



Properties of and Changes in Matter: Bread

Grade 5 (Cycle 3)



Starch gelatinization? Protein coagulation? There is a lot of science in a loaf of bread! In this program, students investigate the physical and chemical changes of the ingredients used in making bread. They grind the wheat and examine its elements with a magnifying glass, and create a new substance by activating yeast. As they knead dough, students will feel the proteins transforming into gluten chains. Students discover how all of these different materials work together to create a useful and delicious food. This program is designed to stimulate kinesthetic, visual, and auditory learners.

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An enriching program



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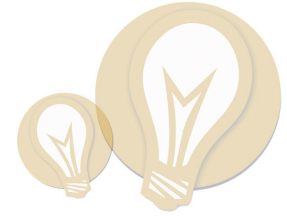
Science and Technology

- Yeast and Leavening Agents
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AN ENRICHING PROGRAM



Target grade level

This program targets Grade 5 in Ontario and Cycle 3 in Quebec.

Duration

2 hours

Program dates

This program is offered weekdays from September to June.

Learning objectives

- learn that wheat is an important grain, and how it is made into flour
- learn about the ingredients that go into a loaf of bread
- discover the role yeast plays in the transformation of dough
- discover the physical and chemical changes necessary to the making of bread
- understand how the ingredients work together to make bread

Learning methods

- separating wheat kernels from the chaff and straw
- examining wheat kernels before and after being crushed
- helping the educator mix, knead, and shape dough
- participating in a co-operative game simulating the interactions between bread ingredients
- eating freshly baked homemade bread



Curriculum Links

ONTARIO

Grade 5

Science and Technology

Understanding Matter and Energy — Properties of and Changes in Matter

QUEBEC

Cycle 3, Primary

Mathematics, Science and Technology

Science and Technology

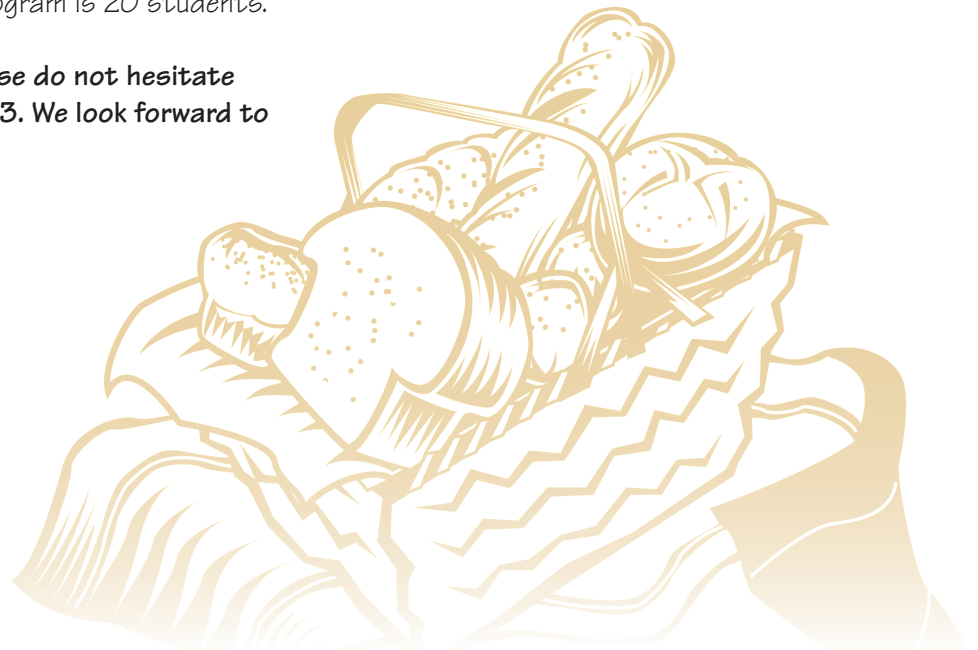
- **Competency 1** To propose explanations for or solutions to scientific or technological problems
- **Competency 2** To make the most of scientific and technological tools, objects and procedures

Fees, payment and group size

Payment may be made in advance or on arrival, by cash, debit card, cheque (payable to the Canada Agriculture Museum), or by credit card (VISA or MasterCard). For more information on fees, please refer to the School Program brochure on the Canada Agriculture Museum website at www.agriculture.technomuse.ca or call 613-991-3053.

