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Presenting:

A Corn Through Time

For Information concerning IMPACT II opportunities,
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Grants

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A Corn in Time

Project Description

This curriculum enables students to simulate the process of growing corn, components of corn and its many uses. Students will experience a hands on approach to how important corn is in our society.

This collection of activities engages students in the exploration of Native American philanthropy and pilgrim community living. The students will understand and explore the story of corn as a golden thread running through the agricultural history of North America from Pre-Columbian times to the present. Students are able to utilize online resources and technology to discover the importance of corn.

Students will also learn that the choices made by people - including themselves and their families - are the most important factors in determining whether renewable corn products like ethanol or biodegradable plastics will be used. They will be able to create renewable products from corn by products.

Students

This project is designed for grades 1-5th grades. This project can also be altered to accommodate ESL students as well as ESE students. The activities used in this project focuses on exploration and discovery of history, math and science, with an emphasis on teamwork in a learning environment .

Staff

Mickey Santerre is in her 24th year of teaching , both in private school and public school in Dade County, Florida. She is nationally board certified. She hold's a master's degree in ESE, with an emphasis on varying exceptionalities. She hold's a specialist's degree in science education. She is currently working on her doctorate in science education. Mrs. Santerre has participated in Disseminator grants as well as Adapt- a-grant programs.

Goals and Objectives

1st- 2nd Grade Mathematics

Component	Objective	Sunshine State Standards
Number Sense, Concepts, and Operations	Understands and uses ordinal numbers 1st-100th or more	MA.A.1.1.1
	Determines relative size, order, and position for numbers and their real-world applications less than 1000 using a variety of experiences including manipulatives, counting, and number lines	MA.A.1.1.3
	Uses concrete materials to compare fractions in real-life situations	MA.A.1.1.4
	Knows place value of a designated digit in whole numbers to 1000	MA.A. 2.1.2
	Writes and solves number problems with one operation involving addition or subtraction	MA.A.3.1.2

	Writes number sentences associated with addition and subtraction situations	MA.A.3.1.2
	Makes predictions of quantities of objects (50 or more) and explains the reasoning supporting that prediction	MA.A.4.1.1
	Knows the difference between reasonable and unreasonable estimates	MA.A.4.1.1
Measurement	Communicates measurement concepts using oral and written language	MA.B.1.1.1
	Demonstrates understanding of capacity by selecting appropriate units of measurement	MA.B.1.1.1
	Uses non-standard and indirect methods to compare and order objects according to their length and weight	MA.B.2.1.1.
	Uses customary and metric units to measure, order and compare lengths and weights of objects.	MA.B.2.1.1
	Knows appropriate tools (clocks and calendars) for measuring time (including days, weeks, etc	MA.B.4.1.2
Algebraic Thinking	Describes a given pattern and explains the pattern rule.	Ma.MA.D.1.1.1
	Transfers patterns from one medium to another (for example, pictorial to symbolic	MA.D.1.1.2
	Uses concrete objects, paper and pencil, or mental mathematics to solve real-world equations with one unknown	MA.D.2.1.2
Data Analysis and Probability	Records data using pictures, concrete materials, or tally marks	MA.E.1.1.1
	different parts of a graph (title, labels, intervals, and key)	MA.E.1.1.1
	Identifies whether an event is certain, probable, or impossible	MA.E.2.1.1

1st-2nd Grade Language Art

Component	Objective	Sunshine State Standards
Reading /Literature	Responds to literature through a variety of activities including choral speaking, role playing, Readers' Theatre, plays, writing, art, and music	L.A.A.2.1.1 L.A.C.2.1.1
	Uses literature, pictures, artifacts, technology and audio visual materials as a means ofj providing new experiences and new insights (background knowledge)	L.A.A.2.1.1. L.A.C.2.1.1
	Supports oral and written responses (student restates/paraphrases ideas in own words) with details from narrative or informational text	L.A.A.2.1.2
	Understands and uses instructional vocabulary and the appropriate transition words related for chronological order	L.A.A.2.1.2
	Uses reference research components, pictures graphs, charts, maps and	L.A.A.1.1.2 L.A.E.1.1.1

	captions to compare and contrast	L.A.A.2.1.3
	Uses reference research components, pictures, graphs, charts, maps, and captions to explore cause and effect relationships	L.A.A.2.1.3 L.A.A.2.1.5

