Mixtures

Physical Science | Lesson Guide

2nd Grade

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.

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)

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.

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)

YouTube Videos:
- "Mixing and Separating Materials" by Homeschool Pop (2:47) — A clear, animated explanation of mixtures and separating materials with real-world examples. https://www.youtube.com/watch?v=jKKJhz5Fz-I

- "Let's Make a Mixture!" by National Geographic Kids (3:15) — A hands-on activity showing how different kitchen ingredients mix, with clear visuals and simple explanations. https://www.youtube.com/watch?v=I0q0pqpLaKs

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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!