Maximum group size for this program is 20 students.

If you have any questions, please do not hesitate to contact us at 613-991-3053. We look forward to seeing you at the Museum!





Science and Technology

YEAST AND LEAVENING AGENTS



Yeast and leavening agents are indispensable to the making of bread. Without these ingredients, bread would look more like a huge wafer than a light and spongy loaf. The exercises below will help students understand the importance of these ingredients, and the role they play, in making bread.

Suggested Activities

- Make bread dough with baker's yeast, as well as dough without baker's yeast. Observe what happens to the yeast dough throughout the day, and compare the results obtained from the two different leavening agents. **See the two attached recipes** to make Baba Luba's Brown Bread and Irish Soda Bread.
- Explain how yeast works. You can put half the yeast-based dough in a cool place, and the other half in a warm place then, with the students, measure at precise intervals how much each portion of dough has risen.
- Bake the two types of bread. Have your students taste each type, and ask their impressions: What does each sample taste like? Are their textures different? Is there a difference in the size of the air pockets where carbonic gas has accumulated in each type of dough?
- Bake bread with rye flour, or any flour other than wheat. As a group, observe what happens.

Baker's yeast is a living organism belonging to the fungi family. This leavening agent makes dough rise, as a result of fermentation (an irreversible chemical change). Yeast transforms the sugar in the dough into carbonic gas (carbon dioxide) and alcohol (ethanol). The trapped carbon dioxide makes the dough rise, and the alcohol produced by fermentation evaporates during the baking process. Since yeast is a living organism, its activity is affected by temperature. Breads made with baker's yeast rise slowly over a long period.

Sodium bicarbonate (baking soda) is inorganic. It is an alkaline (or basic pH) chemical compound. When it comes into contact with an acidic compound (contained in buttermilk, for example), a chemical reaction releases carbonic gas (carbon dioxide), which makes the dough rise (an irreversible chemical change). This type of bread is commonly called "quick bread." Since the chemical reaction lasts only a short time, the bread rises rapidly and must be baked immediately.

Breads made with **wheat flour** rise the highest. Wheat flour contains more glycoproteins (gliadin and glutenin) than any other flour. When mixed with water, these proteins form gluten chains (an irreversible chemical change). The gluten chains act like springs and allow the dough to stretch like a balloon.



LEAVENING AGENTS EXPERIMENT

Team members:

Date: _____

Task

As a team, conduct an experiment on leavening agents by observing the difference between the leavening reaction that occurs with sodium bicarbonate and the reaction that occurs with baker's yeast.

Objectives

- 1 Learn why quick bread dough must be baked right away, while yeast bread dough cannot be baked until a few hours have passed.
- 2 Study two chemical changes that produce carbonic gas.

Materials (per team)

- 2 clear plastic narrow-necked bottles
- 2 balloons
- sugar
- yeast
- vinegar
- sodium bicarbonate
- warm water
- funnel
- measuring spoons
- measuring cup
- pen, paper, and ruler
- timer (clock or watch with second hand)

Process

- 1 Using a pen, write "yeast" on one balloon, and on the other balloon write "sodium bicarbonate."
- 2 Measure each balloon's length.
- 3 Pull the balloon labelled "yeast" carefully onto the end of the funnel. Pour 15 ml of yeast into the funnel and shake it gently until all the yeast falls into the balloon. Set balloon aside.
- 4 Pull the balloon labelled "sodium bicarbonate" carefully onto the end of the funnel. Pour 15 ml of sodium bicarbonate into the funnel and shake it gently until all the soda falls into the balloon. Set balloon aside.
- 5 Using a funnel, carefully pour 60 ml of warm (not hot! not cold!) water into one of the bottles. Add 15 ml white sugar to the bottle and swirl until the sugar dissolves.
- 6 Using a funnel, carefully pour 60 ml of vinegar into the other bottle.
- 7 Take the balloon labelled "yeast" and **carefully** (take care not to tip the contents of the balloon into the bottle yet!) affix it onto the bottle with the sugar and water mixture.

Process (continued)

- 8 Take the balloon labelled “sodium bicarbonate” and **carefully** (take care not to tip the contents of the balloon into the bottle yet!) affix it onto the bottle containing vinegar.
- 9 Prepare the timer.
- 10 Gently tip up the balloons, pouring their contents into the liquids in the bottles.
- 11 Time how long it takes for the balloon to inflate.

