



The Making of Gingerbread

Science

Am I seeing correctly, a house made of gingerbread? Do I dare approach for a taste and small bite of once was the physical properties of eggs, milk, flour and sugar? Yes! Yum!

National Standards > Science

NS.K-4.2 Physical Science (Grade K-3)

- Properties of objects and materials
- Properties and changes of properties in matter

Kentucky: Science > Physical Science

2. Students shall develop their abilities to apply core concepts and principles from mathematics, the sciences, the arts, the humanities, social studies, practical living studies, and vocational studies to what they will encounter throughout their lives.

Properties of Objects and Materials (2.2 Patterns of Change, 2.3 Systems, 2.4 Scale and Models, 2.5 Constancy, and 2.6 Change Over Time) Grades K-3

2.6 Students understand how living and nonliving things change over time and the factors that influence the changes.

SC-E-1.1.1 Objects have many observable properties such as size, mass, shape, color, temperature, magnetism, and the ability to react with other substances. Some properties can be measured using tools such as metric rulers, balances, and thermometers.

SC-E-1.1.3 Materials can exist in different states--solid, liquid, and gas. Some common materials, such as water, can be changed from one state to another by heating or cooling.

Ohio: Science > Science > Physical Sciences

- Demonstrate an understanding of the composition of physical systems and the concepts and principles that describe and predict physical interactions and events in the natural world.
- Demonstrate an understanding of the structure and properties of matter, the properties of materials and objects, chemical reactions and the conservation of matter.
- Understand the nature, transfer and conservation of energy, as well as motion and forces affecting motion, the nature of waves and interaction of matter and energy.

Benchmark(s) Grades K-2

- A. Discover that many objects are made of parts that have different characteristics. Describe these characteristics and recognize ways an object may change.

Note: There is no aligned indicator for Grade Two.

Benchmark(s) Grade 3

- A. Compare the characteristics of simple physical and chemical changes.

Ohio: Science > Scientific Inquiry

- Develop scientific habits of mind as they use the processes of scientific inquiry to ask valid questions and to gather and analyze information.
- Develop hypotheses and make predictions.
- Reflect on scientific practices as they develop plans of action to create and evaluate a variety of conclusions.
- Communicate findings to others.

Benchmark(s) Grades K-2

- A. Ask a testable question.
- B. Design and conduct a simple investigation to explore a question.
- C. Gather and communicate information from careful observations and simple investigation through a variety of methods.

Benchmark(s) Grade 3

- B. Organize and evaluate observations, measurements and other data to formulate inferences and conclusions.

Objective

Students will:

- Explore and examine change in the physical and chemical properties of baking and cooking ingredients.

Assessment

Students will be able to:

- Recognize and identify physical attributes of given objects.
- Compare physical properties of two or more objects.
- Make observations, pose and explore questions, and formulate inferences and conclusions for experimentation with baking.

Sample Items to gauge student understanding:

1. What is a recipe? (*instructions for making something, especially for cooking purposes*)
2. Explain the various ways to describe an object or objects. (*e.g., by size, color, thickness, texture, shape, weight, height, etc.*) Have students group and arrange a variety of objects based on these physical properties.
3. Discuss why it is important to observe and recognize "physical properties" when mixing ingredients together as in cooking? What does this recognition help one to do? (*assists with recognition of appropriate ingredients, assists with knowing what to expect with regards to chemical reactions of those ingredients, etc.*)

Vocabulary

- Attributes (characteristics)
- Physical properties
- Observation
- Recipe

Materials

- Recipe (e.g., for gingerbread)

- Ingredients for selected recipe
- Mixing bowls and containers
- Chart paper and Markers
- Access to an oven

Activity 1

What's in a Recipe?

Teacher will:

1. Select a recipe for use and classroom preparation.
2. Gather necessary ingredients.
3. Facilitate student reflection and discussion of the witch's house in the story and production, Hansel and Gretel, with emphasis on the material properties of the house (gingerbread). Question prompts:
 - a. What was used to make the witch's house?
 - b. Do you think the witch used a recipe to make the house?
(Explain the concept for recipe)
 - c. Have you ever used a recipe for cooking?
 - d. Why is it important to use a recipe for cooking? How does a recipe help a cook?
4. Facilitate the making of gingerbread with students. (Have students pre-measure all recipe ingredients into separate containers to prepare for mixing.
5. Have students observe, describe and compare properties of the recipe ingredients before mixing together, and record their observations noting texture, color, if dry or wet, etc.
6. Have students predict if the properties of ingredients will differ after mixing them together.
7. Have students follow the recipe, mix ingredients and continue their observations as the ingredients interact with one another. Allow students to pose and ask questions. *(If taste is used as one of the properties students will observe after the mixture is baked, make sure to have enough for everyone to sample. Also, keep mind possible student allergies. Any mixture that contains raw eggs needs to be cooked before being eaten. Discourage eating of raw batter.)* Bake the bread making use of a small toaster oven, school cafeteria oven, or ask parents to assist student with the making of the gingerbread and observations as a home activity).
8. Allow students to observe, compare property of the mixture and finish product after baking.
9. Facilitate class discussion for students to share observations and examine what happened during preparation, mixing and baking of the gingerbread.

Student will:

1. Share in the preparation and baking of gingerbread.
2. Observe, compare and analyze properties of ingredients, mixtures and the finished product.

3. Make predictions about what will happen as ingredients are mixed and baked.
4. Actively participate in class discussion.

Activity Extension

- Facilitate the making of gingerbread with students by having different groups make a larger or smaller portion of the recipe than called to make. *(e.g., the recipe calls for 1 cup flour, students consider the change needed to prepare only half of the gingerbread batter, or prepare a full recipe plus more to increase the batter. This activity may be more appropriate for grades 2 and 3, and will require additional adult supervision and assistance).*
 - Use chart paper to write down and compare the three preparations of the recipe.
 - Recipe with no changes (control group)
 - Recipe with a greater amount of one ingredient.
 - Recipe with a lesser amount of one ingredient.
 - Have students predict any changes that may occur in the final product if the same ingredients are used but in different amounts.
- Set up experimental stations for students to observe both physical and chemical change in baking ingredients when added together (e.g., rising dough, stiffen egg whites, fizz of baking soda and vinegar, etc.).

Student Self-Selected Reading Suggestions

- Muldrow, D. (2001). *Little Red Hen*. New York: Golden Books
- Priceman, M. (1994). *How to Make an Apple Pie and See the World*. New York: Alfred A. Knopf, Inc.