

Photo Description



This image shows the early stages of making a baked good using both dry and wet ingredients. On the left side is a white bowl with brown dry ingredients (flour and spices) being mixed with a whisk. On the right, a black stand mixer contains a bright red ingredient (likely tomato sauce or food coloring mixed with liquid). These separate materials will eventually be combined together, showing how different substances can mix to create something new.

Scientific Phenomena

Anchoring Phenomenon: How do different materials combine to make something completely new?

This image demonstrates mixture formation—the physical process where two or more materials are combined while maintaining their individual properties until they are thoroughly blended. The dry ingredients (powder, spices, sugar) and the wet ingredients (liquid, food coloring) are about to be mixed together. This is a reversible physical change because the individual ingredients still exist; they're just no longer separated. Students can observe that when materials mix, the color changes and textures combine, but no new chemical reaction is necessarily occurring—it's a straightforward mixing of substances.

Core Science Concepts

- * **Mixtures:** A combination of two or more materials that are physically combined but can often be separated again. In cooking, ingredients mix to create new foods.
- * **Physical Properties:** Observable characteristics like color, size, texture, and shape. When dry brown powder mixes with red liquid, the visible properties of both change.
- * **Combining Materials:** When different materials come together in a mixture, they can change how they look and feel, but the original materials are still present.
- * **Reversibility:** Some mixtures can be separated back into their original parts (like sand and salt), while others cannot easily be reversed (like batter).

Pedagogical Tip:

For Second Grade, emphasize observable changes rather than molecular explanations. Have students focus on "What do you see?" and "What changed?" before asking "Why?" This concrete observation builds the foundation for understanding mixtures at deeper levels in later grades. Use cooking metaphors since students have kitchen experience.

UDL Suggestions:

Provide Multiple Means of Representation: Display large, labeled photos of each ingredient separately BEFORE showing the mixed result. Some students benefit from seeing the individual items first. Offer a sensory-rich experience by allowing students to safely touch dry ingredients (flour, cinnamon) in sealed bags so they understand texture differences. For students with visual processing challenges, create a simple before-and-after diagram with large images and minimal text.

Zoom In / Zoom Out

Zoom In: Microscopic View

If we could shrink down really, really small—smaller than an ant, smaller than a grain of sand—we would see that the brown powder is made of millions of tiny, tiny pieces called particles. The red liquid is made of water particles mixed with color particles. When you stir them together with a whisk, you're actually pushing all those teeny-tiny particles around so they spread throughout the mixture. The particles don't disappear; they just get scattered everywhere, like hiding toys all over a playroom instead of keeping them in one corner!

Zoom Out: The Bigger Picture

Baking and cooking happen in kitchens all around the world, in homes, restaurants, and bakeries. Every single day, cooks and bakers are mixing ingredients together to make food for people to eat. This simple mixing process is part of a much larger food system—farmers grow the wheat for flour, other farmers grow tomatoes for sauce, and trucks deliver these ingredients to stores where families buy them to cook together. Understanding how to mix ingredients properly is how communities feed themselves and share meals with each other!

Discussion Questions

1. What ingredients do you see in this picture, and how are they different from each other? (Bloom's: Understand | DOK: 1)
2. What do you think will happen to the color and texture when these two ingredients get mixed together? (Bloom's: Predict | DOK: 2)
3. If we mixed flour and water together, could we separate them back into flour and water again? Why or why not? (Bloom's: Analyze | DOK: 3)
4. What other mixtures have you seen at home or school? What made you notice they were mixtures? (Bloom's: Apply | DOK: 2)

Potential Student Misconceptions

Misconception 1: "When you mix things together, one ingredient disappears."

Clarification: The ingredients don't disappear—they're still there! When you mix brown powder with red liquid, both are still present; they just spread throughout the mixture so you can't see them as separate anymore. A helpful analogy: If you hide toy blocks all around your room, the blocks are still there even though you can't see them all in one pile.

Misconception 2: "If something changes color when mixed, it's a completely different thing now, not a mixture."

Clarification: The color change is just what we SEE on the outside when things mix together. The individual materials haven't changed into something brand new—they've just combined. Think of it like mixing two colors of paint: red and white make pink, but the red and white are still both there in the pink paint.

Misconception 3: "Everything that mixes together can be easily separated back apart."

Clarification: Some mixtures, like sand and water, separate easily when you pour them (sand stays, water drains). But once you bake flour and eggs together, they become very hard to separate because heat changes how they stick together. Not all mixtures are reversible!