Observations

- 1 Record the time it takes for the balloons to inflate.

| Yeast | Sodium Bicarbonate |
|-------|--------------------|
| | |



- 2 Record the size of the balloon before inflation, and then measure it after inflation, at one-minute intervals, for 15 minutes.

| Time | Length of Balloons | |
|------------------|--------------------|--------------------|
| | Yeast | Sodium Bicarbonate |
| Before inflation | | |
| 1 minute | | |
| 2 minutes | | |
| 3 minutes | | |
| 4 minutes | | |
| 5 minutes | | |
| 6 minutes | | |
| 7 minutes | | |
| 8 minutes | | |
| 9 minutes | | |
| 10 minutes | | |
| 11 minutes | | |
| 12 minutes | | |
| 13 minutes | | |
| 14 minutes | | |
| 15 minutes | | |

Questions (continued)

b) How do baker's yeast and sugar work together to produce carbonic gas?
Is this a physical or chemical change? Explain your answer.



(Answers)

Questions

- 1 Why does the quick bread dough have to be baked soon after the ingredients are mixed together?

The chemical reaction that causes quick bread dough to rise lasts only a short time.

The dough rises rapidly and if it is not baked immediately it will collapse once the chemical

reaction is over. Quick bread dough needs to be baked while the gas production takes place.

- 2 Why do we need to wait before baking the bread dough made with baker's yeast?

It takes time for the yeast to produce enough gas (carbonic gas) for the dough to rise.

- 3 Do some research on the two different types of leavening agents.

a) How do the sodium bicarbonate and vinegar act to produce carbonic gas?

Is this a physical or chemical change? Explain your answer.

When mixed, the vinegar (acetic acid) and the sodium bicarbonate react together to form two

new substances: salt (sodium acetate) and carbonic acid. The carbonic acid immediately breaks

down into carbonic gas and water.

This is an irreversible chemical change because new substances—salt, water, and

carbonic gas—were created and the reaction cannot be reversed.

continued...

(Answers)

Questions (continued)

b) How do baker's yeast and sugar work together to produce carbonic gas?
Is this a physical or chemical change? Explain your answer.

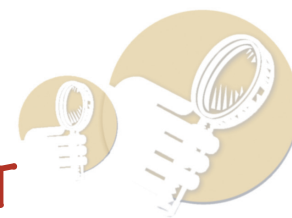
Yeast and sugar produce carbonic gas through fermentation. As the yeast consumes the sugar, it produces alcohol (ethanol) and carbonic gas (carbon dioxide) as waste products. The trapped carbon dioxide makes the dough rise, and the alcohol evaporates during the baking process.

This is an irreversible chemical change, because by consuming the sugar, the yeast has created new substances—carbon dioxide and ethanol—and the reaction cannot be reversed.





Science and Technology



GLUTEN BALLS EXPERIMENT

Gluten chains are necessary to the production of bread made with baker's yeast. Because of these chains, dough made with wheat flour is able to trap the carbonic gas produced by the yeast, causing the bread to rise.

Task

Conduct an experiment on the transformation of proteins into gluten chains by rinsing wheat flour.

Objectives

- Understand the role of gluten chains in making bread with baker's yeast.
- See how a chemical change affects the properties and characteristics of a substance.

Materials

- all-purpose unbleached white or whole wheat flour
- water
- measuring spoons
- one bowl for each student or a small bucket per team of students
- other types of flour

Method

- 1 Mix two tablespoons of warm water with four tablespoons of all-purpose flour.
- 2 Shape the dough into a ball.
- 3 Put the dough into a bowl of cool water and let it rest for 30 minutes.
- 4 Change the water in the bowl. Gently fold and squeeze the dough, under running water if possible.
- 5 Knead the rinsed dough.



Observations

Ask students to describe the changes that they observe during the experiment.

- What colour is the rinsed dough?
- What colour is the water in which the dough was rinsed?

