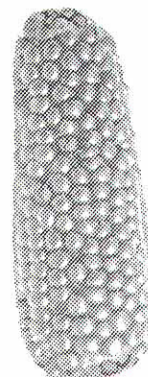


## TEACHER MATERIALS - Popcorn



**CONCEPTS:** Math, Science, and Technology  
 -Standard 3.2- Number and Numeration  
 -Standard 3.5- Measurement  
 -Standard 4.1, 4.6- Living Environment  
 Career Development  
 -Standard 3a.1- Basic Skills

**OBJECTIVES:** The students will learn how popcorn grows, pops, and several ways to eat it.

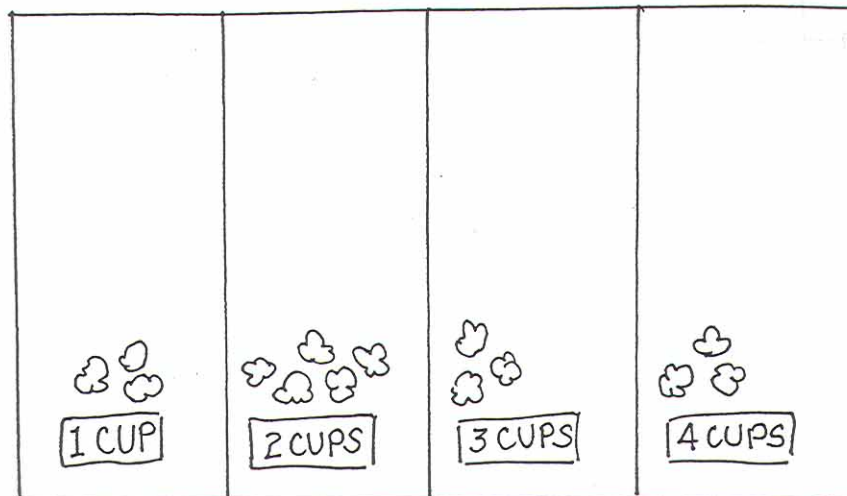
**BACKGROUND:** Today, popcorn is not often seen on the ear, or in fact, thought of as a corn. It is. As with other types of corn, popcorn was developed by American Indians. Popcorn pops because kernels have a hard outside shell. Water is trapped inside the hard shell. As the popcorn is heated, the water vaporizes (turns to steam). The volume of a given amount of water as a liquid is much smaller than that volume in steam. So, the kernel literally explodes as the water vapor tries to expand.

A popcorn plant is smaller than that of sweet corn or field corn grown for animal feed. While the two latter types of corn may have more than one ear per stalk (field corn could have three ears per stalk in unusual cases), popcorn almost never has more than one ear. For more information, please see the separate information pages.

**ACTIVITIES:**

1. Have the students cut out the pictures and assemble them in sequence on "**How Popcorn Grows**" on pages K-91 through K-92.
2. Complete the corn "**Germinator**" (in the science section) on pages K-147 through K-150.

3. Measure popcorn and pop it for math ideas in a variety of ways as follows:
- A. Measure  $\frac{1}{4}$  cup of popcorn. Pop it and measure how much it expands. Graph it. Discuss how much the volume increased. Repeat with a  $\frac{1}{2}$  cup,  $\frac{3}{4}$  cup, 1 cup, and graph.
  - B. Pop the same amount of several different brands to see if they pop more or less. Graph these also and compare. Does the brand name make a difference? How about the price?
  - C. Examine the different types of popcorn as popped. Some popcorn is shaped like a mushroom and some like a snowflake. Pop  $\frac{1}{4}$  cup of popcorn and graph these types by gluing these onto the bulletin board—mushrooms in one column, snowflakes in another.
  - D. Have the students predict how much the popcorn volume will increase when popped. Graph. Will it double? Triple? Make a contest out of it. The student closest gets a surprise or free time.
  - E. On the 100th day of school, pop 100 kernels. Use the popcorn for each child to vote on the number of cups 100 kernels will equal when popped by placing their name on a popcorn (page K-93) and placing it in the correct column or using real popcorn.