1st- 2nd grade Science

Component	objective	Sunshine State Standards
The nature of Science as Inquiry	Select and use simple instruments to enhance observations (e.g. stopwatch, hand lens, or simple microscope	S.C.H.1.1.5
	Record the observations in a data table (chart) from observational and comparative experiments	SC.H.1.1.4
	Select and use standard measuring instruments(e.g. ruler or balance)	SC.H.3.1.1
	Predict which event is more likely or less likely to occur	SC.H.1.1.4
	Identify testable problems statements and construct hypotheses	SC.H.1.1.4
	Identify the changing and non-changing elements in an experiment	SC.H.1.3.5
	Recognize that botanists are scientists who specialize in the study of plants	SC.H.1.1.4
Life Science	Observe, illustrate, and describe the functions of the parts ofj a plant	SC.F.1.1.5
	Measure, chart, and graph seed germination and plant growth under different conditions	SC.F.1.1.3
	Demonstrate a plant's tendency to grow toward the light source	SC.F.1.1.5

1st- 2nd Grade Social Studies

Component	Objective	Sunshine State Standards
Geographic Understanding	Define and give examples of urban, suburban and rural communities	S.S.B.2.1.4
	Use appropriate resources to study an identified topic	S.S.B.3.1.4
Historical Awareness	Recognize that communities change over time	S.S.A.1.1.1 SS.A.1.1.2 SS.A.5.1.4 SS.B.2.1.3
Economic Understanding	Define Economic Terms,i.e. production, goods, services, trade, market distribution, credit, supply, demand	SS.B.2.1.3 SS.D.1.1.1 SS.D.2.1.1 SS.D.21.2 SS.D.2.1.4
	Cite examples of different kinds of resources,i.e. human, natural, and man-made	SS.D.1.1.2

3rd-5th Mathematics

Component	Objective	Sunshine State Standards

Number Sense, Concepts and Operations	Reads, write, and identifies whole numbers, fractions, mixed numbers, and decimals through thousandths	M.A.A.1.2.1
	Compares and orders whole numbers, commonly used fractions, percents, and decimals to thousandths using concrete materials, number lines, drawings, numerals, and symbols	MA.A.1.2.2
	Explains and demonstrates the multiplication of common fractions using concrete materials, drawings, story problems, symbols, and algorithms.	MA.A.3.2.1
	Solves real world problems involving addition, subtraction, multiplication, and division of whole numbers, and addition, subtraction, and multiplication,decimals, fractions, and mixed numbers using an appropriate method	M.A.A.3.2.3
	Write number sentences and word problems using combinations of operations, including powers	MA.A.5.2.1
Measurement	Communicates measurement concepts using oral and written language	MA.B.1.2.1
	Uses schedules, calendars and elapsed time to solve real-world problems	MA.B.1.2.2
	Knows varied units of time that included centuries and seconds	MA.B.1.2.1
	Uses a conversion table to solve real world problems involving measurements	MA.B.4.2.2
	Uses manipulatives to solve problems requiring spatial visualization	MA.C.3.2.1
	Explores Tesselations	MA.C.2.2.2
Algebraic Thinking	Applies the appropriate rule to complete a table or a chart	MA.D.2.2.1
	Understands mathematical relationships in patterns	MA.D.1.2.2
	Uses concrete or pictorial models, drawings, number lines, and graphs to solve equations or inequalities	MA.D.2.2.2

3-5th Language Arts

Component	**Objective**	**Sunshine State Standards**
Reading/ Literature	Responds to literature through a variety of activities including choral speaking, role playing, Readers' Theatre, Plays, Writing (Response Journal) , Art, music and multimedia presentations	**L.A.A.2.2.1** **L.A.C.2.2.1** **L.A.E.2.2.4**
	Uses literature, pictures, artifacts, technology, and audio visual materials as a means ofj providing new experiences and new insights	**L.A.A.2.2.1** **L.A.C.2.2.1** **L.A.E.2.2.4**
	Uses reference research components, pictures, graphs, charts, maps and captions to gain meaning from the text	L.A.E.1.2.2
	Uses reference research components pictures, graphs, charts, maps, and captions to compare and contrast information	L.A.A.2.2.7 L.A.E.1.2.3 L.A.E.2.2.1

Course Outline/Overview

A corn in time can be implemented throughout the school year or during a designated portion of the year. However, an ideal time is during the harvest months of October and November.

