

The Science of Everyday Life

Unit Study Guide



The Science of Everyday Life

Overview & Objectives

Welcome to **The Science of Everyday Life** unit study!

In this unit, we'll explore how science plays a role in the things we do every day. From cooking our favorite meals to understanding how our gadgets work, we'll see how science is everywhere around us.

By the end of this unit, you'll know more about how scientific principles are involved in daily activities and how to use this knowledge to make everyday tasks easier and more fun.

Introduction to the Scientific Method

We'll use the scientific method to explore these topics. The scientific method is a way to find out how things work. It includes these steps:

- 1. Ask a Question:** What do you want to find out?
- 2. Make a Hypothesis:** Guess what might happen.
- 3. Conduct an Experiment:** Test your guess by doing an activity.
- 4. Observe and Record:** Watch what happens and write it down.
- 5. Analyze Results:** Look at your notes and see if your guess was right.
- 6. Draw a Conclusion:** Decide what you've learned from your experiment.

Exploration of Each Topic

Cooking and Baking:

Investigate Food Science: Learn how cooking changes food. For example, how does heat make cookies rise or why do cakes need baking powder? We'll experiment with different ingredients and see what happens.

Sports and Exercise:

Explore Physics and Biology: Find out how science affects sports. We'll look at how forces and motion play a role in how we throw a ball or how muscles work when we exercise.

Gardening and Plant Growth:

Study Botany and Environmental Science: Discover how plants grow and what they need. We'll experiment with different types of soil and light to see how they affect plant growth.

Household Chemistry:

Understand Chemical Reactions and Cleaning: Explore how chemical reactions help us clean our homes. We'll make simple cleaning solutions and test their effectiveness to see how chemistry helps in our daily chores.

Everyday Technology:

Learn About Electrical Engineering and Technology: Understand how everyday gadgets like phones and microwaves work. We'll build simple circuits and compare different ways of heating food to learn about technology and electricity.

Weather and Climate:

Study Meteorology and Environmental Science: Explore how weather patterns work and how different factors affect the climate. We'll experiment with how temperature, wind, and humidity influence daily weather, and study how these factors impact the environment over time.

The Science of Everyday Life

Hands-On Activities

Experiments Related to Each Topic: For each topic, you'll get to do experiments. These will include:

- Mixing ingredients to see how they react.
- Testing how different forces affect sports performance.
- Growing plants under various conditions.
- Making and testing homemade cleaning products.
- Building simple circuits to understand how technology works.

Practical Applications and Real-World Connections: You'll also learn how to apply these experiments to real life. For example:

- Use your knowledge of cooking science to make better recipes.
- Improve your sports skills by understanding physics.
- Use effective cleaning solutions you made yourself.
- Understand how your favorite gadgets work and troubleshoot them.

Assessment and Review

Summarize What's Been Learned: At the end of the unit, we'll review what you've learned from each topic and experiment. This will help you see how all the pieces fit together.

Assess Understanding Through Quizzes or Projects: To see how much you've learned, you'll complete a quiz or project. This could be:

- A quiz about the scientific principles we covered.
- A project where you apply what you've learned to a new experiment or real-life situation.

Discussions and Reflections

Scientific Principles Behind Each Activity: After each activity, we'll discuss the science involved. For example:

- Why did the cake rise? (Chemical reactions in baking)
- How did changing the angle of your throw affect the ball? (Physics of motion)
- What happened to your plants in different types of soil? (Botany)

Reflective Questions and Prompts: You'll answer questions to think about what you learned. For example:

- What surprised you about the experiment?
- How did your results compare with your hypothesis?
- How can you use what you learned in your daily life?

Notes

Experiment Ideas

Cooking and Baking

Experiment:

Why do cookies spread differently when baked?

You will bake two batches of cookies, one with softened butter and one with melted butter, and observe the difference.

1. Question:

Why do some cookies spread more than others?

2. Make a Hypothesis: Guess what might happen.

I think the cookies with melted butter will spread more because...

3. Conduct an Experiment: Test your guess by doing an activity. Follow the same recipe for two batches of cookies, but for one batch, use softened butter, and for the other batch, use melted butter. Bake both batches and observe the results.

4. Observe and Record: Watch what happens and write it down. Write down what you notice about the size and shape of each batch of cookies. How much did each one spread?

5. Analyze Results: Look at your notes and see if your guess was right. Compare the two batches. Did the cookies with melted butter spread more? Why do you think this happened?

Draw a Conclusion: Decide what you've learned from your experiment. Was your hypothesis correct? What did you learn about how butter affects cookies when they bake?

Sports and Exercise

Experiment:

How does the angle of a throw affect the distance a ball travels?

You'll throw a ball at three different angles (30°, 45°, 60°) and measure how far it travels each time.

1. Ask a Question: What do you want to find out?

How does the angle of a throw affect how far a ball travels?

