Unit 1: Mixtures and Solutions

Content Area: **Science**
Course(s): **Science**
Time Period: **Week 1**
Length: **10 Weeks**
Status: **Published**

Unit Overview

In this module, students will be introduced to fundamental ideas about matter and its interactions. Students will know that matter is made of particles too small to be seen and develop the understanding that matter is conserved when it changes state - from solid to liquid to gas - when it dissolves in another substance and when it is part of a chemical reaction. Students will be exposed to experiences with mixtures, solutions of different concentrations and reactions forming new substances. Students will also engage in engineering experiences to separate materials. Finally, students will gain experiences that will contribute to the understanding of crosscutting concepts of patterns, cause and effect, scale, proportion and quantity, systems and system models and energy and matter.

Standards

Disciplinary Core Ideas (DCI's)

5-PS1-1	Develop a model to describe that matter is made of particles too small to be seen.
3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
3-5-ETS1-3	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
5-PS1-2	Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.
5-PS1-3	Make observations and measurements to identify materials based on their properties.
5-PS1-4	Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Crosscutting Concepts (CC's)

CCC.2.1	students routinely identify and test causal relationships and use these relationships to explain change. They understand events that occur together with regularity might or might not signify a cause and effect relationship.
CCC.4.1	students understand that a system is a group of related parts that make up a whole and

	can carry out functions its individual parts cannot. They can also describe a system in terms of its components and their interactions.
SCI.3-5.1.2	Patterns of change can be used to make predictions.
SCI.3-5.1.3	Patterns can be used as evidence to support an explanation.
SCI.3-5.3.2	Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.
SCI.3-5.4.2	A system can be described in terms of its components and their interactions.

Science and Engineering Practices (SEP's)

SEP.1.c	Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.
SEP.2.d	Develop and/or use models to describe and/or predict phenomena.
SEP.3.a	Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.
SEP.3.c	Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
SEP.3.d	Make predictions about what would happen if a variable changes.
SEP.4.a	Represent data in tables and/or various graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships.
SEP.4.b	Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, and/or computation.
SEP.4.c	Compare and contrast data collected by different groups in order to discuss similarities and differences in their findings.
SEP.5.c	Describe, measure, estimate, and/or graph quantities (e.g., area, volume, weight, time) to address scientific and engineering questions and problems.
SEP.6.b	Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation or design a solution to a problem.
SEP.6.c	Identify the evidence that supports particular points in an explanation.
SEP.7.d	Construct and/or support an argument with evidence, data, and/or a model.
SEP.7.e	Use data to evaluate claims about cause and effect.
SEP.8.d	Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.
SEP.8.e	Communicate scientific and/or technical information orally and/or in written formats, including various forms of media as well as tables, diagrams, and charts.

Essential Questions

Investigation 1 - Separating Mixtures:

- How can a mixture be separated?
- Where does the solid material go when a solution is made?
- How can you separate a mixture of dry materials?
- Are there materials outdoors that will dissolve in water?

Investigation 2 - Developing Models:

- What is the process to develop a model of the black box?
- How does a drought-stopper system work?
- What is the difference between dissolving and melting?

Investigation 3 - Concentration:

- Are all solutions made with soft-drink powder and water the same?
- How can you determine which salt solution is more concentrated?
- How can you determine the relative concentrations of three mystery solutions?
- What is the relationship between salt-solution concentration and density?

Investigation 4 - Reaching Saturation:

- Is there a limit to the amount of salt that will dissolve in 50mL of water?
- Does it always take the same amount of solid materials to saturate 50 mL of water?
- What is the identity of the mystery substance?
- What is in our water samples?
- What is a design to remove salt from ocean water?

Investigation 5 - Fizz Quiz:

- What is the effect of mixing two substances with water?
- How can we identify the products from the baking soda and calcium chloride reaction?
- What happens when you mix substances with water in a bag?

Application of Knowledge: Students will know that…

- A gas or precipitate is evidence of a reaction.
- A mixture is two or more materials intermingled.
- A solution is saturated when as much solid material as possible has dissolved in the liquid.
- A substance is a single, pure material.
- An aqueous solution is a mixture in which a substance disappears (dissolves) in water to make a clear liquid.
- Calcium carbonate reacts with acid.
- Concentration is the amount of dissolved solid material per unit volume of water.
- Density is mass per unit volume
- Developing a model is an iterative process, which may involve observing, constructing, analyzing, evaluating and revising.
- Dissolving is an interaction between two (or more) substances: a solute which dissolves and a solvent, which does the dissolving and into which the solute disappears.
- During reactions, starting substances (reactants) change into new substances (products).