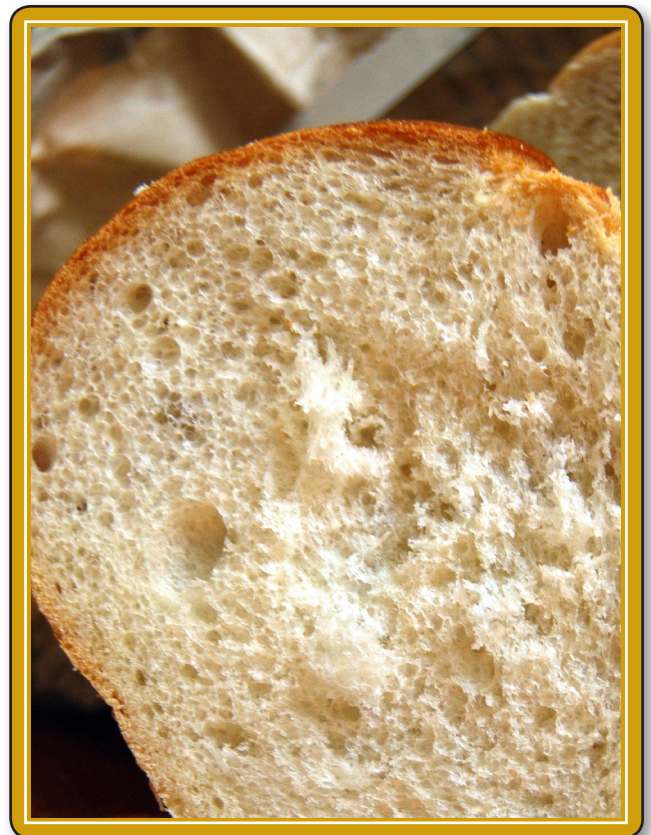
The water becomes white because the starch in the flour (wheat endosperm) is insoluble and is in suspension in the water.

- Compare the consistency and properties of the rinsed dough with those of the flour or with the unrinsed ball.
- How far can you stretch the rinsed dough?
- Can it return to its original shape?
- Repeat the experiment with another type of flour and compare the results.

The only other flour with enough of the necessary proteins to produce gluten is buckwheat flour. However, because buckwheat contains far fewer of these proteins than wheat flour, it has fewer gluten chains, and the dough will not rise as high.

- Explain to students that what they have in their hands is actually a ball of gluten chains. Gluten chains are indispensable in the making of yeast bread. They give the dough its elasticity, which allows it to trap the bubbles of carbonic gas produced by the yeast, making the dough rise. Without gluten, the dough would simply let the gas escape.
- Discuss the transformation of flour into gluten chains. With the students, determine if this is a physical or chemical change. Discuss the indicators that determine which kind of change it is.

It is a chemical change. The transformation of flour into gluten chains creates a new substance with different properties, and an altered chemical composition. The gluten chains cannot become flour again. It is an irreversible change. For more information, please see the Additional Information below.

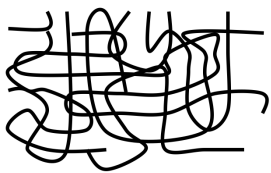


Additional Information

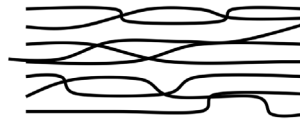
When wheat flour is mixed with water, two proteins—**gliadin and glutenin**—transform into a viscous and elastic substance called gluten. The gluten chains trap the bubbles of carbonic gas (carbon dioxide) that have been created by the yeast. This is what enables wheat bread to rise.

This type of chemical change is called polymerization. It is a chemical reaction that leads to the formation of polymer chains (a three-dimensional network of molecules). The gliadin molecules resemble a tangled ball of thread, while the glutenin molecules look more like springs. When they come into contact with water and are mixed together, the proteins tangle and absorb two times their weight in water by binding with hydrogen (hydrogen bridges occur when molecules become linked by a hydrogen atom). A gluten chain is actually a complex network of interlaced proteins with the interstices (the spaces between the proteins) filled with water molecules.

When the dough is kneaded, the long gluten chains, which start out tangled, are unfolded, lengthened, and aligned to eventually create layers of interlaced glutes.