2. Make a Hypothesis: Guess what might happen.

For example: I think the ball thrown at 45° will go the farthest because...

3. Conduct an Experiment: Test your guess by doing an activity. Throw a ball three times, once at 30°, once at 45°, and once at 60°. Measure the distance the ball travels each time.

4. Observe and Record: Watch what happens and write it down. Record the distance the ball traveled for each angle. Which angle made the ball travel the farthest?

5. Analyze Results: Look at your notes and see if your guess was right. Look at the distances. Did the ball thrown at 45° travel the farthest? Why do you think this angle made a difference?

6. Draw a Conclusion: Decide what you've learned from your experiment. Was your hypothesis correct? What did you learn about how the angle of a throw affects the distance?

Experiment Ideas

Gardening and Plant Growth

Experiment:

Does the amount of sunlight affect how fast plants grow?

You will place one plant in full sunlight and another in partial shade, and observe their growth over two weeks.

- 1. Ask a Question:** What do you want to find out?
How does the amount of sunlight affect the growth of plants?
- 2. Make a Hypothesis:** Guess what might happen.
For example: I think the plant in full sunlight will grow faster because...
- 3. Conduct an Experiment:** Test your guess by doing an activity.
Place one plant in full sunlight and one plant in partial shade. Water them the same amount and observe their growth for two weeks.
- 4. Observe and Record:** Watch what happens and write it down.
Measure the height of each plant every few days. Record the growth in a chart. Did one plant grow faster?
- 5. Analyze Results:** Look at your notes and see if your guess was right.
Compare the growth of the two plants. Which plant grew faster, and why do you think that is?
- 6. Draw a Conclusion:** Decide what you've learned from your experiment.
Was your hypothesis correct? What did you learn about how sunlight affects plant growth?

Household Chemistry

Experiment:

Which homemade cleaner works best on grease?

You will test vinegar, baking soda, and a store-bought cleaner on a greasy surface to see which one cleans the best.

- 1. Ask a Question:** What do you want to find out?
Which homemade cleaner removes grease the best?
- 2. Make a Hypothesis:** Guess what might happen.
For example: I think baking soda will work best because...
- 3. Conduct an Experiment:** Test your guess by doing an activity.
Apply vinegar, baking soda, and a store-bought cleaner to three separate greasy spots. Rub each area with a sponge and observe how well the grease is removed.
- 4. Observe and Record:** Watch what happens and write it down.
Write down how easy or hard it was to remove the grease with each cleaner. Which one worked best?
- 5. Analyze Results:** Look at your notes and see if your guess was right.
Compare how well each cleaner worked. Why do you think one worked better than the others?
- 6. Draw a Conclusion:** Decide what you've learned from your experiment.
Was your hypothesis correct? What did you learn about the effectiveness of different cleaners on grease?

Experiment Ideas

Everyday Technology

Experiment:

How does the length of a wire affect the brightness of a light bulb in a circuit?

You will set up a simple circuit using different lengths of wire and observe the brightness of the light bulb.

1. Ask a Question: What do you want to find out?
How does the length of the wire in a circuit affect the brightness of a light bulb?

2. Make a Hypothesis: Guess what might happen.
I think a shorter wire will make the light bulb brighter because...

3. Conduct an Experiment: Test your guess by doing an activity.
Build a simple circuit with a battery, light bulb, and different lengths of wire. Observe the brightness of the light bulb with each wire length.

4. Observe and Record: Watch what happens and write it down.
Note the brightness of the light bulb with each wire. Was the bulb brighter with a shorter or longer wire?

5. Analyze Results: Look at your notes and see if your guess was right.
Compare the brightness of the bulb with different wire lengths. Why do you think wire length affects brightness?

6. Draw a Conclusion: Decide what you've learned from your experiment.
Was your hypothesis correct? What did you learn about the relationship between wire length and light bulb brightness?

Weather and Climate

Experiment:

How does temperature affect the evaporation of water?

You will leave cups of water at different temperatures (room temperature, in the fridge, and outside in the sun) and observe how much water evaporates over time.

1. Ask a Question: What do you want to find out?
How does temperature affect how fast water evaporates?

2. Make a Hypothesis: Guess what might happen.
I think the water in the sun will evaporate the fastest because...

3. Conduct an Experiment: Test your guess by doing an activity.
Place three cups of water in different environments: one at room temperature, one in the fridge, and one outside in the sun. Observe the water levels over a few hours or days.

4. Observe and Record: Watch what happens and write it down.
Measure and record how much water is left in each cup after a set amount of time. Which environment had the most evaporation?

5. Analyze Results: Look at your notes and see if your guess was right.
Compare how much water evaporated from each cup. Why do you think temperature affected the rate of evaporation?

6. Draw a Conclusion: Decide what you've learned from your experiment.
Was your hypothesis correct? What did you learn about the relationship between temperature and evaporation?