

Photo Description



This image shows an egg cooking on a dark pan sitting on a stovetop with blue flames underneath. The egg white has turned from clear to solid white, and the yellow yolk in the center is still runny. Heat from the flames is making the egg change from raw to cooked.

Scientific Phenomena

Anchoring Phenomenon: Heat changes the way food looks and feels.

When thermal energy (heat) from the flames transfers to the pan, and then from the pan to the egg, it causes a physical and chemical change. The proteins in the egg white denature and coagulate when exposed to temperatures above 140°F, transforming from a transparent liquid into an opaque solid. The yolk remains runny because it requires higher temperatures to solidify. This is a direct, observable example of how thermal energy changes matter—a foundational concept in First Grade physical science.

Core Science Concepts

- * Thermal Energy (Heat): Energy that makes things warmer and can change how things look and feel.
- * Heat Transfer: Heat moves from hot places (the flame and pan) to cooler places (the raw egg) and causes changes.
- * States of Matter Change: Heat can turn liquids into solids (the egg white becoming firm), demonstrating how thermal energy affects matter.
- * Observable Changes: We can see and feel changes caused by heat—color changes, texture changes, and hardness changes are evidence that thermal energy is doing work.

Pedagogical Tip:

First graders learn best through direct sensory experiences. Rather than only showing this image, have students feel the warmth of a lamp or warm water, observe ice melting, or toast bread. Connect the image to real experiences they've had with warm and cold objects.

UDL Suggestions:

Multiple Means of Representation: Show the image alongside a video of an egg cooking to engage visual and auditory learners. Provide tactile experiences (touching warm vs. cold surfaces under teacher supervision) for kinesthetic learners.

Multiple Means of Action & Expression: Allow students to show understanding by drawing before/after pictures of the egg, sorting pictures of things that change when heated, or acting out the process of heat moving through the pan.

Multiple Means of Engagement: Connect cooking at home—a relatable experience—to this phenomenon. Ask students about foods their families cook together.

Zoom In / Zoom Out

Zoom In: The Microscopic Level

When we zoom in really close—so close we need a special microscope to see—the egg is made of tiny, tiny building blocks called proteins. These proteins are like little coiled-up springs or chains. When heat energy reaches them, these tiny chains unwind and tangle together, making them stick to each other. That's why the clear, runny egg white becomes thick and white and solid! The heat is rearranging these invisible building blocks. This process is called protein denaturation, but for First Graders, we can simply say: "Heat makes the tiny parts of the egg stick together differently."

Zoom Out: The Food Preparation System

Zooming out, we see that cooking an egg is part of a bigger system of how humans prepare food for meals. The stove connects to a gas line or electric power plant that provides energy. That energy becomes heat. The cook decides how hot to make the pan and how long to cook the egg. Families use heat to cook many different foods—breakfast, lunch, and dinner—to make them taste good and safe to eat. Cooking is a daily human activity that depends on thermal energy and connects to nutrition, culture, family traditions, and our need for food to survive. This egg cooking is one small moment in the bigger story of how people care for themselves and their families.

Discussion Questions

1. What do you see happening to the egg white? Why do you think it changed?
(Bloom's: Remember & Understand | DOK: 1)
2. Where is the heat coming from, and how does it reach the egg?
(Bloom's: Analyze | DOK: 2)
3. If we kept cooking the egg longer, what do you think would happen to the yellow yolk? Why?
(Bloom's: Predict/Analyze | DOK: 2)
4. Can we change the egg back to how it was before cooking? Why or why not?
(Bloom's: Evaluate | DOK: 3)

Potential Student Misconceptions

Misconception 1: "Heat only comes from fire/flames."

Clarification: First Graders often think heat only comes from flames or fire. In reality, heat can come from many sources—the sun, a warm lamp, warm water, friction (like rubbing hands together), and even our own bodies! Help students discover multiple heat sources in the classroom and at home. Ask: "What else feels warm besides fire?"

Misconception 2: "The yolk isn't cooking because it's not turning white."

Clarification: Students may think the yolk isn't being affected by heat since it doesn't change color like the white does. Explain that the yolk IS getting warmer and will eventually become solid if we cook it longer, but it needs more heat to change because it has different ingredients than the white. Use the analogy: "Different things cook at different speeds—kind of like how different people get tired at different times!"

Misconception 3: "Once something is cooked, we can cook it back to being raw."

Clarification: Some students may think heat changes are reversible (like melting ice into water and refreezing it). Cooking an egg is a permanent chemical change—we cannot turn a cooked egg back into a raw egg, even if we cool it down. This is different from physical changes like melting. Use simple language: "When we cook an egg, it changes forever. We can't make it raw again—it's a one-way change."

Extension Activities

Activity 1: Warming and Cooling Sensory Exploration

Provide students with warm water, cold water, and room-temperature water in cups (teacher-prepared and safe). Have students carefully observe and describe how their hands feel in each. Relate this to the heat in the cooking pan. Safety Note: Use warm (not hot) water—test temperature first.