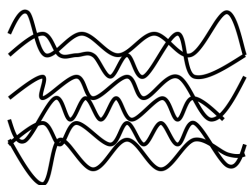


before kneading

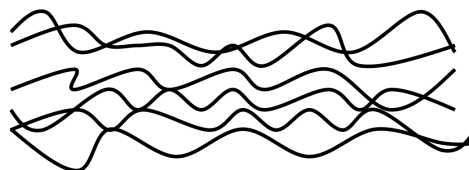


after kneading

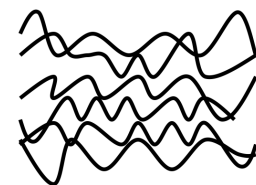
The dough thus becomes both plastic and elastic. Under pressure, its form is modified. When the pressure is removed, however, the dough resumes its original form.



no pressure



under pressure



no pressure

Because of these properties, dough made with wheat flour can expand to incorporate the carbon dioxide produced by the yeast, while also offering enough resistance that it doesn't become too thin and rupture under the pressure of the gas. Wheat flour is thus unique. It is the only flour that contains enough gliadin and glutenin to make gluten chains in sufficient quantity to make bread rise so high.



Science and Technology



PHYSICAL AND CHEMICAL CHANGES ON THE FARM

(Answers)



Here is a list of changes in matter that are found on the farm at the Canada Agriculture Museum. For each of the transformations below, indicate if it is a physical or a chemical change by checking the appropriate box.

| Description of the Transformation | Physical Change | Chemical Change |
|---|---|--|
| Cracking grains of corn to make cattle feed | ✓ Grains of corn are simply broken into small pieces to facilitate their digestion by cattle. | |
| Fermenting corn in a silo to make corn silage for cattle feed | | ✓ Silage allows fodder to keep moist without spoiling. To do this, shredded corn plants are placed in an oxygen-free environment in which bacteria transform certain sugars into acids. When the silage is sufficiently acidic, the bacteria die and the putrefaction process is halted. |
| Evaporating liquid nitrogen in the vats used to preserve bull semen | ✓ Change in state from liquid to gas; bull semen (contained in a special straw) is frozen in a vat of liquid nitrogen to preserve the sperm until it is needed. Artificial insemination is practised on most dairy farms. | |

continued...

Answers (continued)

| Description of the Transformation | Physical Change | Chemical Change |
|--|--|--|
| Compressing hay into rectangular bales | ✓ Pressure is exerted on the hay to compress it and reduce its volume, making it easier to handle and store. | |
| Rust forming on a leaking bowl of water | | ✓ A chemical reaction (oxidation) occurs when compounds containing iron corrode in the presence of oxygen and water. |
| Cooling milk in the dairy's tank | ✓ The temperature has been lowered (from 36°C to less than 4°C). | |
| Shearing sheep | ✓ The wool is cut using shears. | |
| Earthworms decomposing straw and manure | | ✓ The straw and manure are digested by earthworms, which excrete these substances in the form of humus. |
| Diesel fuel combustion in a tractor engine | | ✓ The heat created by pressure ignites the fuel that has been injected into the engine's cylinder, and this explosion drives the piston. The combustion of diesel fuel makes the tractor's engine run. |
| Welding a broken bar in a pig stall | ✓ The state of the metal changes through the action of heating and cooling. The iron passes from a solid to a liquid state then back to a solid again. | |

Name: _____

Date: _____

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| Evaporating liquid nitrogen in the vats used to preserve bull semen | | |

continued...

| Description of the Transformation | Physical Change | Chemical Change |
|--|-----------------|-----------------|
| Compressing hay into rectangular bales | | |
| Rust forming on a leaking bowl of water | | |
| Cooling milk in the dairy's tank | | |
| Shearing sheep | | |
| Earthworms decomposing straw and manure | | |
| Diesel fuel combustion in a tractor engine | | |
| Welding a broken bar in a pig stall | | |



Science and Technology



MAKING BUTTER

Making butter is a good example of a physical change. When cream is beaten, the globules of fat that it contains are destabilized and clump together. At first, the beating or whipping process causes tiny bubbles of air to become wedged in the cream, producing whipped cream. As beating continues, the fat globules are squeezed more tightly together and air and fluids can no longer be contained in the foam. The networks of fat break up and form the larger clumps of fat that we call butter.

Task

Conduct an experiment on physical changes by making butter from cream.

Objective

Study a physical change by making butter.

