

Oklahoma Ag in the Classroom

Pancakes, Please

Objective

Students conduct experiments, solve math problems and conduct research related to pancakes.

Background

Pancakes were an important food to early settlers of New England. They might have starved without the cornmeal cakes they learned to make from local Pawtuxet Indians. When the Pilgrims landed at Plymouth in 1620, most of their wheat brought from England had spoiled on the long voyage. Cornmeal cakes were also called johnnycakes, or journey cakes, because they could be carried on long trips in saddlebags and baked along the way.

By 1745 Americans were also referring to “hoe cakes,” possibly because they were cooked on a flat hoe blade. The Dutch brought buckwheat cakes, made from buckwheat flour.

A pancake is a thin, flat cake prepared from a batter and cooked on a hot griddle or frying pan. Pancakes exist in several variations in many different cuisines around the world. The griddle method of cooking is older than oven baking, and pancakes are an ancient food. Ancient Romans prepared *Alita Dolcia* (Latin for another sweet) from a batter of egg, milk, water and a little flour. They were fried and served with pepper and honey. Pancakes as we know them today were invented in medieval Europe. Throughout Europe pancakes had a place among Easter foods, especially on Shrove Tuesday, the last day before Lent. Since Lent is a time of abstinence, everyone prepared by getting rid of rich foods such as eggs, butter, and milk. The favorite dish to use up all these ingredients was pancakes. Shrove Tuesday, also known as Mardi Gras (Fat Tuesday), is everyone’s last chance to indulge.

LEAVENING

Most of the pancakes we eat today are made with some kind of leavener, to make the cakes lighter. Leavening is a chemical reaction caused by the formation of carbon dioxide. In pancakes (and other kinds of baking) carbon dioxide is formed by baking soda, baking powder or yeast. These leaveners all work in different ways and need different ingredients to help them work.

Yeast is really tiny plants that need food and water to grow. When we use yeast in bread and other recipes, the sugar and water provide food for the yeast. The yeast digests the sugar and gives off carbon dioxide gas bubbles. These gas bubbles cause air spaces that help the dough rise. The yeasts

Oklahoma Academic Standards

GRADE 3

Speaking and Listening: R.1,2,3; W.1,2. Reading and Writing Process: R.1,3. Research: R.1,2,3,4; W.1,2,3. Life Science: 1-1; 4-3. Number & Operations: 2.5,7. Algebraic Reasoning: 2.1. Data & Probability: 2.1,2

GRADE 4

Speaking and Listening: R.1,2,3; W.1,2. Reading and Writing Process: R.1,3,4. Research: R.1,2,3; W.1,2,3. Life Science: 1-1. Number & Operations: 1.5. Algebraic Reasoning: 2.2. Measurement: 2.5. Data & Probability: 1.1,2,3

GRADE 5

Speaking and Listening: R.1,2,3; W.1,2. Reading and Writing Process: R.1,3. Research: R.1,2,3; W.1,2,3,4. Physical Science: 1-1,3,4. Life Science: 1-1; 2-1,2. Number & Operations: 1.4; 3.1. Algebraic Reasoning: 2.1

Materials

yeast

sugar

warm water

baking powder

clean, empty pop bottles

balloons

buttermilk

milk

vinegar

baking soda

cardboard cut in circles to
represent pancakes

skillets

See pancake recipes included
with this lesson for pancake
ingredients

themselves are killed by heat in cooking.

Baking powder contains sodium bicarbonate, but it also includes an acidifying agent (cream of tartar) and a drying agent (usually starch). Baking powder is available as single-acting baking powder and as double-acting baking powder. Single-acting powders are activated by moisture. With double-acting powder, some gas is released at room temperature when the powder is added to dough, but the majority of the gas is released after the temperature of the dough increases with cooking.

Baking soda is pure sodium bicarbonate. When baking soda is combined with moisture and an acidic ingredient (e.g., yogurt, chocolate, buttermilk, honey), the resulting chemical reaction produces bubbles of carbon dioxide that expand at high temperatures, causing baked goods to rise. The reaction begins immediately upon mixing the ingredients.

