

## Photo Description



This image shows a car engine compartment with a white plastic container filled with yellow liquid (coolant). We can see tubes connected to the container, metal engine parts, and various mechanical components. The liquid inside the container is a liquid—a type of matter that flows and takes the shape of its container.

## Scientific Phenomena

Anchoring Phenomenon: Why does a car need liquid inside containers to help it work?

Scientific Explanation: The yellow liquid shown is engine coolant (or antifreeze), which is a liquid matter. Unlike solids that keep their shape, liquids flow and change shape based on their container. This particular liquid has special properties: it can absorb heat from the hot engine and carry it away through tubes. The coolant prevents the engine from overheating, demonstrating how different types of matter have different properties that make them useful for different jobs. Liquids also have a maximum fill line (visible on the container) because they take up a specific amount of space and can spill if overfilled.

## Core Science Concepts

1. States of Matter – Liquids: Liquids flow, change shape to fit their container, and have a fixed volume (amount). The yellow coolant is an example of a liquid.
2. Properties of Matter: Different materials have different characteristics (color, texture, ability to flow). This liquid is yellow, slippery, and flows freely.
3. Purpose and Function: Materials are chosen for specific jobs based on their properties. This liquid was selected because it can absorb heat and flow through tubes to cool the engine.
4. Observation and Comparison: Students can compare liquids (water, milk, juice) with solids (blocks, toys) to understand how matter behaves differently.

### Pedagogical Tip:

For Kindergartners, use sensory-safe explorations with everyday liquids (water, cornstarch slime, paint) rather than engine coolant. Focus on observable features: "Does it pour? Does it keep its shape? What color is it?" This concrete experience builds foundational understanding of liquid properties before introducing abstract concepts.

### UDL Suggestions:

Multiple Means of Representation: Provide pictures, real containers, and tactile exploration stations so students can see, hear descriptions, AND feel (within safe boundaries) how liquids behave differently from solids. For English learners, pair vocabulary with images of liquid examples: water, milk, juice, paint.

Multiple Means of Action/Expression: Allow students to show understanding through pouring, sorting real objects into "liquid" vs. "solid" categories, drawing what they observe, or acting out how liquids move (flowing motions) versus solids (staying still).

## Discussion Questions

1. "What do you notice about the yellow liquid inside the container? Can you describe what it looks like?" (Bloom's: Remember | DOK: 1)
2. "Why do you think this liquid needs to be in a container instead of just sitting loose in the engine like a solid block?" (Bloom's: Understand | DOK: 2)
3. "How is this yellow liquid different from a toy block or a piece of wood? What can liquids do that solids cannot?" (Bloom's: Compare | DOK: 2)
4. "If we poured this liquid into a different-shaped container (like a cup instead of this rectangular one), what would happen to its shape?" (Bloom's: Analyze | DOK: 3)

## Extension Activities

1. Liquid Exploration Station: Set up safe, edible liquids (water, food coloring, dish soap, honey, maple syrup) for students to observe and pour into clear cups. Ask: "Which liquids flow fast? Which flow slowly? Which are thick? Which are thin?" This builds vocabulary and observational skills.
2. Solid vs. Liquid Sort: Provide real objects (wooden block, plastic ball, toy car, paper cup filled with water, sponge) and have students sort them into two groups: "Keeps its shape" (solids) and "Flows and changes shape" (liquids). Create a class chart with pictures.
3. Paint Pouring Art: Let students pour washable paint between two paper plates (sealed with tape) and tilt them to watch the liquid move. Discuss: "Why does the paint slide around? Because it's a liquid!" This is engaging, safe, and demonstrates liquid properties creatively.

## NGSS Connections

Performance Expectation (K-PS1-1): Plan and conduct investigations to provide evidence that objects can be sorted and classified by their observable properties.

Disciplinary Core Ideas:

- K-PS1.A: Properties of Matter – Objects have observable properties, including the ability to be pushed, pulled, rolled, or changed in shape; liquids flow differently than solids.

Crosscutting Concepts:

- Patterns – Recognizing that all liquids have similar behaviors (pouring, flowing) is an observable pattern.
- Structure and Function – The liquid's properties (flowing, filling containers) relate to its function (cooling the engine).

## Science Vocabulary

- \* Liquid: A type of matter that flows and takes the shape of its container (like water or juice).
- \* Container: A holder that keeps liquids or other materials inside (like a cup, bottle, or tank).
- \* Cool/Cooling: To make something less hot or to lower its temperature.
- \* Properties: The special characteristics or features of something (like color, shape, or how it moves).
- \* Flow: To move smoothly and continuously from one place to another (the way water moves).

## External Resources

### Children's Books:

- Oobleck: Exploring Slime and Other Non-Newtonian Fluids by Jill McDonald (Capstone Press) – Explores unusual liquids in an accessible way.
- What Are the Three States of Matter? by Christy Mihaly (Lerner Publications) – Simple, colorful introduction to solids, liquids, and gases.
- Liquids by Rebecca Olien (Pebble Books) – Beginner-friendly exploration of liquids in everyday life.

### YouTube Videos:

- "States of Matter for Kids: Solids, Liquids, and Gases" by Crash Course Kids – Clear, animated explanation. <https://www.youtube.com/watch?v=ImQ0sAG-Nq4>
- "Learning about Liquids | Science Lesson for Kids" by Kids Learning Videos – Focuses on observable liquid properties with real-world examples. <https://www.youtube.com/watch?v=0v-Xs9KGqkY>