(s)***

What is the most important idea about the content that students should gain a deep understanding of as a result of the debate?

The student should gain a deeper understanding of how censorship can be abused and can be a necessary evil.

What are specific concepts directly related to the above idea about which students should develop a deep understanding?

Can sway the way people vote in certain ways	Censorship protects lives and keeps military plans secret	Censors shape opinions by what they allow to be reported

Skill Development ***INSTRUCTIONAL OBJECTIVE(s)***

Information Processing Skills

- [X] Finding relevant information
- [ ] Prioritizing importance of information
- [X] Summarizing gist & relevant details
- [ ] Recording information in a useful format

Communication Skills

- [X] Articulating an idea in a clear and precise manner
- [X] Turn-taking (not interrupting)
- [X] Responding to ideas with reasoned logic
- [X] Acknowledging importance while stating disagreeing perspective

Work Habits

- [ ] Persistence while working on difficult tasks
- [ ] Employing creativity to communicate ideas
- [X] Commitment to accuracy and depth of information
- [ ] Setting and monitoring goals

Collaboration Skills

- [X] Doing one's share on time
- [X] Utilizing unique talents of team members
- [ ] Actively working to resolve conflicts
- [X] Encouraging & complimenting

Accommodations

Some students may need accommodations to enable them to access information needed when PREPARING for the debate. Some may need accommodations to enable them to more actively participate DURING the debate.

- [ ] Reading Buddy
- [ ] Audio Recording
- [ ] Adult 1-1 assistance
- [ ] Alternative Passages
- [ ] Read aloud
- [x] Other

Who & What notes

Sam & Mary … Have a variety of articles on other war related freedom of the press and freedom of speech cases available written at 4th grade level .

Debate Resources

- [X] Debate Strategy, pg1
- [X] Debate Strategy, pg2
- [ ] Why Better Than v.1
- [ ] Why Better Than v.2
- [ ] 2 Reasons Why
- [ ] 3 Reasons Why
- [ ] Data Spinning
- [ ] Seems like, but …
- [ ] Debate Topic Analysis

Related Resources

- [X] Presentation Goals
- [ ] DRAFT project-planner
- [ ] Information Resources
- [ ] Use of Collaboration Skills
- [ ] Observations of Collaboration Skills
- [ ] Project-end Evaluation
- [ ] Presentation Evaluation

Experiment Content Mini-planner

Content-learning ***INSTRUCTIONAL OBJECTIVE(s)***

What is the most important idea about the content that students should gain a deep understanding of as a result of the experiment?

Consumerism is a system which goods which are produced for the satisfaction of wants or needs

What are specific concepts directly related to the above idea about which students should develop a deep understanding?

Someone had to produce the items (materials and ingredients).

Someone sold the items (materials and ingredients) = someone brought the items. This "produce / sold" concept creates a cycle.

The more someone buys, the more items produced. However, a key component is the advertising of the goods.

Skill Development ***INSTRUCTIONAL OBJECTIVE(s)***

Information Processing Skills

- [ ] Identify & describe steps to experimental process
- [ ] Recording information in a useful format
- [ ] Forming inferences about the experiment
- [ ] Relating experiment to info from text
- [ ] Listing & describing critical features of experiments outcomes
- [X] Relating experiment to real-life situations
- [ ] Acquiring skills modeled during experiment
- [ ] Relating experiment to key concept(s) of unit

Note-taking Think-sheet Resources

- [ ] Steps & Sequences
- [ ] Process
- [ ] Cause & Effect
- [X] Hypothesis testing
- [ ] Compare & Contrast

When will the experiment occur?

- [ ] At the beginning of lesson to create interest
- [X] After students have an opportunity to develop a knowledge-based about the topic

How will knowledge about the topic be developed?

- [ ] Teacher will read a passage to students
- [ ] Students will read a passage
- [ ] Students will view film or video
- [ ] Guest will present info about topic
- [ ] Teacher will provide instruction about topic via guided note-taking format

Materials needed

White, blue, stripped display boards Cupcakes, Markers (to write the title on display boards) Copy of prcinimp.graphic for every student

- [X] OTHER

Group Work / Class Discussion

List key elements or steps to include in experiment

Directions: There are three displays of cupcake advertisements located around the room. We are going to divide up into groups of four and complete the influence / impact graphic within the group. As you complete the graphic, keep in mind the idea of consumerism.
When all groups have completed the graphic, we will discuss our answer as a whole-group. During the discussion, we will decide as a class which advertisement is the best and which advertisement is the worst.

Art Connection Content Mini-planner

Content-learning ***INSTRUCTIONAL OBJECTIVE(s)***

What is the most important connection between art and the content idea students are expected to learn?

1. One of the clearest ways we can understand another person's experience is through their artistic expression.
2. Understand the horror of internment through art.