Extension Activities

1. Classroom Mixture Exploration Station: Set up sealed containers with safe, colorful mixtures (dry pasta + uncooked rice + dried beans; sand + salt; water + food coloring + oil). Have students observe and describe each mixture using their five senses (safely, without tasting). Ask: "Are these materials still separate, or did they mix together?"
2. Recipe for Science: Create an edible mixture with your class using simple ingredients (crackers, raisins, nuts, dried fruit—all allergen-aware). Have students predict what will happen, observe the mixing process, describe the new mixture, and discuss whether they could separate the ingredients back out.
3. Mixture Sort and Classify Game: Show pictures or real items of different materials (water, oil, salt, flour, sugar, sand). Have students predict which pairs would mix well together and which might separate. Test 1-2 predictions safely in clear cups with water, and observe which sink, which float, and which actually mix.

Cross-Curricular Ideas

Language Arts Connection: Have students write or dictate a "recipe story" where they describe the steps of mixing ingredients in order, using sequence words like first, next, then, and finally. Students can illustrate each step, creating a simple picture book. This builds vocabulary and sequencing skills while reinforcing the science concept of combining materials in order.

Math Connection: Create a "Measuring Mixtures" activity where students measure dry ingredients and liquids using measuring cups and spoons. Ask questions like: "If the recipe needs 2 cups of flour and 1 cup of liquid, how much total do we have?" This integrates measurement, addition, and the practical application of mathematics to real-world cooking scenarios.

Art Connection: Have students explore color mixing by combining paint or food coloring in water. Predict what color will result when blue and red mix, when yellow and red mix, etc. Students can create a color-mixing chart and observe that new colors emerge from mixtures—connecting visual art to scientific observation of physical change.

Social Studies Connection: Discuss how families and cultures around the world use different ingredients and recipes. Invite students to share recipes their families make, talk about where ingredients come from, and discuss how mixing food ingredients is a way families celebrate together. This builds community awareness and cultural respect while grounding science in real family experiences.

STEM Career Connection

Food Scientist / Food Technologist — Average Salary: \$65,000–\$75,000 per year

Food scientists study how different ingredients mix and work together to create safe, delicious foods. They figure out which ingredients taste good together, how to keep food fresh, and how to create new recipes. If you love cooking experiments and wondering "what if I mixed this with that?" you might become a food scientist!

Recipe Developer / Test Kitchen Chef — Average Salary: \$55,000–\$70,000 per year

These professionals work in test kitchens (special cooking labs!) where they create new recipes for restaurants, cookbooks, and food companies. They spend their days mixing ingredients, tasting food, and writing down exact instructions so other people can make the same delicious meals. It's like being a science detective who solves the puzzle of making food taste amazing!

Baker / Pastry Chef — Average Salary: \$35,000–\$55,000 per year

Bakers mix flour, sugar, eggs, and other ingredients in exact amounts to create breads, cakes, cookies, and pastries. They need to understand how different mixtures work—too much liquid and the batter won't bake right; too little and it gets dry. Every batch is a small science experiment in the oven!

NGSS Connections

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: Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties.
- 2-PS1.B: Objects are made of material(s). Objects can be broken into smaller pieces or put together to make larger objects.

Crosscutting Concepts:

- Patterns: Patterns in the natural and human designed world can be observed and used as evidence.
- Cause and Effect: Simple events have causes and effects; events that occur together with regularity might or might not be a cause-and-effect relationship.

Science Vocabulary

- * Mixture: When two or more different materials are put together and combined.
- * Ingredient: One of the separate things that you mix together to make something new, like flour or eggs in a recipe.
- * Combine: To put two or more things together to make one new thing.
- * Texture: How something feels when you touch it, like rough, smooth, bumpy, or soft.
- * Separate: To take apart or move things away from each other.

External Resources

Children's Books:

- Pancakes, Pancakes by Eric Carle (shows ingredients being mixed for breakfast)
- The Cake That Mack Ate by Rose Robart (a cumulative story about ingredients coming together)
- Mix It Up! by Herve Tullet (an interactive book about mixing colors and materials)

Teacher's Note: This lesson connects kitchen science to formal science standards. Second graders are naturally curious about cooking and food preparation, making this an ideal anchor phenomenon for exploring physical properties and mixtures. Encourage students to notice mixtures in their own homes and bring examples to share!