English Language Arts

1. Read and discuss background.
2. Read and discuss the story of the Olney Pancake Race, included with this lesson.
—Students will retell the story in writing, place the events in proper sequence and draw pictures to illustrate the story.
3. Students will use online and library resources to research buckwheat pancakes and other common breakfast foods eaten by American pioneers.
4. Students will use online and library resources to research varieties of pancakes from different cultures (crepes, latkes, etc.)
5. Students will use online and library resources to research celebrations around the world associated with different variations of pancakes.

Science

1. Students will use the worksheet included with this lesson to design and conduct experiments with leaveners.
2. Students will make pancakes using the three different kinds of leaveners. (Recipes included with this lesson.)

Math

1. Divide students into groups, and assign each group one of the recipes included with this lesson.
—Students will determine how many pancakes each student wants, one or two, and then determine how many pancakes are needed for the group.
—Students will adjust recipes according to how many pancakes are needed.
—Students will mix the batter in gallon-size zip-closing bags.
—Lightly-grease a griddle or electric skillet for each group before turning on the heat.
—Cut a small hole in one corner of each pancake batter bag.

- Students take turns squeezing the batter onto the hot griddle or skillet.
 - When the edges start to dry and bubbles form throughout, flip the pancakes.
2. Provide assorted toppings—butter, sorghum molasses, syrup, honey, yogurt, jelly, fruit, peanut butter, cream cheese, etc.
 - Students will record impressions of each topping.
 - Students will vote on their favorite pancakes and favorite toppings, and graph the results.
 3. List toppings on the chalkboard. Students will list all the possible ways they can be combined.

Physical Activity

1. Have a Pancake relay:
 - At the starting line, each participant flips a pancake (or representation, such as a flat round piece of cardboard) in a small skillet.
 - Run (gallop, hop, skip, etc.) a designated distance, carrying the skillet and pancake (without dumping the pancake).
 - Return to the starting line, flip the pancake again, and hand the skillet and pancake over to the next person on the team.

Extra Reading

- Hoflander, Kay, *The Chautauqua Kids and The Fuddy Duddy Daddy: A Tale of Pancakes and Baseball*, AuthorHouse, 2007.
- King, Hazel, *Carbohydrates for a Healthy Body (Body Needs)*, Heinemann, 2009.
- Macaulay, David, *The Way We Work*, Houghton Mifflin, 2008.
- Miller, Edward, *The Monster Health Book: A Guide to Eating Healthy, Being Active and Feeling Great for Monsters & Kids*, Holiday House, 2008.
- Spinelli, Eileen, and Joanne Lew-Vriethoff, *The Dancing Pancake*, Yearling, 2011.

Olney Pancake Races

Olney, England, has been holding a pancake race every year since 1445. The tradition began when a housewife was cooking the family's traditional Shrove Tuesday pancakes as the church bell summoning the townspeople to the shroving service began to ring. Anxious to get there on time, the woman immediately ran out the door, with her skillet still in her hand. This oversight immediately turned into a beloved tradition. Entrants in the pancake race must wait at the starting line, skillet in hand, until the "pancake bell" sounds. Then they must toss their pancake in the air, catch it in their skillet, and run the 400 yards to the church. Once they reach the finish line, they must once more toss their pancake in the air. When the race is finished, everyone attends the shroving service in the church, then the whole town joins together for an enormous pancake party!

How Leaveners Work

Leavening is a chemical reaction caused by the formation of carbon dioxide. In pancakes (and other kinds of baking) carbon dioxide is formed by baking soda, baking powder or yeast. These leaveners all work in different ways and need different ingredients to help them work.

YEAST

Yeast is really tiny plants that need food and water to grow. When we use yeast in bread and other recipes, the sugar and water provide food for the yeast. The yeast digests the sugar and gives off carbon dioxide gas bubbles. These gas bubbles cause air spaces that help the dough rise. The yeasts themselves are killed by heat in cooking.

