IN THE LAB

Exploring Chemistry

FAMILY UNIT STUDY

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Welcome!

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What to Expect

Thank you for choosing one of How Wee Learn's Family Unit Studies! If you are new to Family Unit Studies, I invite you to take a moment to review the "What to Expect" below, as well as the suggested schedule on the following page.

A unit study focuses on critical thinking and problem-solving, allowing children to dive deep into fascinating topics and engage in meaningful learning. When a child is engaged in what they are learning, that learning sticks. And when a child is engaged and fascinated by what they are learning, learning is amazingly fun for the whole family! Say goodbye to those power struggles.

Our unit studies are divided into ten topics with manageable, bite-sized amounts of information. Each topic includes:

- **Interesting Fact:** Did you know that elephants suck their trunks much like babies suck their thumbs? Or that a human has the same number of neck bones as a giraffe? Interesting facts are an excellent way to spark a child's interest and imagination!
- **Discussion Question:** Asking the right questions and having meaningful discussions is a wonderful way to meet your child at their level of understanding and help them grow. So much can be learned through one meaningful discussion!
- **Curated YouTube Video:** Dive into fun and easy learning with experts in the field, entertaining stories, and inspiring tales, all selected to highlight key learning concepts. Enjoy a snuggle on the couch, learning with popcorn and a movie!
- **Book Suggestion:** The book suggestions for each topic are just that—suggestions. Any books related to the topic are strongly encouraged. Immersing your child in a literacy-rich environment and offering plenty of time to explore is key for child-led learning.
- **Math Enrichment:** Each unit study includes five math enrichment questions with three levels so they are fitting for ages 4 to 12. These questions cover the five strands of math: Number Sense, Algebra, Data, Spatial Sense, and Financial Literacy. This is not a full math curriculum, of course, but an enrichment opportunity and a chance to be exposed to real-world math. As you go through a question, consider how you might ask a follow-up question. Perhaps, "What would happen if there were 6 birds instead of 5?"
- **Literacy Enrichment:** There are so many opportunities to integrate literacy development throughout each unit study! Reading, researching, recording information, labeling, and note-taking all happen naturally. On top of this, each unit study includes five literacy enrichment activities with three levels so they are fitting for ages 4 to 12.
- **Hands-on Activity:** The hands-on activity brings the information shared and discussed to life! These activities allow children to engage in and solidify their learning.
- **What's Happening:** This ensures any information you need for the hands-on activity is right at your fingertips. This may include background information on the topic, the science behind an experiment you perform, etc.
- **Extension Activity:** Some activities might feel too young for your learner. If that's the case, this section is for you! The extension activity shares how to make the hands-on activity more challenging or enriching, ensuring every child is met with appropriate developmental activities.

I hope you and your family love this unit study!

If you have any questions at all, please email me at customercare@howweelearn.com.

xo Sarah

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Suggested Schedule

These unit studies are completely flexible—there is no right or wrong way to dive in. When learning is this exciting, you simply cannot go wrong! Below are two possible ways you might choose to use these unit studies.

10-Day Focused Unit Study

Your family might choose to focus on one unit study topic a day, completing the entire unit study over a 10-day period:

Day 1	**Morning** *30-60 mins*	Complete core skill work with one page of How Wee Learn Literacy and one page of How Wee Learn Math for your child's specific grade. Next, introduce Topic 1 of this unit study with the interesting fact, discussion question, and YouTube video.
	Afternoon *30-60 mins*	Complete Topic 1 by diving into the math or literacy enrichment question, the hands-on activity, and the optional extension activity!
Day 2	**Morning** *30-60 mins*	Complete core skill work with one page of How Wee Learn Literacy and one page of How Wee Learn Math for your child's specific grade. Next, introduce Topic 2 of this unit study with the interesting fact, discussion question, and YouTube video.
	Afternoon *30-60 mins*	Complete Topic 2 by diving into the math or literacy enrichment question, the hands-on activity, and the optional extension activity!

Etc., repeating until all 10 topics are covered.