Beginning in October:

Send home a letter to parents in order to explain and clarify the unit of A Corn In Time.

Utilize a Bloom's Taxonomy Question Board (see Appendix A) in order for students to place their questions accordingly.

Week 1	Introduction to unit. Divide students into groups. Conduct inquiry into prior knowledge as well as what children would like To learn.
Week 2	Students create time line of corn and its uses by research.
Week 3	Teacher and students read and discuss history and legends of the Corn plant.
Week 4-5	Students discover meaning to new vocabulary words.
	Conduction of a Corn Shucking Contest.
	Read and discuss history of corn husk dolls. Students create Their own corn husk dolls.
	Students will create three sisters Garden.
	Students begin to grow their own corn plants.
Week 6-7	Students continue to observe growth in individual plants and tend To garden.
	Students create " Words to Grow on" Books
	Students will learn to make bread.
	Students will be introduced to various types of group projects concerning corn.
Week 8-9	Students will read literature books in order to understand by-products of corn.
	Teacher and students will create their own biodegradable packing peanuts.
	Students will learn the history of popcorn.
	Students will learn the nutrition in popcorn.
	Students will conduct experiments with popcorn utilizing the Scientific method.
Week 10	Students will complete KWHL Charts .
	Students will enter end of unit journal.
	Students will create their own popcorn or corn product.

Lesson Plans-(Time periods are determined by the teacher)

Week One and Week Two

Day 1

Distribute Corn …The Beginning Question Sheet. (see appendix A). This will help teacher show children how much knowledge they will gain after this unit and it will also be a seque into this week's tasks/ assignments. Go Over the Answers.

Day 2

Assign students to sit in groups of 4-6. This will become their groups of collaboration and learning. Have students, individually, create inquiry questions (See Appendix B).

After the students have created questions that they would like answered through this unit, each student will then share with their groups their questions. The students will then share with whole class and decide under which heading the questions fit under on the Inquiry Board. Students will observe each other's placement of question in proper column of Inquiry Board. This is a peer collaboration on part of children

Day 3-4

The Teacher then distributes the KWHL Charts wherein each group will answer this together. The charts will be placed on bulletin board so that the children can utilize them in order to track their learning and acquisition of knowledge. (See Appendix C)

Day 5

Students write in journal :

1. What was the most interesting to you this week?
2. What was the most challenging to you this week?
3. What will you improve on next Week?
4. What would you like to learn next Week?

Students can then share their journal entries either with another child, small group, or whole class.

Day 6-8

Students will research dates in order to create a class time line of corn and its uses. The students will work collaboratively in finding this information.

Students will utilize technology, reference material and media center to obtain information.(See Appendix E. This is where teacher keeps track of sites the children have gone on.)

Once this task is completed the students will then place each date on a index card and illustrate time, place and usage of corn in color (using art supplies) thus having a pictorial timeline for future reference. Students may share with other students.

The teacher can extract a grade from product and oral presentation

Week Three:

Days 1-3
The teacher will discuss with groups the legend of the Corn and its origin as portrayed through Indian Folklore. **** please read stories beforehand. The age of the children are pertinent to this section of the Unit. The teacher may need to omit some details. (See Appendix F)

Have each group illustrate a portion of the legend told.

Days 4-5
Teacher will introduce the history of Squanto and the Pilgrims either by telling story or by acting out the play A Native American Welcome. (See Appendix F)

Have Students Write a journal entry explaining what did they take away from the understanding of the play.

Weel 4- Week 5

Day 1-2
Have students work in groups to define the Vocabulary words.
(See Appendix G) The students will be utilizing words and their definition in the Booklet" Words to Grow on" Later on.

Day 3-4

The teacher will Discuss the parts of a kernel of corn and the corn plant. Have students label the handouts. As a culmination to this activity, have students illustrate corn plant and label.
(See Appendix H)

Day 5

The students will then take a Farming through History Quiz
(No Test Test) to establish prior knowledge. Go over the answers. (See Appendix I)

Day 6-7
the teacher conduct inquiry and discussion into the farmers' role in the production of corn. (See Appendix J)

OPTIONAL: Have students interview a farmer in the local area. The teacher can also have a guest speaker come to class and discuss the role of a farmer in the community.

Students complete geography assignment of the states that are in the "Corn Belt."
(See Appendix K)

Day 8-9
For younger children teach them " The Farmer in the Web" Song for older students read the stories below. (See Appendix L.)