Materials

- whipping cream (35% milk fat)
- small airtight containers
(preferably transparent; one per group of 5 or 6 students)
- medium bowl
- spatulas (one per group)
- water
- crackers
- butter knife

Method

Part 1—A Physical Change

- 1 Fill each group's container about one-third full with cream, and close the covers tightly.
- 2 Shake the containers until the cream froths (when the liquid no longer moves in the container).
- 3 Open the containers and observe the changes (the cream will have been transformed into whipped cream).



continued...

Method (continued)

- 4 Close the container tightly and shake it again until a solid mass separates from the liquid.
- 5 Open the container and observe the two substances (butter and buttermilk). Ask your students if they think making butter is a physical or a chemical change. Discuss the indicators that determine which kind of change it is.

It is a physical change. The ingredients in the cream have been separated, but no new substance was created. When milk is not homogenized, the cream separates naturally and floats on the surface of the milk because the globules of fat are less dense than the other ingredients in the milk. During butter making, the fat globules stick together and form large clumps—this is the butter. For more information, please see the introduction to this activity.

- 6 Pour the buttermilk into the bowl. With a spatula, compress the butter to extract all the liquid. You can rinse the butter in cold water to harden it and compress it with the spatula again to remove any remaining buttermilk.
- 7 Spread the butter on the crackers for your students to sample it.





Language



OLD SAWS — BREAD SAYINGS

This activity is designed to show students how wordiness gets in the way of communication. The object of the game is to take a simple, familiar saying and bury its meaning in a barrage of verbosity, using a dictionary and thesaurus to look up complicated words. Provide a sample page of obfuscated saws and have students guess the bread sayings buried in the verbiage.

This exercise is not only fun, but it helps students improve their dictionary and thesaurus skills, allows them to become familiar with word synonyms and will aid them in their writing skills by discouraging the use of unnecessarily difficult diction. It is also a great group activity in that the students can challenge each other by coming up with their own obfuscated saws and having another group translate them into simple sayings.

Example

When original endeavours for triumph do not achieve the immediate desirable results, never hesitate to indulge in however many necessary attempts thereafter.

Familiar saying: “If at first you don’t succeed, try, try again.”

Suggested Activity

Discuss the possible meanings of these sayings with your class. What is the moral teaching behind them? Why is bread central to their meaning?

Adapted from Barbara Christian, *Creative Escapes: Adventures in Writing* (Pitman Learning: Belmont, Calif., 1980).





Language



OLD SAWS — BREAD SAYINGS

(Answers)

- 1 When an individual has victualage based on hard red wheat, the said individual should not quest for *gâteau*-style pastry. (American saying)

Bread saying: *If you have bread, don't look for cake.*

- 2 The brown outer surface of baked, leavened dough consumed during cessation of combat is better than a banquet during a quarrel. (American saying)

Bread saying: *A crust of bread in peace is better than a feast in contention.*



Name: _____

Date: _____

OLD SAWS — BREAD SAYINGS

1 When an individual has victualage based on hard red wheat, the said individual should not quest for *gâteau*-style pastry. (American saying)

Bread saying: _____

2 The brown outer surface of baked, leavened dough consumed during cessation of combat is better than a banquet during a quarrel. (American saying)

Bread saying: _____



Name: _____

Date: _____

WORD SEARCH



Look for these words:

- baguette
- bake
- ball
- bran
- bread
- chaff
- coagulation
- combine

- delicious
- dough
- eat
- fermentation
- flail
- flour
- fresh
- gelatinization

- germ
- gluten
- grain miller
- grind
- harvest
- jam
- knead
- oil

- seed
- starch
- straw
- sun
- wheat
- windmill
- winnowing basket
- yeast



Mathematics

WHEAT CALCULATIONS (Answers)



Using the wheat yields provided, have students calculate how much bread can be made. Ask students to bring in their favourite recipes (e.g., muffins, pizza) and calculate how many of these items could be made from a hectare yield of wheat.

Basic information

- 1 bushel wheat = 27 kg wheat = 42 L of flour
- 1 loaf of bread = 500 ml of flour
- 1 dozen cookies = 500 ml of flour
- commercially-produced cookies are 50 percent flour
- crackers are 80 percent flour
- from 1990 to 2004 the wheat yield in Saskatchewan averaged approximately 2000 kg per hectare; in Ontario, the average yield was about 4000 kg per hectare

Questions

- 1 a) Calculate the number of bushels of wheat (x) per hectare produced by Saskatchewan and Ontario.

| Saskatchewan | Ontario |
|--|---|
| <p>yield = 2000 kg per hectare</p> <p>1 bushel = 27 kg</p> <p>$x = 2000 \text{ kg} \div 27 \text{ kg} = 74 \text{ bushels per hectare}$</p> | <p>yield = 4000 kg per hectare</p> <p>1 bushel = 27 kg</p> <p>$x = 4000 \text{ kg} \div 27 \text{ kg} = 148 \text{ bushels per hectare}$</p> |

- b) Why are the yields are so different?