One-Month Blended Unit Study

Alternatively, your family might choose to blend this unit study with your core skills and family adventures, completing it at a more leisurely pace. For example, 2-3 afternoons per week:

Day 1	**Morning** *30-60 mins*	Complete core skill work with one page of How Wee Learn Literacy and one page of How Wee Learn Math for your child's specific grade.
	Afternoon *60 mins*	Complete Topic 1 of this unit study by chatting about the interesting fact and discussion question, watching the YouTube video, doing the math or literacy enrichment question, and diving into the hands-on activity!
Day 2	**Morning** *30-60 mins*	Complete core skill work with one page of How Wee Learn Literacy and one page of How Wee Learn Math for your child's specific grade.
	Afternoon *60 mins*	Head outside for a nature walk, go to the park, or play board games!
Day 3	**Morning** *30-60 mins*	Complete core skill work with one page of How Wee Learn Literacy and one page of How Wee Learn Math for your child's specific grade.
	Afternoon *60 mins*	Complete Topic 2 of this unit study by chatting about the interesting fact and discussion question, watching the YouTube video, doing the math or literacy enrichment question, and diving into the hands-on activity!

Etc., repeating until all 10 topics are covered.

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Scope & Sequence

Family Unit Studies allow your child to explore one big topic through multiple subjects: reading, writing, math, science, history, geography, social studies, health, music, art, and life skills. This has been shown to make learning more meaningful and memorable—it makes learning stick! We use "cross-curricular connections" to help children see how ideas are linked in the real world, keeping them engaged and deepening their understanding.

As a parent, it's important to feel confident in the rich learning you're guiding your child through. That's why we've included this Scope and Sequence—not as an exhaustive list, but as a helpful starting point to show how key learning standards are met (and often exceeded!) through deep, connected experiences.

We hope this Scope and Sequence encourages you to look creatively at each Family Unit Study and see how the hands-on learning and fun are a part of an intentional, impactful, learning-filled journey.

Literacy		Topics
Listening & speaking	Daily "Spark Curiosity" discussion and video debriefs.	All
Reading comprehension	Through book suggestions and read-alouds in each topic.	All
Poetry	Compose a CHEMISTRY acrostic poem.	3
Making connections	Sort substances into acids and bases using research.	4
Word play	Build words from the letters in RADIOACTIVITY.	6
Creative writing	Write a short beaker-world narrative with a clear beginning, middle, and end.	8
Vocabulary	Define chemistry vocabulary and use it in context.	10
Informational writing	Complete an element research page and a Marie Curie poster.	3, 6

Math		Topics
Number sense	Order amounts of liquids and gases from least to greatest.	1
Financial literacy	Compare science kit prices; calculate price difference.	2
Data	Graph bread-preference surveys and determine simple probability from the results.	5
Spatial sense	Calculate perimeter, area, and area changes for a soap dish.	7
Algebra	Extend color patterns and growing patterns.	9

Science		Topics
Introduction to chemistry	Learn what chemistry studies and identify lab apparatus.	1
States of matter	Explore solids, liquids, gases, and non-Newtonian fluids.	2
Elements & the periodic table	Learn how elements are organized and how scientists use the table.	3
Acids, bases & indicators	Test liquids with red cabbage indicator and compare pH.	4
Biochemistry & fermentation	Investigate how yeast makes dough rise by producing carbon dioxide.	5

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Soap chemistry & surface tension	Observe how soap changes water behavior in the pepper experiment.	7
Physical vs. chemical changes	Make bath bombs and identify fizzing reactions and changes.	8
Spectroscopy & data sonification	Explore how element light patterns can be turned into sound.	9
Density, mass & volume	Build a density rainbow tower and use the density formula.	10

History		Topics
History of scientific ideas	Trace major developments in the periodic table.	3
Biography of a scientist	Research Marie Curie's life and accomplishments.	6
Women in science & perseverance	Discuss barriers Curie faced and her influence on science.	6

Geography		Topics
Cultural geography through food	Compare breads from different countries and regions.	5
World places & scientific journeys	Connect Marie Curie's story to Poland and France.	6

Social Studies		Topics
Chemistry in everyday life	Explore how chemistry connects to food, cleaning, bathing, and daily routines.	1, 5, 7, 8
Culture & traditions	Discuss how bread reflects culture, place, and traditions.	5
Science and society	Consider how Marie Curie's work influenced medicine and everyday life.	6

Health		Topics
Health science	Connect pH ideas to stomach acid, toothpaste, and health.	4
Hygiene & wellness	Learn why soap helps remove oil and dirt from skin.	7
Medical science & imaging	Explore how radiation and X-rays support diagnosis and treatment.	6