Read excerpt From Charles Diary (See Appendix M)
Explain to students that children in the earlier years had to create their own fun, while still helping parents.

Have students write a journal entry as if they were farmers from the year that Charles was. Have them take on different characters: Charles, his wife, his children, etc.

The two activities that will be utilized in the next lesson are : Corn Shucking contest and Creation of Corn husk dolls.

Day 10

The teacher will read to students, "The Story of Corn shucking." Explain that as the years went by all children enjoyed the competition of corn shucking.

Have each group write down rules for Corn Shuckingj (Student Created).

Take a vote as to which rules are the best. These rules will be the ones that the competiton will adhere by. Have students create a poster of the rules.

Week 6-Week 7

Day 1-2

Review the rules of Corn Shucking with students.

Materials for Corn Shucking:

2-3 ears of corn for each child. (if you contact a community grocery store, they may be able to donate this!)
1 paper bag for each group.
1 timer
1 camera to capture the moment
1 boiling pot
1 stove or hot plate

Corn Shucking Contest Take Pictures!!!

Have each child have two ears of corn. On the Count of three, have students shuck the corn. The children that win by being the fastest receive a package of Candy Corn.

Place husks in bag separated from hair of corn. The husks will be laid out to dry in the sun so that the dolls can be ready.

Rinse corn off. Cook corn on the stove for 10 minutes. Distribute corn to students. Tell them that all germs that did not come off did in the process of cooking !!! Enjoy the eating session!

Have students read, " Corn Dolls have no Features." Upon Completion of reading activity, students will create their own corn husk dolls.

Read story of Three Sisters
Review Parts of Corn Plant and discuss the role of each part of plant.

Conduct a hands on lab for Kernals of Corn.

Divide Groups into different growing teams.

Team A- will grow plants in classroom temperature

Team B- will grow plants in a bag with raw fish** CAUTION** Fish will produce odor
Team C- will grow plants in a jar
Team D- will grow plants outside in the ground.

Throughout the rest of unit students will observe plant growth every two days. The students will chart plant growth. Once there is evidence of small plant growth, usually 1-2 feet in height, have students place plant in ground at home.

Some plants will grow and some will not. Discuss with children the reason why after observations are completed.

Students will be introduced to various uses of Corn and Corn by products (see Appendix through reading A Pot of Gold.
(you need to go to this website-http://www.ontariocorn.org/classroom.html)

Have students conduct a scavenger hunt for Corn and Corn by products at home. Students will add to this list as the weeks go on.
(go to this website for products that have corn
http://www.ontariocorn.org/classroom/products.html

Week 6 and Week 7

Day 1-3
Have students create ," Words to Grow On Books". The words will be those that are associated with this unit. The students are to define and illustrate. The website demonstrates several types of books for having children make book products.
(http://library.thinkquest.org/J001156/makingbooks/makeown.htm?tqskip1=1&tqtime=0715)

Days 4-5
Explain to explain to students that during the next week they will be making bread, which is a by product of corn as well as doing group products and tasks.

While teacher is working with students in specified groups. Have students complete projects below. (the teacher may want to invite parents to help)

Make A Corn Products Display. Discover the large array of products that are made with corn. Put together a display that shows and organizes these products. Include real items and pictures of the corn products.

Create a Corn Mosaic. Check out the Corn Palace in South Dakota. Dye yellow corn or find some Indian corn. Create a corn mosaic. Or, make your own mini corn palace.

Explore Corn in Your Family. What corn products do you use at your house? Compare your favorite corn food with other class members.

Map the World of Corn. Where is the world's corn produced? Create a North American and World map showing corn production. How is all this corn used? How much is eaten by humans versus animals?

Illustrate A Native American Corn Myth. Read The Forgotten Ear of Corn (Sioux: Arikari) and Father of Indian Corn (Ojibwa). Illustrate one of the stories with your own original drawings.

Complete a corn WebQuest. Use or adapt the following webquest:
Lowry Popcorn Factory http://www.humboldt.k12.nv.us/acartwright/

Days 6-10
http://www.michigan.gov/mda/0,1607,7-125-2961_2971-67074--,00.html
Background:
Nearly all agriculture products must be processed in some way before we can use them. Pork is processed into sausage. Wool is processed into sweaters and its lanolin into hand lotions. Timber is processed into furniture and lumber for construction.

