Marietta City Schools

District Unit Planner

Grade 5 Science

Theme	*Unit 5 Physical and Chemical Changes*	**Unit duration**	*6 weeks*

Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?*

GaDoE Standards/3D Science Elements

Georgia Standards:
S5P1. Obtain, evaluate, and communicate information to explain the differences between a physical change and a chemical change.
a. Plan and carry out investigations of physical changes by manipulating, separating, and mixing dry and liquid materials.
b. Construct an argument based on observations to support a claim that the physical changes in the state of water are due to temperature changes, which cause small particles that cannot be seen to move differently.
c. Plan and carry out an investigation to determine if a chemical change occurred based on observable evidence (color, gas, temperature change, odor, new substance produced).

Unit Objectives:
Students will understand the differences between chemical and physical changes and how they are influenced by the energy applied.

Physical change: an often reversible (if energy is input) change that affects the physical properties of a substance, (crumple or shred paper or foil, breaking bottle, melting an ice cube, boiling water, evaporation alcohol, sublimation of dry ice into carbon dioxide vapor).

Chemical change: an irreversible reaction that affects the composition of a substance, produces a new substance, results in a chemical reaction (burning, cooking, rusting, rotting, souring milk, digesting food, cooking an egg, baking a cake), the only way to reverse a chemical change in via another chemical reaction.

Unit Phenomena:
Elephant Toothpaste
Ask students what they notice and what they wonder about the experiment. Have them come up with an explanation for what happens during the experiment. Do not reveal the explanation in the video. At the end of the unit, revisit the elephant toothpaste experiment (perhaps do a demo), and have students revise their explanations based on what they now know. Students should be able to state that a chemical change has occurred and cite observable evidence to support the statement that chemical change has occurred.

Page Keeley Probes:
Page Keeley probes can be used as phenomena. They are intended to elicit student understanding about science concepts. Starting a unit or lesson with a probe will help you uncover misconceptions and see what students already know about a topic. Using a probe at the beginning of a lesson and then at the end of the lesson serves the purposes of pretesting and then formatively evaluating student thinking. Below is a list of probes from Page Keeley's book Uncovering Student Ideas in Primary Science, that are appropriate for this unit. This book has been purchased for your grade level by the Office of Academic Achievement and can be found in your media center.

- Ice Cubes in a Bag (Volume 1)
- Rusty Nails (Volume 1)
- Lemonade (Volume 1)
- Is It Melting? (Volume 1)
- Is it Matter? (Volume 1)
- Ice Cold Lemonade (Volume 2)
- Turning the Dial (Volume 2)
- Sugar Water (Volume 4)
- Burning Paper (Volume 4)
- Nails in a Jar (Volume 4)
- Salt Crystals (Volume 4)
- Ice Water (Volume 4)

Science & Engineering Practices:	**Disciplinary Core Ideas:**	**Crosscutting Concepts:**
• Asking questions • Developing and using models • Plan and carry out investigations • Engage in Argument from Evidence	● Physical Changes ● Chemical Changes ● Phases/States of water are related to temperature changes ● Energy Transfer	• Cause and Effect • Energy and Matter

Misconceptions:

· Students may believe that matter can be destroyed or created.
· Students may believe that water must be boiled in order to change from a liquid to a gas.
· Substances only freeze (change from a liquid to a solid) when it is cold.
· Students may have difficulty distinguishing whether a physical change or a chemical change has occurred.

Math/ELA Connections/STEM Connections
ELAGSE5SL5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.
ELAGSE5SL6 Adapt speech to a variety of contexts and tasks, using formal English when appropriate to task and situation. (See grade 5 Language Standards 1 and 3 for specific expectations.)
MGSE5.MD.1 Convert among different-sized standard measurement units (mass, weight, length, time, etc.) within a given measurement system (customary and metric) (e.g., convert 5cm to 0.05m), and use these conversions in solving multi-step, real world problems.

MGSE5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

STEM
DE Science Techbook STEM Starter – Redesigning the Alaska Pipeline to prevent rust.

Discovery Education Science Techbook (Log into your DE account using your Google credentials before accessing the DE resources) You will find station rotation activities such as leveled reading passages, interactives, hands-on labs, virtual labs, video clips, and more on the Explore page of each Techbook unit.
DE Science Techbook Chemical Changes Unit
DE Science Techbook Mixtures Resources

Image: Melting Ice Cubes
Image: Rusting Ship
Changes of States
Things That Change
Chemical Changes
Mixtures
All Mixed Up

Discovery Education Hands-On Activities
Hands-On Activity: What Should We Use?
Hands-On Activity: Will It Freeze?
Hands-On Activity: Heating Up
Hands-On Lab: Mass and Chemical Change
Hands-On Activity: Modeling Heterogeneous Mixtures
Hands-On Activity: Mixing and Separating

More Hands-on Activities
Ice cream in a Bag

Use the AIMS 5th grade book to access the following lessons for more student-centered lessons. Contact your Instructional Coach or Science Coordinator if AIMS books are not available in your Media Center or Workroom.

Page #	Lesson Title	Lesson Description
49	Physically Changed *	Students will create a physical change in a group of objects.
56	Magnificent Mixtures *	Students will investigate physical changes that occur when solids are combined to make mixtures.
66	Ice Change: The Meltdown	Students will predict how long it will take an ice cube to melt and compare their predictions with the actual time.
94	Mixed Reactions *	Students will work through stations to determine chemical or physical changes.
111	It's a Good Indicator	Students will use color change as an indicator that a chemical change has happened.
131	Change Matters *	Students will identify physical and chemical changes, classify changes in matter, and collect, graph, and analyze data.

Essential Questions

Factual—

What are the five indicators of a chemical change?

What is the difference between a physical and chemical change?

Inferential—

Provide five examples of an environmental physical change.

Provide five examples of an environmental chemical change.

Critical Thinking-

What happens at the molecular level when a physical change occurs?

Tier II Words- High Frequency Multiple Meaning	**Tier III Words-** Subject/ Content Related Words
change, water, solid, liquid, gas, freeze, warm, melt, heat, structure, measurable	physical properties, chemical properties, substance(s), physical change, evaporation, chemical change, chemical reaction, mixture, separate, states of matter, matter

Assessments
Unit Summative Assessments are accessible through Schoology and use the Performance Matters assessment platform.

Objective or Content	**Learning Experiences**	**Differentiation Considerations**
CLE 1-3: S5P1. Obtain, evaluate, and communicate information to explain the differences between a physical change and a chemical change.	GaDOE Physical and Chemical Changes Instructional Segment Students will gain an understanding of the difference between how things change physically or chemically. Chemical and Physical Changes Stations The objective of the lesson is to help students differentiate between a chemical and physical change. This lesson includes some great hands-on experiments with which students should be familiar.	Student Choice Performance Tasks Reflection and Goal Setting Learning Stations Choice Boards Formative Probes Science Journaling Multi-sensory activities Assistive Technology Flexible Grouping Multiple Means of Representation

Recommended High Quality Complex Text By Lexile Band
Chemistry: Investigate the Matter That Makes Up Your World By Carla Mooney

Step-By-Step Experiments With Matter By Gina Hagler

Real World Science: Matter By Heather Miller

States of Matter By Lynnette Brent

Explore Solids and Liquids with 25 Great Projects By Kathleen M. Reilly

Chemical Changes By Lynnette Brent