- F. Use colored popcorn, graph colored kernels.
  - G. Lay 100 kernels of unpopped corn in a line. See how far it goes. Repeat with 100 popped kernels. Compare.
4. To utilize the popped corn:
- A. use it as a class snack.
  - B. mix it with the raisins produced in the science lesson as a type of trail mix.
  - C. use the popped corn for art projects—pussy willows, snow, fur, popcorn snowflakes, or clouds.
  - D. make a Popcorn Mosaic.
  - E. create Pp with kernels glued to paper.
5. Make Maple Popcorn or any of the other varieties following the recipes provided.
6. Do the **"Popcorn Dance"** in all its variations and sing **"Popcorn Pops"** on pages K-97 through K-99.
7. Pop popcorn on the cob.
8. Use *The Popcorn Book* by Tomie de Paola.



*(While this book was recommended by a piloting teacher, when the American Indian program was asked to review it, they recommended it not be used due to technical inaccuracies concerning the American Indians. For example: holding an ear of popcorn over a fire or tossing kernels into the fire and the kernels popping freely. They also rejected the idea of popcorn soup. However, other than this, the book is a good one so we recommend that you explain the objections when you read the book or skip those pages.)*



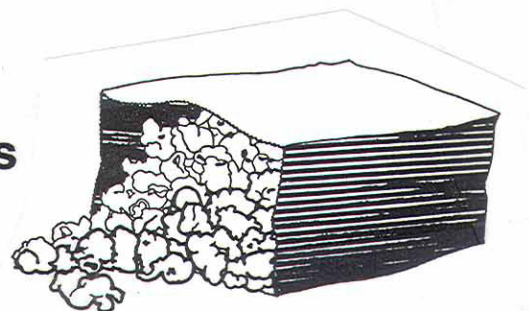
9. Grow popcorn seeds in class.
10. October is popcorn month. Celebrate it!

**Suggested book:** de Paola, Tomie. The Popcorn Book. New York: Holiday House, 1978.

**Suggested reading for further teacher information:**  
Woodside, Dave. What Makes Popcorn Pop? New York: Atheneum, 1980.



# Popcorn Facts



## Popcorn and American Indians

Popcorn, and all other corn was developed by American Indians. Corn's origin is thought to be somewhere in Central America or Mexico. Corn is a grass. Tiny ears have been found at ancient village and tomb sites of American Indians. Evidence in Mexico suggests that as long as 7,000 years ago, it was domesticated from wild grass. In the Southwestern United States, Indians cultivated corn for at least the past 3,000 years. Archeologists have found unpopped ears of popcorn in the Bat Caves of West Central New Mexico which are almost 5,600 years old. The Indians would pop popcorn in clay containers. Some have been found in ancient graves containing kernels which still pop!

When Columbus came to America, the native people (which he named Indians) were wearing necklaces made of popcorn, ceremonial popcorn headdresses, popcorn corsages, and weaving popcorn in their hair.

The Indians call(ed) this crop maize. Colonists had never heard that word, so they called it the word they used for all grains—corn. (In Europe corn means any grain, maize is the term used for American corn.)

The Indians believed that a little demon lived inside the kernel of popcorn. When the popcorn was heated this angered the demon and made him hopping mad. His anger caused the kernel to explode (or pop).

It is believed that popcorn was served at the first Thanksgiving.

## How popular is popcorn?

Per person in the United States, we eat 68 quarts of popcorn. Americans lead the world in popcorn consumption for a total of 17.3 billion pounds of popcorn each year. Due to popcorn's low calorie count (25-55 calories per cup without butter), adults are eating more popcorn than ever before.\*

## What makes popcorn pop?

The popcorn seed, as with other corn, consists of a hard seed coat covering a starchy endosperm and an oil rich germ. Inside the starchy endosperm, water is trapped by the

\*As of 2004

hard seed coat. When the kernels are heated, the moisture expands (turns to steam) which cannot escape. The pressure builds up until the kernel literally explodes. This pressure can actually cause the kernels to pop up to 30 times their size.

### **Where does popcorn grow?**

Popcorn will grow almost anywhere in the United States. In garden plots, it is raised for home use in all states. It is grown commercially in Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Missouri, Nebraska, and Ohio.

### **Popcorn's Improvement**

Research is constantly improving the popcorn we eat. In 1933, a new breeding method called hybridization was developed. Hybrid seeds produce plants and crops which are far superior to their parents.