Understanding cultural art connections to content subject matter

- [x] Students will identify critical features of art genre specific to a culture / time / place
- [ ] Students will create art that reflects their interpretation of a culture's art genre

Understanding how art devices are used to convey an idea related to the content

- [x] Students will be informed what the content idea is and then asked to analyze the art and explain how artist attempted to communicate the idea

OR

- [ ] Students will analyze the art and attempt to identify possible ideas and/or emotions the artist attempted to communicate and how these relate to the content subject matter

Art items to be analyzed by students

Photographs & artwork related to both internment of Japanese-Americans & Nazi concentration camps

Understanding artistic devices as communication tools

- [ ] EXAGGERATION: How did the artist exaggerate features of something to draw attention or make a point?
- [x] EMOTION: How did the artist illustrate & use emotion to communicate an idea?
- [ ] ACTION: How did the artist illustrate & use action to communicate an idea?
- [ ] PERSPECTIVE: How did the artist use perspective (angle of view) r to draw attention to or help communicate an idea?
- [ ] SPACE / COMPOSITION: How did the artist use space or composition to draw attention to or help communicate an idea?
- [ ] LIGHT / SHADOW / COLOR: How did the artist use light, shadow, and/or color to draw attention to or help communicate an idea?

Creating art to convey an idea

Idea to be Illustrated horror of internment

Art medium to be used to convey content idea

[ ] ABC pop-up	[ ] Dirorama	[ ] Mask	[ ] Montage	[ ] Poster	[ ] Scratchboard
[ ] Bookmaking	[ ] Display / bulletin board	[ ] Mixed media	[ ] Mural	[ ] Print	[ ] Sculpture
[ ] Collage	[ ] Drawing	[x] Mind Map	[ ] Painting	[ ] Puppet	[ ] Wash
[ ] Craft	[ ] Line / String art	[ ] Mobile	[ ] Pastel	[ ] Rubbing	[ ] OTHER

Materials Needed

Horror of internment through art.

Using art devices to convey an idea

- [ ] EXAGGERATE key features to draw attention or make a point
- [ ] Illustrate EMOTION to communicate an idea
- [ ] Illustrate ACTION to communicate an idea
- [x] Use PERSPECTIVE to draw attention to or help communicate an idea
- [ ] Use SPACE / COMPOSITION to draw attention to or help communicate an idea
- [ ] Use LIGHT / SHADOW / COLOR to draw attention to or help communicate an idea

Literature Connection Content Mini-planner #2

What is the most important idea of the content

Germany threatened opportunity, safety, and values of people in the other countries by invasion.

Literature / Story

The Butterfly by Patricia Polacco

Concept or process directly related to the above idea

Threatened Value & Safety

In the cellar of Montiquie's house, Sevrine whispered, "We are being hunted by the Nazi, you know. We are Jews. There are many of us hiding all over France. (Polacco.13)

Explain the connection

When Germans invaded other countries, safety was threatened. During the Nazi occupation many Jews hid in safe havens until they could escape to freedom.

- [X] The context of the story provides an example of the idea or process
- [X] The story illustrates how the idea impacts the way characters live or their culture
- [X] The story illustrates how the idea impacts the actions, emotions, or decisions of the characters
- [X] The story provides a context for helping students understand moral or ethical principles / issues related to the idea
- [ ] The story provides a context for helping students understand how the idea might be manifested in the real world
- [ ] The story provides a context for helping students understand how the idea might be connected to their own past or future experiences

Questions to pose to help students make connections

1. How is this like (or not like) the under ground railroad?
2. Who is someone that might be hunted today by the government?

Recommended Think-sheets

- [ ] Comparison Frames
- [ ] Is Like Comparisons
- [ ] REAL – world connections
- [ ] Cause & Effect

Concept or process directly related to the above idea

Threatened Safety

"You are no longer safe here… We must leave home tonight… We need to get you and your family out of the country" (Polacco.25)

Explain the connection

Hitler wanted Germans to be the dominating "Aryan" race. The safety and value of Jews, gypsies and others were threatened. Many of them hid in cellars or refuge homes until they could flee the country.

- [ ] The context of the story provides an example of the idea or process
- [X] The story illustrates how the idea impacts the way characters live or their culture
- [X] The story illustrates how the idea impacts the actions, emotions, or decisions of the characters
- [ ] The story provides a context for helping students understand moral or ethical principles / issues related to the idea
- [ ] The story provides a context for helping students understand how the idea might be manifested in the real world
- [ ] The story provides a context for helping students understand how the idea might be connected to their own past or future experiences

Questions to pose to help students make connections

1. Would you react the same or different way than the character in the story?
2. When people feel their safety is threatened, fight or flight?

Recommended Think-sheets

- [ ] Comparison Frames
- [ ] Is Like Comparisons
- [ ] REAL – world connections
- [ ] Cause & Effect