- Engineers plan designs, select materials, construct products, evaluate results and improve ideas.
- Melting is a change in a single substance from solid to liquid caused by heat (energy transfer).
- Mixtures can be separated into their constituents by using screens, filters and evaporation
- Models are explanations of objects, events or systems that cannot be observed directly.
- Models are representations used for communicating and testing.
- More concentrated salt solutions are denser.
- Possible solutions to a problem are limited by available materials and resources (constraints).
- Solubility is the property that indicates how readily a solute dissolves in a solvent.
- Solubility varies from substance to substance.
- Solutions are composed of a solvent (liquid) and a solute (solid), which is dissolved in the solvent.
- Solutions form layers based on density.
- Solutions with a lot of solid dissolved in a volume of water are concentrated; solutions with little solid dissolved in a volume of water are dilute.
- Some mixtures results in a chemical reaction.
- Some products of reactions are soluble and can be identified by crystal structure after evaporation.
- Substances form predictable, identifiable crystals.
- The amount of matter is conserved when it changes form.
- The mass of a mixture is equal to the mass of its constituents.
- The success of a designed solution is determined by considering the desired features of a solution (criteria).
- When equal volumes of two salt solutions are weighed, the heavier one is more concentrated.

Application of Skills: Students will be able to...

- Apply knowledge to design a process for making ocean water suitable for drinking.
- Compare proposals for design solutions on the basis of how well each one meets the criteria for success and how well each takes the constraints into account.
- Compare the properties of the products of several reactions.
- Gather data and use analysis and logic to construct and communicate reasonable explanations for how a system functions.
- Identify an unknown substance based on the properties of solubility and crystal form.
- Layer solutions to determine relative density (concentration).
- Make mixtures and solutions with different solid materials and water.
- Measure solids and liquids to compare the mass of a mixture to the mass of its parts.
- Observe and compare reactants and products of a chemical reaction.
- Plan and conduct saturation investigations to compare the solubility of materials in water.
- Separate and identify the products of reactions.
- Separate mixtures and solutions, using screens, filters and evaporation.
- Use balance to determine relative concentration.
- Work with others as scientists to create conceptual and physical models that explain how something works.

Assessments

Investigation 1 - Separating Mixtures:

- Formative Assessments: Science Notebook entry (Focus Questions - How can a mixture be separated? Where does the solid material go when a solution is made? How can you separate a mixture of dry materials? Are there materials outdoors that will dissolve in water?; New Vocabulary - mixture, dissolve, solution), Response Sheet and Performance Assessment - Teacher observes the rich conversation among students and the actions they are taking to investigate phenomena or design solutions to problems
- Benchmark Assessments: Survey (pre and post), Investigation 1 I-Check

Investigation 2 - Developing Models:

- Formative Assessments: Science Notebook entry (Focus Questions - What is the process to develop the model of a black box? How does a drought-stopper system work? What is the difference between dissolving and melting?; New Vocabulary - analyze, collaboration, consensus, construct, model, revise) and Response Sheet
- Benchmark Assessments: Investigation 2 I-Check

Investigation 3 - Concentration:

- Formative Assessments: Science Notebook entrie, (Focus Questions - Are all solutions made with soft drink powder and water the same? How can you determine which salt solution is more concentrated? How can you determine the relative concentrations of three mystery solutions? What is the relationship between salt-solution concentration and density?; New Vocabulary - concentrated, concentration, dilute) Response Sheet and Performance Assessment - Teacher observes the rich conversation among students and the actions they are taking to investigate phenomena or design solutions to problems
- Benchmark Assessments: Investigation 3 I-Check

Investigation 4 - Reaching Saturation:

- Formative Assessments: Response Sheet, Science Notebook entries (Focus Questions - Is there a limit to the amount of salt that will dissolve in 50 mL of water? Does it always take the same amount of solid materials to saturate 50 mL of water? What is the identity of the mystery substance? What is in our water samples? What is a design to remove salt from ocean water?; New Vocabulary - saturated solution), Performance Assessment - Teacher observes the rich conversation among students and the actions they are taking to investigate phenomena or design solutions to problems
- Benchmark Assessments: Investigation 4 I-Check

Investigation 5 - Fizz Quiz:

- Formative Assessments: Science Notebook entry (Focus Questions - What is the effect of mixing two substances with water? How can we identify the products from the baking soda and calcium chloride reaction? What happens when you mix substances with water in a bag?; New Vocabulary - baking soda, calcium chloride, carbon dioxide, chemical reaction. gas, precipitate, product, reactant) and Response Sheet
- Benchmark Assessments: Posttest - identical pre-survey