Today's popcorn pops nearly double the size of popcorn grown 40 years ago. There are over 100 strains of popcorn grown today. There are two most common types of popcorn—snowflake and mushroom.

Snowflake popcorn produces large, cloud-like kernels when popped. Home and theater eating varieties are commonly the snowflake type because the popcorn is light, fluffy, and large.

Mushroom popcorn pops into a smaller kernel with a ball on one end. This popcorn is used for coated popcorn treats and other confections because it holds its shape and is more durable.

### **Stringing Popcorn**

When the author was growing up, she and her siblings were always unsuccessful at creating popcorn strings. The popcorn kernels always broke. Has this happened to you?

Well, the trick to successful popcorn stringing is to use only stale popcorn. Leave the popped popcorn out for at least 24 hours before trying to string it with a needle and thread. Then string away!



# Popping Tips

The first electric popcorn makers appeared around 1925. Whether popping in an electric popper or on a stove follow these tips:



Warm the popper, heavy pan, or heavy skillet.



If oil popping, add 1/4 cup of cooking oil, allow oil to heat. Test the heat by dropping one or two kernels into the pan, skillet, or popper. When the kernel pops or spins, add remaining popcorn. Add just enough kernels to cover the bottom of the pan—make sure oil coats kernels.



The best popping temperature is between 400 and 460°F, but oil burns at 500°F. If the oil starts to smoke, it's too hot!



**DO NOT POPCORN IN BUTTER! BUTTER WILL BURN BEFORE IT REACHES A HIGH ENOUGH TEMPERATURE.**



If air popping, follow the recommendations of the air popper.



The Popcorn Institute has a "Seal of Quality Performance" which is granted to those poppers which perform best. Look for the seal to get a popper which does the best job.

# THE POPCORN MYSTERIES

## How did popcorn get to China?

Before Columbus tripped on "The New World," popcorn was being popped in parts of China, Sumatra, and India. How did it get there? Could it have floated across the Pacific? Did the Chinese travel to Central America? Did the American Indians travel back to Asia by a southern water route? No one has the answers to these questions yet, but maybe someday.

## Why is corn in the Bible?

If corn originated in America and wasn't "discovered" until the 15th century, why does the Bible talk about "corn"? Well, the corn stored in the granaries of Egypt during the Seven Years of Plenty was really either wheat or barley. What the Bible refers to as corn was a generic term for any grain. In "The Old World" corn could mean wheat, oats, barley, or rye. Even today most of the world uses corn interchangeably with the term grain. American corn is known as maize. It's just another European name goof-up.

## Popcorn and Nutrition

Popcorn has no sugar.

Popcorn has no artificial coloring or preservatives.

Popcorn has more nutrients than other snack foods.

Popcorn is low in fat and calories unless butter is added.

Dentists say that popcorn helps clean teeth and massages the gums.





## Popcorn Surprise! \*

Andeans still love popcorn today, maybe even more than their North American neighbors. High in the corn mountains of Peru and Bolivia they eat freshly popped corn for breakfast. It can be purchased in towns from vendors who pop it over charcoal fires. The kernels taste very sweet and slightly smoky. Sometimes sugar is added instead of salt.



What is so amazing about this? That is the surprise. The popped kernels are so large that only one or two can be held in your hand. This popcorn is so light and fluffy that the kernels are called "palomitas," the Spanish word for "little doves"!