Activity 2: Before and After Drawing

Show students pictures or videos of different foods before and after cooking (toast, popcorn, melted butter). Have them draw or color both versions and explain what heat did to each food.

Activity 3: Heat Source Hunt

Take students on a safe classroom walk to find things that produce heat (sunny window, lamp, warm building air vent). Have them point out each heat source and describe what they feel or observe.

Cross-Curricular Ideas

Math Connection: Measuring Time and Temperature

Create a simple graph showing "how long" it takes different parts of the egg to cook. Use a sand timer or classroom clock to measure cooking time in minutes. Introduce the concept that heat works over time. Students can draw a bar graph: "Egg white cooked in 2 minutes" vs. "Yolk cooked in 5 minutes." This connects sequential thinking and basic data representation to the cooking process.

ELA Connection: Procedural Writing and Story Sequencing

Have students draw or dictate a "recipe" for cooking an egg using sequence words: first, next, then, finally. Create a simple class book where each page shows one step: "First, we turn on the stove. Next, we put the pan on the heat. Then, we crack the egg. Finally, we eat it!" This develops sequential language and procedural writing skills while reinforcing the cause-and-effect chain of cooking.

Social Studies Connection: Family Cooking Traditions

Invite students to share how their families cook eggs at home (fried, scrambled, boiled). Create a simple survey or picture chart showing different ways families prepare eggs around the world. Discuss how cooking is part of culture and family traditions. This connects science to real-world practices and builds awareness of cultural diversity through a food-centered lens.

Art Connection: Color Mixing and Change Observation

Have students paint or color with watercolors, observing how adding water (and heat from drying) changes the paint's appearance. Compare this to how heat changes the egg's color from clear/yellow to white/yellow. Students can create a "before and after" collage showing things that change with heat—toast getting brown, a banana ripening, snow melting in the sun. This develops observational and artistic skills while reinforcing the concept of visible change.

STEM Career Connection

Chef or Cook

Chefs and cooks use heat every single day to prepare delicious food in kitchens! They learn exactly how hot to make food and how long to cook it so the food tastes amazing and is safe to eat. Chefs also have to understand ingredients (like eggs, flour, and butter) and how heat changes them. It's like being a scientist in the kitchen! Average Annual Salary: \$35,000–\$45,000 USD (varies by experience and restaurant type)

Food Scientist

Food scientists study how heat and other things change foods. They work in laboratories to figure out the best ways to cook, store, and prepare food so it's healthy and delicious. They ask questions like: "What temperature makes this egg cook perfectly?" and "How can we keep food fresh longer?" They use science to help make all the food we eat better. Average Annual Salary: \$68,000–\$75,000 USD

Heating and Cooling Technician (HVAC)

These workers use science to understand how heat and cold move in homes and buildings. They install and fix the systems that keep houses warm in winter and cool in summer—kind of like controlling heat energy the same way a stove does! They use special tools to measure temperature and make sure everything works safely. Average Annual Salary: \$48,000–\$56,000 USD

NGSS Connections

Performance Expectation:

K-PS1-1: Plan and conduct investigations to provide evidence that vibrations make sound and that vibrations can make materials move.

(Note: For First Grade, the most relevant standard is:)

1-PS4-1: Plan and conduct investigations to provide evidence that vibrations in materials can make sound, and that sound can make materials vibrate.

Alternative alignment:

K-PS3-1: Make observations to determine the effect of sunlight on Earth's surface.

K-PS3-2: Make observations to determine the effect of placing objects in sunlight to make some materials warmer and others cooler.

Relevant Disciplinary Core Ideas:

* K-PS3.A - Sunlight warms Earth's surface. Heat can be produced in many ways (e.g., burning, rubbing, mixing substances). Heat is felt.

Crosscutting Concepts:

- * Cause and Effect - Simple cause-and-effect relationships exist in all systems (heat causes egg to cook).
- * Observable Patterns - Patterns in the natural and human-designed world can be observed and used as evidence.

Science Vocabulary

- * Heat (or Thermal Energy): Energy that makes things warm and can change how they look and feel.
- * Temperature: How hot or cold something is.
- * Cook: To use heat to change food so it becomes safe to eat and different to look at.
- * Solid: Something hard that keeps its shape, like a cooked egg white.
- * Liquid: Something wet and runny that takes the shape of its container, like a raw egg yolk.
- * Change: When something becomes different from how it was before.

External Resources

Children's Books:

Heat* by Rebecca Olien (National Geographic Little Kids)

The Magic School Bus and the Electric Field Trip* by Joanna Cole and Bruce Degen (introduces energy concepts)

Who Likes the Sun?* by Margaret Miller (explores warmth and sunlight)

Teacher Tip: This phenomenon is highly relatable since most First Graders have experienced cooking or eating cooked food at home. Use this connection to build engagement and help students understand that science is happening in their everyday lives!