Suggested Activities

Investigation 1 - Separating Mixtures:

Part 1 - Making and Separating Mixtures:

- Students make three mixtures of solid materials and water
- Investigation Time - 1 Session
- Writing/Reading - Science Notebook Entry: *Mixtures, Separations*
- Online Activity - "Tutorial: Mixtures"

Part 2 - Separating a Salt Solution:

- Students add a measured amount of salt to a measured amount of water to make a solution.
- Active Investigation Time - 2 Sessions, Reading - 1 Session
- Writing/Reading - Science Notebook Entry: *Making a Solution*
- Science Resources Book - "Mixtures"
- Online Activity - "Tutorial: Solutions"

Part 3 - Separating a Dry Mixture:

- Students are given a dry mixture to separate.
- Active Investigation Time - 2 Sessions, Reading - 1 Session
- Writing/Reading - Science Notebook Entry: Answer the focus question
- Science Resources Book - "Taking Mixtures Apart", "Science Practices", "Engineering Practices"
- Online Activity - "Separating Mixtures", "Virtual Investigation: Separating Mixtures"
- Video: *Elements, Compounds and Mixtures*

Part 4 - Outdoor Solutions:

- Students are challenged to discover if natural materials in the schoolyard will make solutions when mixed with water.
- Active Investigation Time - 1 Session, Reading - 1 Session, Assessment - 2 Sessions
- Writing/Reading - Science Notebook Entry: Answer the focus question
- Science Resources Book - "Extracts", "The Story of Salt"

Investigation 2 - Developing Models:

Part 1 - Black Boxes:

- Students make multisensory observations of sealed black boxes in an effort to determine what is inside.
- Active Investigation Time - 3 Sessions
- Writing/Reading - Science Notebook Entry: Answer the focus question
- Online Activity - "Black Box"

Part 2 - Drought Stopper:

- Students observe a device that delivers 600 - 700 mL of water when only 100 mL of water is put in.
- Active Investigation Time - 1 Session, Reading - 1 Session
- Writing/Reading - Science Notebook Entry: Drought-Stopper Drawing

- Science Resources Book - "Beachcombing Science"

Part 3 - Model for Change in Properties:

- Students use hot water to heat four common solid materials and observe that one melts, two soften and one is unchanged.
- Active Investigation Time - 1 Session, Reading - 2 Sessions, Assessment - 2 Sessions
- Writing/Reading - Science Notebook Entry: Answer the focus question
- Science Resources Book - "Solid to Liquid", "Liquid and Gas Changes", "Celsius and Fahrenheit"
- Video - *Changes in Properties of Matter*

Investigation 3 - Concentration:

Part 1 - Soft-Drink Recipes:

- Students observe and compare soft-drink solutions that differ in the amount of powder and in the amount of water to develop the concept of concentration.
- Active Investigation Time - 1 Session, Reading - 1 Session
- Writing/Reading - Science Notebook Entry: *Soft-Drink Recipe*
- Science Resources Book - "Solutions Up Close"
- Online Activity - "Tutorial: Conservation of Mass"

Part 2 - Salt Concentration:

- Students make salt solutions and compare their concentrations.
- Active Investigation Time - 1 Session, Reading - 1 Session
- Writing/Reading - Science Notebook Entries: *Salt Solutions 1 and 2, Comparing Salt Solutions*
- Science Resources Book - "Concentrated Solutions"

Part 3 - Mystery Solutions:

- Students determine the relative concentrations of three mystery salt solutions by comparing equal volumes on a balance.
- Active Investigation Time - 1 Session, Reading - 1 Session
- Writing/Reading - Science Notebook Entry: Answer the focus question
- Science Resources Book - "The Air", "Famous Scientists"
- Online Activities - "Tutorial: Concentration", "Virtual Investigation: Saltwater Concentration"

Part 4 - Liquid Layers:

- Students observe that a mass piece sinks in one liquid and floats in another because the liquids are different densities.
- Active Investigation Time - 1 Session, Reading - 1 Session, Assessment - 2 Sessions
- Writing/Reading - Science Notebook Entry: *Liquid Layers*
- Science Resources Book - "Carbon Dioxide Concentration in the Air", "The Frog Story"
- Video - *Why Are Oceans Salty?*
- Online Activity - "Tutorial: Density"

Investigation 4 - Reaching Saturation:

Part 1 - Salt Saturation:

- Students make a saturated solution by adding salt water until no more salt will dissolve.
- Active Investigation Time - 1 Session, Reading - 1 Session
- Writing/Reading - Science Notebook Entry: *Saturating a Solution*
- Science Resources Book - "The Bends"