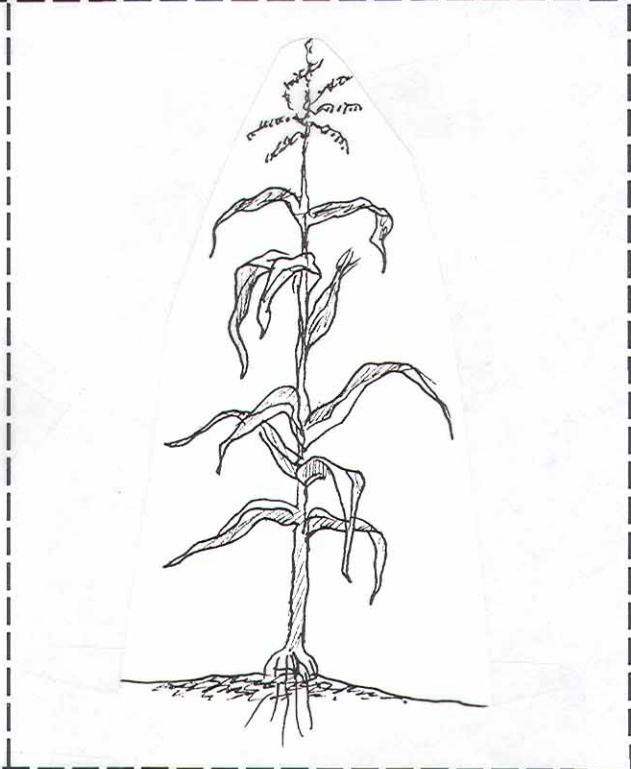
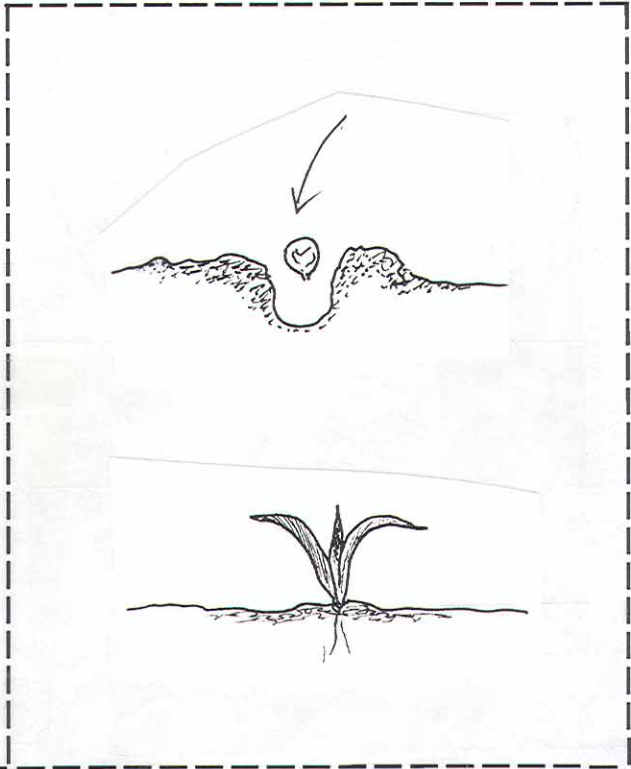
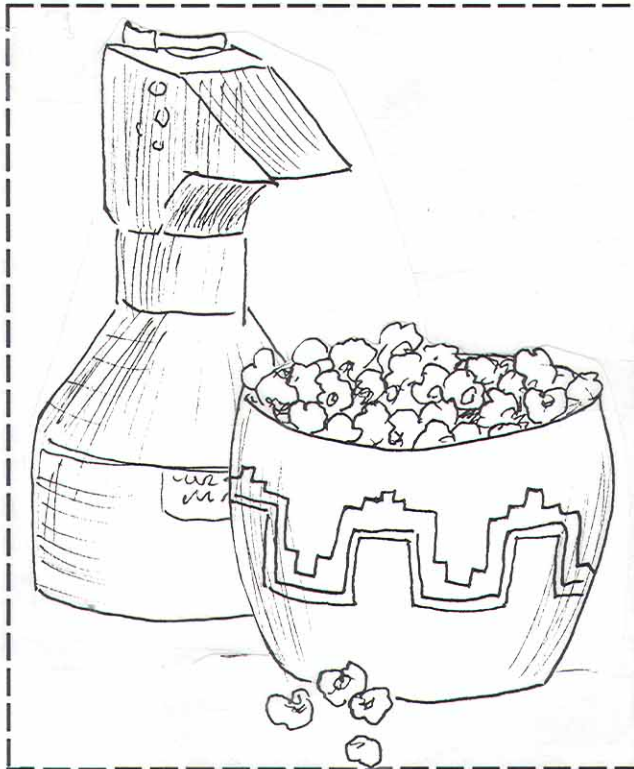


\* Information provided by Ellen Alexander who traveled in this high mountain area of Peru and Bolivia while researching her book, Llama and the Great Flood.