Wheat is processed into bread, rolls, muffins, buns, cereals, crackers, spaghetti, macaroni, cakes, and cookies. Rollers scrape off the outer brain layer and break the endosperm of wheat. It continues through a series of rollers and sifters until it is fine enough for flour, and the bran and germ have been separated. For whole-wheat flour, the bran, and sometimes the germ, remain with the ground endosperm.

After it has been ground into flour, it goes through another stage of processing where it is mixed with other ingredients and baked into bread, other baked goods, or shaped into pasta. Each step of processing adds more value to the final product. For that reason, a product that has been processed is called a value added product. Consumers are willing to pay more for wheat when it is sold as bread then they would if it was sold as wheat kernels.

Step-By-Step Instructions

1. If possible, acquire a handful of wheat kernels from a local farmer or seed dealer. Hand them out so students can feel them and see what they look like. Share background information.
2. Draw a wheat kernel on the chalkboard, or use the worksheet illustration on an overhead projector. Discuss the endosperm, bran, and germ of the kernel. Explain that normally in wheat processing, the bran and germ are removed, and endosperm is ground into flour.
3. Guide the students through the steps of the recipe on the following page to make bread in a bag.
4. While measuring and mixing dough, discuss scientific process with students and have them hypothesize or predict what occurs in the bread making process, (e.g., Why is sugar necessary, why use warm water, what makes the bread rise, etc.).

Related Activities:

1. While you wait for the bread to rise and bake, have students make butter to eat with it. Divide your class into groups of four or five, and provide each group with one half-pint carton of whipping cream (at room temperature), one pint jar with a tight fitting lid, a large spoon, and a small bowl. Have the students pour the whipping cream into the quart jars, screw the lids on tightly, and take turns shaking the jar. When the cream separates noticeably, have the students pour the buttermilk off into a large bowl. Have students transfer the butter to a small bowl with the spoon and add one teaspoonful of salt.
2. Bring in examples of some products in their raw forms and in different stages of their processing (unshelled peanuts/salted peanuts/ peanut butter/peanut butter candy, fresh tomatoes/canned tomatoes/tomato sauce/ ketchup, corn on the cob/canned corn/corn chips). Have students discuss the advantages and disadvantages of buying foods in their raw and processed forms (including discussion of cost, nutritional value, convenience, taste, etc.).

3. Bring examples of fresh and processed foods so students can have a tasting party. Have them decide which food taste better processed and which taste better fresh.

4. Substitute different types of flour in the recipe. While making the bread, examine different dough for similarities and differences. After baking, hold a taste test to determine the best tasting bread.

Week 8

Day 1-3

For Younger Students :

Read Dr. Seuss's book, The Lorax . Distribute Venn Diagram.
(http://teacher.scholastic.com/lessonplans/graphicorg/pdfs/venndiagram.pdf)

Compare the Truffula Trees with corn. Have students rewrite the story using corn instead of Truffula Trees.

Older Students:

Read Bill Peet's Book, Wump World. Discuss how biodegradable products made from a renewable resource like corn may change the story.

Days 4-10

Students will compare biodegradable and non-biodegradable packaging (teacher needs to modify this experiment according to age groups)

http://www.cancentral.com/canc/text/lesson1.htm

Handout can be found at http://www.cancentral.com/canc/text/lesson1.pdf

HANDOUT: All Wrapped Up (PDF 16K)

MATERIALS:

- chalkboard or flipchart
- students' science notebooks for composing definitions of packaging
- students' language arts notebooks for creating poems or recording interviews

Ask students to bring in samples of food/beverage packaging. Supplement with the following:

- aluminum, steel and bimetal cans
- plastic soft drink bottle
- glass jar
- cereal box
- candy bar in wrapper
- packages of candy or cookies
- foam fast-food containers
- examples of "natural" packaging such as bananas, peanuts or hard-boiled eggs
- fruits or vegetables packaged in shrink-wrapped foam tray or paper carton

TEACHER TIP: This lesson establishes concepts upon which other lessons in this series are based. Consider breaking this lesson into two parts (as indicated) if you'd like to include optional activities 6a, 6b and 6c. These optional activities emphasize environmental aspects of packaging addressed in later lessons that focus on the impact of recycling aluminum cans on energy and resources.