Wheat yields per hectare vary because growing conditions (more available moisture in Ontario), cultivation practices (wheat rows are planted slightly tighter with more wheat per row in Ontario), and wheat varieties planted in the two regions are so different. Even though wheat yields per hectare are higher in Ontario, Saskatchewan's entire wheat yield is many times higher than Ontario's because it has more land cultivated in wheat: 8.5 million hectares in wheat in Saskatchewan compared to 180 767 hectares in wheat in Ontario.

continued...

- 2 Calculate how many loaves of bread (**z**) you could make with one hectare of wheat (bread is usually made with flour from red hard wheat from Saskatchewan, as well as Alberta and Manitoba).

yield = 2000 kg wheat flour per hectare
1 bushel = 27 kg
1 bushel = 42 L of flour
1 loaf of bread = 500 ml of flour
x = bushels per hectare
x = 2000 kg ÷ 27 kg = 74 bushels per hectare
74 bushels makes y litres of flour
y = 42 L x 74 bushels = 3108 L of flour per hectare
3108 L of flour makes z loaves of bread
z = 3108 L ÷ 500 ml = 6216 loaves of bread per hectare

- 3 Calculate how many cookies (**C**) you could make with one hectare of wheat (cookies are usually made with the flour from soft white wheat, much of which is grown in Ontario).

yield = 4000 kg of flour per hectare
1 bushel of wheat = 27 kg of flour
1 bushel of wheat = 42 L of flour
1 dozen cookies = 500 ml of flour
A = bushels per hectare
A = 4000 kg ÷ 27 kg = 148 bushels per hectare
148 bushels of wheat makes B litres of flour
B = 42 L x 148 bushels = 6216 L of flour per hectare
1 hectare of wheat makes C dozen cookies
C = 6216 L ÷ 500 ml = 12 432 dozen cookies per hectare

Name: _____

Date: _____

WHEAT CALCULATIONS

Basic information

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- 1 loaf of bread = 500 ml of flour
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Questions

- 1 a) Calculate the number of bushels of wheat per hectare produced by Saskatchewan and Ontario.

| Saskatchewan | Ontario |
|--------------|---------|
| | |

- b) Why are the yields are so different?

- 2 Calculate how many loaves of bread you could make with one hectare of wheat (bread is usually made with flour from red hard wheat from Saskatchewan, as well as Alberta and Manitoba).

- 3 Calculate how many cookies you could make with one hectare of wheat (cookies are usually made with the flour from soft white wheat, much of which is grown in Ontario).



General Activity

TEST YOUR KNOWLEDGE ON BREAD (Answers)



1 Which plant doesn't belong, and why?

- A. Rice
- B. Corn
- C. Potato**
- D. Wheat

The potato is a tuber, an edible part of the plant that grows underground. The other three plants are cereals, which produce edible kernels that grow above ground.

2 Bread was first made by:

- A. Ancient Egyptians
- B. Ancient Romans
- C. Ancient Greeks
- D. Stone-age peoples**

The first bread was made as early as as 12 000 years ago in the region comprising Iran, Iraq, Israel, Jordan, Syria, and Turkey.

3 Marquis, AC Delta, and AC Zorro are all:

- A. Cities in Canada where wheat is grown
- B. Characters in a movie
- C. Wheat varieties**

All three of these are wheat varieties that were developed in Ottawa at the Central Experimental Farm.

4 Bran is:

- A. A plant grown for animal feed
- B. The outer layer of the wheat kernel**
- C. A nutritional supplement made from wheat flour

The outer layers of the wheat kernel are called the bran.

5 Whole wheat flour usually contains:

- A. The entire wheat plant
- B. The entire wheat kernel
- C. Only part of the wheat kernel**

Commercial whole wheat flour consists of white flour that has the bran mixed back in. The other component of the kernel, the oil-rich germ, is not usually added back in since it spoils quickly.