Part 2 - Epsom Salts Saturation:

- Students add Epsom salts to 50 mL of water to make a saturated solution.
- Active Investigation Time - 1 Session
- Writing/Reading - Science Notebook Entry: Answer the focus question

Part 3 - The Saturation Puzzle:

- Students are given an unknown substance to identify based on its properties.
- Active Investigation Time - 2 Sessions, Reading - 1 Session
- Writing/Reading - Science Notebook Entry: *Solubility Table*
- Science Resources Book - "A Sweet Solution", "Sour Power"
- Online Activities - "Tutorial: Saturation", "Virtual Investigation: Solubility"

Part 4 - What's In Your Water?:

- Students collect water samples from the school and use observation and evaporation to determine what's in each sample.
- Active Investigation Time - 3 Sessions, Reading - 2 Sessions, Assessment - 2 Sessions
- Writing/Reading - Science Notebook Entry: Answer the focus question
- Science Resources Book - "East Bay Academy for Young Scientists", "Drinking Ocean Water", "Creative Solutions"
- Video - *The Water Cycle*

Investigation 5 - Fizz Quiz:

Part 1 - Chemical Reactions:

- Students use three substances to make three different combinations of two substances.
- Active Investigation Time - 1 Session, Reading - 1 Session
- Writing/Reading - Science Notebook Entry: *Two-Substance Mixtures*
- Science Resources Book - "Ask a Chemist"
- Online Activity - "Fizz Quiz"

Part 2 - Reaction Products:

- Students use techniques from earlier investigations to separate the products of the reactions.
- Active Investigation Time - 2 Sessions, Reading - 1 Session
- Writing/Reading - Science Notebook Entry: Answer the focus question
- Science Resources Book - "When Substances Change"
- Video - *Chemical Reactions*

Part 3 - Reaction in a Zip Bag:

- Using combinations of the substances used in Parts 1 and 2, students produce chemical reactions in zip bags.
- Active Investigation Time - 1 Session, Reading - 1 Session, Assessment - 2 Sessions

- Writing/Reading - Science Notebook Entry: Answer the focus question
- Science Resources Book - "Air Bags"
- Video - *Changes in Properties of Matter*
- Online Activity - "Tutorial: Reaction or Not?"

Activities to Differentiate Instruction

Differentiation for special education:

- General modifications may include:
    - Modifications & accommodations as listed in the student's IEP
    - Assign a peer to help keep student on task
    - Modified or reduced assignments
    - Reduce length of assignment for different mode of delivery
    - Increase one-to-one time
    - Working contract between you and student at risk
    - Prioritize tasks
    - Think in concrete terms and provide hands-on-tasks
    - Position student near helping peer or have quick access to teacher
    - Anticipate where needs will be
    - Break tests down in smaller increments

Differentiation for ELL's:

- General modifications may include:
    - Strategy groups
    - Teacher conferences
    - Graphic organizers
    - Modification plan
    - Collaboration with ELL Teacher
- Content specific vocabulary important for ELL students to understand include: constraint, criteria, crystal, diatomaceous earth, dissolve, engineer, evaporation, extract, filter, gravel, magnet, mass, mixture, powder, property, salt, screen, separate, solute, solution, solvent, transparent, analyze, collaboration, condensation, consensus, construct, freezing, melting, model, phase change, revise, siphon, water vapor, concentrated, concentration, density, dilute, equal volumes, layer, less dense, more dense, citric acid, Epsom salts, insoluble, saturated solution, soluble, solubility, substance, supersaturated, baking soda, calcium carbonate, calcium chloride, carbon dioxide, chalk, chemical reaction, gas, precipitate, product, reactant

Differentiation to extend learning for gifted students may include:

- Home/School Extension Activities
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    - Investigation 1 - Separating Mixtures:

      Extension Activities: Invent a gorp recipe, math problem of the week, investigate if the material dissolves, research diatomaceous earth, research sodium chloride, engineers without borders, make unusual mixtures and study properties

- Investigation 2 - Developing Models:

Extension Activities: Write procedures for construction, math problem of the week, draw blueprints, do a model-building activity, design advertisements, gather more information about black boxes, introduce more mystery boxes, develop a soft-drink dispensing machine model

- Investigation 3 - Concentration:

Extension Activities: List descriptive words, play a memory game, math problem of the week, calculate drink cost, prepare density-demonstration bottles, make concentration rainbows, compare the crystals, investigate drinks, compare diet and regular colas, investigate dilution, make unknown concentrations, concoct play putty

- Investigation 4 - Science Resources Book:

