

Photo Description



This image shows a car engine's coolant reservoir—a white plastic container filled with yellow-colored liquid. You can see tubes connected to the container that carry this special liquid throughout the engine. The liquid is a state of matter we can observe and measure, helping us understand how materials can be liquids with different colors and purposes.

Scientific Phenomena

Anchoring Phenomenon: Why do cars need special colored liquids inside their engines?

Scientific Explanation: This image shows engine coolant, a liquid that absorbs and removes heat from the engine to keep it from overheating. Liquids have a special property: they flow and spread out to fill containers. The yellow color helps mechanics and car owners quickly identify this specific liquid among other engine fluids. This demonstrates that matter has observable properties (color, state, ability to flow) that we can describe and use to identify and classify materials in the real world.

Core Science Concepts

- * States of Matter — Liquids: Liquids have a definite volume but take the shape of their container. They can flow and pour, unlike solids.
- * Observable Properties: All materials have properties we can observe with our senses (or safely with tools), including color, texture, whether something is a solid or liquid, and how it moves.
- * Matter and Function: Different materials are chosen for specific jobs because of their properties. This liquid is chosen for cooling because liquids can absorb and transfer heat effectively.
- * Color as an Identifier: We use observable properties like bright colors to identify different materials and their purposes, especially for safety in vehicles and machines.

Pedagogical Tip:

Second graders are concrete thinkers who learn best through direct observation and hands-on exploration. Rather than explaining engine mechanics, focus on the observable property of "liquid" by asking students to compare this coolant to water, juice, or other familiar liquids they've seen. Let them describe what they notice: "Does it move? Does it have a shape? Can we pour it?" This builds foundational vocabulary and understanding of states of matter before introducing more complex systems.

UDL Suggestions:

Representation: Provide multiple ways for students to understand this concept:

- Show real photos AND videos of liquids in action
- Use tactile comparisons (let students hold a solid block, then pour sand/water to feel the difference)
- Create a word wall with pictures and words: "Liquid," "Flows," "Container," "Color"

Engagement: Connect to student interests and experiences:

- Ask about liquids they see at home (milk, juice, puddles after rain)
- Mention that cars are something many students ride in—making the connection personal

Expression: Allow multiple ways for students to show understanding:

- Draw pictures of liquids they know
- Sort pictures of solids vs. liquids
- Describe liquids using sentence frames: "A liquid can _____. A liquid looks _____. "

Discussion Questions

1. "What do you notice about this liquid? How is it different from a solid like a rock or toy block?"

(Bloom's: Observe/Describe | DOK: 1)

2. "Why do you think someone chose to make this coolant bright yellow instead of clear like water?"

(Bloom's: Infer | DOK: 2)

3. "If we poured this liquid into different shaped containers—a cup, a bottle, and a bowl—what would happen to its shape? Why?"

(Bloom's: Predict/Analyze | DOK: 2)

4. "Describe a time you've seen a liquid at home. How was it the same as or different from this car coolant?"

(Bloom's: Compare | DOK: 2)

Extension Activities

Activity 1: Liquid Sorting and Classifying

Gather 4–5 clear containers with different liquids (water, cooking oil, milk, juice, dish soap). Have students observe each liquid, describe its color and how it moves, and sort them by properties (clear vs. colored, thick vs. thin, etc.). Create a chart together showing each liquid's properties. Safety note: Use only non-toxic, food-safe liquids; supervise closely.

Activity 2: Design a Coolant Container

Students draw or build (with paper cups and markers) their own container for a special liquid. Ask: "What shape would hold liquid best? How would you mark it so people know what's inside?" Have them label their container with a color and name for an imaginary liquid with a special job (medicine for robots, juice for giants, etc.).

Activity 3: Observing Liquids in Motion

On a playground or outside, set up a simple water table or use a shallow tray. Provide funnels, cups, and tubes. Let students pour water through different tools and observe how it flows and changes shape. Ask: "Can you make the liquid flow fast? Slow? Into a tall, thin container? A wide, flat one?" This reinforces that liquids are flexible and adapt to their containers.

NGSS Connections

Grade 2 Performance Expectation:

2-PS1-1: Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Disciplinary Core Ideas:

- 2-PS1.A Structure and Properties of Matter — Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature.

Crosscutting Concepts:

- Properties of Materials — Different materials have different properties, which can be observed and described.
- Systems and System Models — A system is a set of connected things or processes. Here, the coolant system works together to keep the engine safe.

Science Vocabulary

- * Liquid: A state of matter that can flow and pour, and that takes the shape of whatever container holds it.
- * Coolant: A special liquid used in cars and machines to remove heat and keep engines from getting too hot.
- * Properties: The special characteristics or qualities of something—like its color, size, shape, or whether it's solid or liquid.
- * Container: An object that holds or carries something inside it, like a bottle, cup, or tank.
- * Observable: Something you can see, hear, feel, taste, or smell using your senses (or tools to help you).

External Resources

Children's Books:

What Is a Liquid?* by Thomas K. and Heather Adamson (Step into Reading series) — Simple, colorful introduction to liquids with relatable examples.

Solid, Liquid, Gas* by Don McLeish (New York: Scholastic) — Explores all three states of matter with clear photographs and simple text.

States of Matter* by Jennifer Boothroyd (Minneapolis: Lerner) — Features real-world photos of solids, liquids, and gases in everyday life.

YouTube Videos:

* "States of Matter for Kids" by Crash Course Kids — A 4-minute, engaging overview of solids, liquids, and gases with simple animations.

<https://www.youtube.com/watch?v=RcqNcMq4cgk>

* "Liquids" by National Geographic Kids — Short video (2 minutes) showing liquids in nature and real-world contexts, visually compelling for young learners.

<https://www.youtube.com/watch?v=5EvDfcKWu0g>

Teacher Note: This lesson bridges concrete observations (the colorful liquid in the image) with foundational physics concepts (properties of matter and states of matter). Second graders thrive when lessons connect to their lived experiences—cars, juice, water—so leverage those connections throughout!