Music		Topics
Songs for content learning	Use science songs and videos to reinforce learning.	3, 10
Pitch, pattern & melody	Create melodies in Chrome Music Lab; explore how note placement changes sound.	9
Science-to-sound connections	Investigate how element light data can be turned into music.	9

Art		Topics
Illustration & line exploration	Create chemical reaction artwork using line and color.	1
Research poster design	Build a Marie Curie poster using text and images.	6
Scientific art & observation	Create and record layered color art in density tower.	10

Life Skills		Topics
Following directions & procedural thinking	Follow multi-step experiment and recipe directions.	2, 4, 5, 7, 8, 10
Kitchen skills & food preparation	Measure, mix, knead, and bake pizza dough.	5
Creativity & problem-solving	Test ideas, revise work, and explore outcomes in open-ended activities.	All

FAMILY UNIT STUDY

Exploring Chemistry

TOPIC ONE

What is Chemistry?

Chemistry is the science that helps us understand how matter changes and interacts. Chemists are scientists who study these changes to learn how substances mix, react, and form new materials. Where do we find examples of chemistry in our everyday life? Let's explore...

Spark Curiosity

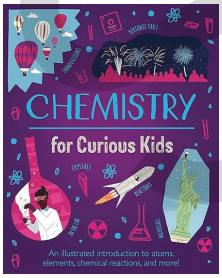
Did You Know? Dry ice changes from a solid straight into carbon dioxide gas without becoming a liquid, a process known as sublimation.

I Wonder... What kind of jobs do chemists have?

Resource Suggestions

Fizzy Soda Experiment! *by SciShow Kids*

You're just in time to help Jessi and Squeaks with their baking soda and vinegar experiment! Then, stick around to learn all about chemists, special scientists who study chemicals!



Chemistry for Curious Kids *by Lynn Huggins-Cooper*

This inspirational book is packed with clear and engaging explanations of chemistry and its scientific principles.

Enrichment Question

Subject Focus: *Math (Number Sense)*

L1 A scientist made 8 mL of blue liquid, 3 mL of red liquid, 6 mL of green liquid, and 5 mL of yellow liquid. Put the amounts in order from least to greatest.

L2 A laboratory produced 245 mL of hydrogen gas, 320 mL of oxygen gas, 198 mL of carbon dioxide, and 275 mL of nitrogen gas. Arrange the gases from the least amount produced to the greatest amount produced.

L3 A laboratory produced 12,350 mL of hydrogen gas, 12,330 mL of oxygen gas, 15,280 mL of carbon dioxide, and 12,345 mL of nitrogen gas. Arrange the gases in order from the least amount produced to the greatest amount produced.

Hands-On Activity

Subject Focus: *Art*

Chemical Reaction Artwork

See the next page for your hands-on activity instructions!

HANDS-ON ACTIVITY: ART

Chemical Reaction Artwork

Materials

White crayon, watercolor paints, paintbrush

Erlenmeyer Flask

How To Draw A Science Beaker *by Art for Kids Hub*

Directions

1. You are going to create an artistic representation of a chemical reaction in an Erlenmeyer Flask! Read the What's Happening section, and choose which types of reactions you want to represent with your artwork.
2. Using a white crayon, draw lines that represent your chosen reactions coming out of the flask.
3. Using watercolors, paint inside the flask and the reaction coming out of the top.

Extension Activity

Follow along with the video to draw your own apparatus and turn it into a character!

What's Happening?

Chemists often do experiments in a lab to learn about the properties of matter and how it changes. They use special tools and equipment to measure, mix, and observe safely and accurately. Some common chemistry laboratory apparatus include:

Graduated Cylinder

Test Tube

Volumetric Flask

Erlenmeyer Flask

Beaker

Dropper

When observing experiments, chemists look for signs that a chemical reaction is taking place. Signs of a chemical reaction include:

Change in Color

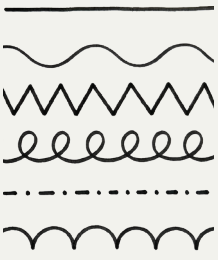
Change in Odor

Change in Temperature

Formation of Bubbles

Formation of a Solid

Release of Light



Keep an eye out for different types of chemical changes in other activities as you continue through this unit study!

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Printables