Extension Activities: Define saturation, make it crystal clear, find citric acid, math problem of the week, make saturated solutions with other materials, change the temperature, find out if time affects saturation, compare crystals of several materials, dissolve two materials in one solution, get involved with World Water Monitoring Day, simulate and outdoor oil spill, conduct an indoor oil spill simulation, make crystals

- Investigation 5 - Fizz Quiz:

Extension Activities: Describe the reaction, list descriptive words, apply the reaction, math problem of the week, compare the reactions, investigate baking powder and baking soda, use baking soda to test household materials for acidity

Integrated/Cross-Disciplinary Instruction

Investigation 1 - Separating Mixtures:

- Language Extensions - Invent a gorp recipe using nuts, dried fruits and other goodies
- Math Extension - Problem of the Week
- Engineering Extension - Research the organization Engineers Without Borders and find out more about the engineering projects they conduct

Investigation 2 - Developing Models:

- Language Extension - Write clear, step-by-step instructions for classmates to create a device
- Math Extension - Problem of the Week; Draw blueprints of fantasy homes with precise measurements; Do a partner model building activity by following step-by-step verbal instructions
- Art Extension - Prepare and ad for a new invention complete with pictures
- Engineering Extension - Gather more information about black boxes by listening with a stethoscope, comparing models with another class and observe frozen droplets of water from the box as they melt

Investigation 3 - Concentration:

- Language Extensions - List adjectives to describe how dilute and concentrated soft drinks taste; Play a vocabulary memory game

- Math Extension - Problem of the Week; Calculate drink costs to determine the most economical

Investigation 4 - Reaching Saturation:

- Language Extensions - Define saturation; Discuss the word *crystal* and its different meanings; List make foods containing citric acid
- Math Extension - Problem of the Week

Investigation 5 - Fizz Quiz:

- Language Extensions - Pretend to describe the reaction of calcium chloride and baking soda in water to a person who is unable to see it; List adjectives to describe the reactions of products in this investigation; Students will design a new product as a result of one of the reactions in this investigation
- Math Extensions - Problem of the Week
- Engineering Extension - Create two different mixtures and compare the reactions; Compare and contrast the similarities and differences between baking powder and baking soda

LA.RI.5.1	Quote accurately from a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.
LA.RI.5.2	Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.
LA.RI.5.3	Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
LA.RI.5.4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.
LA.RI.5.6	Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent.
LA.RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
LA.RI.5.8	Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).
LA.RI.5.9	Integrate and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) information from several texts on the same topic in order to write or speak about the subject knowledgeably.
LA.RI.5.10	By the end of year, read and comprehend literary nonfiction at grade level text-complexity or above, with scaffolding as needed.
LA.RF.5.4	Read with sufficient accuracy and fluency to support comprehension.
LA.W.5.4	Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
LA.W.5.5	With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
LA.W.5.7	Conduct short research projects that use several sources to build knowledge through investigation of different perspectives of a topic.
LA.W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

LA.W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
LA.SL.5.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
LA.SL.5.2	Summarize a written text read aloud or information presented in diverse media and formats (e.g., visually, quantitatively, and orally).
LA.SL.5.4	Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
LA.SL.5.6	Adapt speech to a variety of contexts and tasks, using formal English when appropriate to task and situation.
LA.L.5.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
LA.L.5.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 5 reading and content, choosing flexibly from a range of strategies.
LA.L.5.5	Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
LA.L.5.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition).

Resources

Investigation 1 - Separating Mixtures:

- Science Resources Book: "Mixtures", "Taking Mixtures Apart", "Science Practices", "Engineering Practices", "Extracts", "The Story of Salt" (optional)
- Videos: *Elements*, *Compounds and Mixtures*

Investigation 2 - Developing Models:

- Science Resources Book: "Scientists and Models", "Beachcombing Science", "Celsius and Fahrenheit", "Solid to Liquid" and "Liquid and Gas Changes"
- Video: *Changes in Properties of Matter*

Investigation 3 - Concentration:

- Science Resources Book: "Solutions Up Close", "Concentrated Solutions", "The Air", "Famous Scientists", "Carbon Dioxide Concentration in the Air", "The Frog Story"
- Video: *Why Are Oceans Salty?*

Investigation 4 - Reaching Saturation:

- Science Resources Book: "The Bends", "A Sweet Solution", "Sour Power", "East Bay Academy for Young Scientists", "Drinking Ocean Water", "Creative Solutions"
- Video: *The Water Cycle*

Investigation 5 - Fizz Quiz

- Science Resources Book: "Ask a Chemist", "When Substances Change", "Air Bags"

- Videos: *Chemical Reactions, Changes in Properties of Matter*

21st Century Skills

CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.