6 Which is the best flour for making bread?

- A. All-purpose flour
- B. Soft wheat flour
- C. Hard wheat flour**

Hard wheat flour, made from hard wheat, makes dough with the most springy, elastic gluten. It is gluten that allows a bread loaf to rise and hold its shape.

7 What is the best place to store your flour?

- A. In the root cellar
- B. In the freezer**
- C. Under your bed

Flour, especially whole wheat flour, can go rancid at room temperature, and will keep longer in the freezer.

8 Which are the three basic ingredients of bread?

- A. Water, flour, yeast**
- B. Flour, milk, salt
- C. Flour, water, sugar

While you can make flat bread from water and flour alone, to make a leavened loaf you must also have yeast.

9 Where was the bread maker invented?

- A. Japan**
- B. United States
- C. Canada

In response to a demand for white bread, Japanese companies were the first to produce the automatic bread maker in 1987. Automatic bread makers became available in Canada one year later.

Name: _____

Date: _____

TEST YOUR KNOWLEDGE ON BREAD

1 Which plant doesn't belong, and why?

- A. Rice
- B. Corn
- C. Potato
- D. Wheat

Why? _____

2 Bread was first made by:

- A. Ancient Egyptians
- B. Ancient Romans
- C. Ancient Greeks
- D. Stone-age peoples

3 Marquis, AC Delta, and AC Zorro are all:

- A. Cities in Canada where wheat is grown
- B. Characters in a movie
- C. Wheat varieties

4 Bran is:

- A. A plant grown for animal feed
- B. The outer layer of the wheat kernel
- C. A nutritional supplement made from wheat flour

5 Whole wheat flour usually contains:

- A. The entire wheat plant
- B. The entire wheat kernel
- C. Only part of the wheat kernel

6 Which is the best flour for making bread?

- A. All-purpose flour
- B. Soft wheat flour
- C. Hard wheat flour

7 What is the best place to store your flour?

- A. In the root cellar
- B. In the freezer
- C. Under your bed

8 Which are the three basic ingredients of bread?

- A. Water, flour, yeast
- B. Flour, milk, salt
- C. Flour, water, sugar

9 Where was the bread maker invented?

- A. Japan
- B. United States
- C. Canada



IRISH SODA BREAD



| | | |
|--------|--|-----------|
| 500 ml | white flour | 2 cups |
| 500 ml | whole wheat flour | 2 cups |
| 75 ml | brown sugar | 1/3 cup |
| 5 ml | salt | 1 tsp |
| 6 ml | baking soda | 1-1/8 tsp |
| 500 ml | butter milk (or milk soured with 15 ml (1 tbsp) vinegar) | 2 cups |
| 30 ml | wheat bran | 2 tbsp |

In a large bowl, mix together all the dry ingredients except for the wheat bran. Add the buttermilk and mix until combined. Pour into a well-greased loaf pan. Sprinkle the wheat bran on top and bake at 175°C (350°F) for 50 minutes in a regular oven, a bit less in a convection oven.

Yield: 1 loaf





BABA LUBA'S BROWN BREAD



| | | |
|------------|-------------------|-----------------|
| 15 ml | yeast | 1 pkg or 1 tbsp |
| 10 ml | sugar | 2 tsp |
| 50 ml | warm water | 1/4 cup |
| 500 ml | warm water | 2 cups |
| 50 ml | vegetable oil | 1/4 cup |
| 50 ml | molasses | 1/4 cup |
| 5 ml | salt | 1 tsp |
| 1.5 litres | whole wheat flour | 6 cups |

In small bowl, add yeast and sugar to 50 ml warm water and let stand for 5 minutes.

In a large bowl, mix 500 ml warm water with the oil, molasses, and salt. When yeast is frothy, stir and add to molasses mixture. Stir well.

Add flour, one cup at a time until blended. Turn dough out onto floured board. Knead until it feels just right (about 10 minutes). Put back in bowl and let rise in a warm place. When doubled in size (1 hour or so), punch down and form into two loaves. Place in well greased bread pans. Cover with cloth and let rise for 45 minutes or so.

Bake at 175 °C (350 °F) for 45 minutes in a regular oven, a bit less in a convection oven.

Yield: 2 loafs