Name \_\_\_\_\_

## How Popcorn Grows

1	2
3	4







## Maple Popcorn

### Ingredients:

- 1 1/2 quarts of popped popcorn
- 1 teaspoon butter or margarine
- 1/2 cup maple syrup
- 1/4 cup sugar

Cook butter/margarine, syrup, and sugar to 275° F (on a candy thermometer). Pour the mixture over popcorn, stirring as you do so. Wet hands in cold water and shape mixture quickly into balls.

Yield = 9 to 12 balls 3 inches in diameter

## Popcorn Trail Mix

### Ingredients:

- 1 cup raisins (use the raisins produced in the science lesson)
- 2 quarts of popped popcorn

Toss together until mixed.

## Tex Mex Mix

### Ingredients:

- 2 quarts popped popcorn
- 2 teaspoons ground chili powder
- 2 teaspoons paprika
- 2 teaspoons ground cumin
- 1 cup cubed Monterey Jack cheese

Mix together spices and cheese. Toss the mixture with the popcorn.

## **Cheese Popcorn**

### **Ingredients:**

- Parmesan or cheddar cheese
- 2 quarts popped popcorn

Toss until mixed.

## **Peanut Butter and Jelly Popcorn**

### **Ingredients:**

- 1 Tablespoon butter
- 1 Tablespoon peanut butter
- 1 Tablespoon jelly
- 2 quarts popped popcorn

Melt butter, peanut butter, and jelly together over low heat. Drizzle over popcorn. Mix well to coat all pieces thoroughly.

## **Popcorn Cake**

### **Ingredients:**

- 8 quarts popped popcorn
- 24 ounce package of marshmallows
- 1 stick of melted butter or margarine
- 1 pound of salted peanuts
- 3/4 cup raisins

Melt marshmallows in the melted butter or margarine. Combine popcorn, peanuts, and raisins. Add marshmallow mixture. Mix well. Press into a greased, 9" x 13" cake pan. Cool until firm, cut into squares, serve.



## Beekeepers Favorite\*

### Ingredients:

- 2 sticks margarine or butter
- 2 cups light brown sugar
- 1/4 cup molasses
- 1/4 cup of honey

Mix and bring to a boil for 4 minutes. Watch and stir carefully so as not to burn. Take off heat, cool slightly and add the following. Mixture will fizz, just stir well:

- 1 teaspoon vanilla
- 1/4 teaspoon soda
- 1/8 teaspoon cream of tartar

Measure out 24 cups of popped popcorn. Spread out on buttered baking dish and pour above mixture over the top. Bake about 1 hour at 250° F. Stir 3 times during cooking.

\* *Adapted from New Hampshire's Amazing Popcorn*

## The Popcorn Dance

Step 1: Have the students curl into as small a "kernel" as they are able.



Step 2: Tell them they are heating up.

Step 3: POP!

Have the students jump up and down, hold their arms up and out.



Step 4: Assign each student a number and have them pop only when their number is called—"Number 3, POP." After they pop, they have to stay 'expanded.'

Step 5: Sing "Popcorn Pops" and have the students dance to it.

Alternatives:

1. Record the sound of popcorn popping. Have the children count off. Play the tape and as the first real kernel pops, child number one pops and so on. Or do it live, as you pop the popcorn.
2. Explain why popcorn pops (see background information) and use the increase in water vapor volume as an example of volume.
  - A. Have all students as close together as kernels as possible—mark the floor around the group.
  - B. Then have them move apart and pop but keep their arms at shoulder length and turn in circles. Have them get as close together as they can without touching. Then mark the floor again. Compare volume, include height!







# Popcorn Pops

(sung to the tune of "The Mulberry Bush")



This is the way the popcorn starts  
the popcorn starts  
the popcorn starts.

This is the way the popcorn starts  
when it is just a seed.

It starts to get all heated up  
all heated up  
all heated up.

It starts to get all heated up  
and its moisture now expands.



The popcorn starts to pop, pop, pop  
pop, pop, pop  
pop, pop, pop

The popcorn starts to pop, pop, pop  
as its moisture blows its top.



Pop, pop, pop, pop, pop, pop, pop  
pop, pop, pop  
pop, pop, pop.

Pop, pop, pop, pop, pop, pop, pop  
pop, pop, pop, pop, pop, pop

pop.



*Adapted from contribution of Lori Wiley*

OCTOBER IS  
**POPCORN**  
POPPIN' MONTH