1. Dissolve 1teaspoon sugar in 1/2 cup warm water.
2. Open a packet of yeast and sprinkle over the top of the water.
3. Allow the yeast to dissolve (about 10 minutes).
4. Observe and record your observations.

BAKING POWDER

Baking powder contains sodium bicarbonate, but it also includes an acidifying agent (cream of tartar), and a drying agent (usually starch). Baking powder is available as single-acting baking powder and as double-acting baking powder. Single-acting powders are activated by moisture. With double-acting powder, some gas is released at room temperature when the powder is added to dough, but the majority of the gas is released after the temperature of the dough increases with cooking.

1. Stir 1teaspoon baking powder into 1/3 cup hot water.
2. Observe and record your observations.

BAKING SODA

Baking soda is pure sodium bicarbonate. When baking soda is combined with moisture and an acidic ingredient (e.g., yogurt, chocolate, buttermilk, honey), the resulting chemical reaction produces bubbles of carbon dioxide that expand at high temperatures, causing baked goods to rise. The reaction begins immediately upon mixing the ingredients. Use this experiment to demonstrate what baking soda needs in order to form the carbon dioxide that makes pancakes rise.

1. Put 1/2 cup buttermilk in one pop bottle.
2. Put 1/2 cup sweet milk in another pop bottle.
3. Put 1 tablespoon vinegar in the last pop bottle.
4. Put 1/2 teaspoon baking soda in each of three balloons.
5. Cover the mouth of each pop bottle with a balloon, shaking the balloon to be sure all the baking soda falls into the bottle.
6. Watch the bottle for about 10 minutes.
7. Record results. Was carbon dioxide formed? How fast was the reaction?

Pancake Recipes

Baking Powder Pancakes

(Serves four)

- 2 cups all-purpose flour, stirred or sifted before measuring
 - 2 1/2 teaspoons baking powder
 - 1/2 teaspoon salt
 - 1 egg, slightly beaten
 - 1 1/2 cups milk
 - 2 tablespoons melted butter
1. Preheat a lightly oiled griddle or fry pan.
 2. Sift together flour, baking powder, and salt.
 3. In a separate bowl, combine egg and milk; add to flour mixture, stirring only until smooth.
 4. Blend in melted butter.
 5. Cook on a hot, greased griddle, using about 1/4 cup of batter for each pancake.
 6. Turn pancakes when surface bubbles begin to break.
 7. Turn and brown the other side.

Buttermilk (Baking Soda) Pancakes

(Serves four)

- 1 cup all-purpose flour
 - 1 tablespoon sugar
 - 1/2 teaspoon salt
 - 1/2 teaspoon baking soda
 - 1 egg
 - 1 cup buttermilk
 - 2 tablespoons butter, melted
1. Preheat a lightly oiled griddle or fry pan.
 2. Sift together flour, salt and baking soda.
 3. Beat egg in medium bowl.
 4. Blend in buttermilk.
 5. Add dry ingredients, beating until smooth
 6. Blend in melted butter.
 7. Cook on lightly oiled griddle or fry pan.
 8. Turn pancakes when surface bubbles begin to break.

Yeast Pancakes

(Serves six to eight)

- 2 1/4 cups all-purpose flour
 - 3 tablespoons sugar
 - 1 teaspoon salt
 - 1 teaspoon ground cinnamon
 - 2 1/4 teaspoons rapid rise yeast • 1 teaspoon vanilla extract
 - 1 1/2 cups warm milk
 - 1/4 cup butter, melted
 - 1 egg
1. In a large bowl combine flour, sugar, salt, cinnamon and yeast; mix well.
 2. Add vanilla, milk, butter, and egg until well blended.
 3. Cover and place in refrigerator overnight.
 4. Heat a lightly oiled griddle or frying pan over medium high heat.
 5. Stir the batter with a whisk.
 6. Pour or scoop the batter onto the griddle, using approximately 1/4 cup for each pancake.
 7. Brown on both sides and serve hot.