The day before you conduct this lesson, ask the students to bring in samples of packages they have at home. You will probably need to supplement their packages with items described in the materials checklist.

TIME:

Preparation

Part One: Collect sample packaging materials, 20 minutes
Part Two: Make copies of handout (PDF 16K)

Think ahead about some ways you could "test" packages for certain properties (see step 7) and have a plan for making those materials available.

Class Time

Part One: 45-60 minutes (steps 1-6), depending on use of optional activities
Part Two: 30-45 minutes (steps 7-9), depending on emphasis; 15-30 minutes for wrap up

BACKGROUND

Packaging is the container or combination of materials used to wrap a product and protect it from damage, theft and/or decay. Packaging can enhance product appeal or create desire for the

product being sold. Containers, labels, boxes, insulation materials and incentives such as coupons and toys are all part of packaging. Packaging is defined as excessive when the wrapping is not necessary for product sale, such as when tomatoes are sold in shrink-wrapped foam containers.

Estimates of packaging waste produced per person per year vary. In 1995, the Environmental Protection Agency estimated that each person generated 550 pounds of container and packaging waste per year, which equals .275 ton per year. This means that packaging waste generated annually by an average classroom of 25 students could weigh as much as an elephant. (The African bull elephant typically weighs between six and eight tons. 25 students X .275 ton/student = 6.875 tons.)

Much of that packaging becomes solid waste. Recycling packaging can reduce waste, conserve natural resources, and prevent air and water pollution that results from manufacturing and disposal. Packaging such as soft drink and milk bottles made from PET (polyethylene terephthalate or #1) and HDPE (high density polyethylene or #2) plastics can be recycled to make other products: fiberfill, insulation, dock pilings, park benches and parking lot carstops. Aluminum cans can be recycled into other aluminum products, such as ice cube trays and lawn furniture. In fact, almost all aluminum products contain some recycled aluminum. Aluminum cans themselves contain an average of 54 percent recycled aluminum.

Today, many manufacturers make packaging from materials that can be recycled. Manufacturers may label material "recyclable" or "made from recycled materials" or "made from post-consumer recycled materials." By purchasing products made of these materials, consumers conserve resources, increase the market demand for recycled materials, create jobs in manufacturing recycled products, save landfill space and reduce pollution.

There are positive and negative environmental impacts associated with each type of packaging material, and manufacturers make trade-offs in design based on some of these considerations. Consumers can also affect the environment negatively or positively by the purchasing decisions they make with regard to product packaging. Some considerations: Is the packaging necessary? Reusable? Recyclable? What advantages or disadvantages does one packaging material have over another? What kinds of resources were used to create the package? Are these resources renewable? Can they be recovered through reuse or recycling?

Solid waste issues are complex; there are no right and wrong answers. However, we can make conscious choices about the packaging we use and the resources we consume. We do this by thinking about the purposes behind product packaging, learning about some of the properties of matter with respect to how well it achieves those purposes, and then making decisions about purchase with regard to the information we have learned.

PROCEDURE

Part One: Classifying Types of Packaging

1. Group students into teams of four and have them share the packaging samples they've collected. (Supplement with the materials you've collected.) Ask students to think about how the foods/beverages inside the packages were "wrapped." Write the word "packaging" on the board and ask students to help you develop a definition. Have students discuss which definition is best. Then leave this discussion open by asking students to copy the definition they like best into their science notebooks. (They will re-evaluate the definition at lesson's end.)

2. Tell students that today they're going to explore packaging materials. Ask students why they think there are so many different kinds of packaging. (They may suggest the following about the purposes for packaging: reduces spoilage or breakage, provides convenient individual servings, keeps products fresh, keeps food warm or cold, displays the product attractively, prevents contamination, keeps the "fizz" in carbonated beverages, or helps stack products in an organized way for display or shipping.)

3. Ask students to work with their teams to sort the packages in any way that makes sense to them. Discuss their classifications and the reasons for them.

4. Ask students to think about what each packaging material is made of (what resources were used). Explain resources that "grow back" are called renewable and those that don't are called "nonrenewable." (You could let students know that some materials that can grow back, such as oil, are considered nonrenewable because it takes so many years to replace them.) Have students give examples of renewable and nonrenewable resources, then have them sort the packaging again into "renewable and nonrenewable" categories. Discuss their choices.

5. Hold up examples of "natural" packaging and show how nature provides a "package" for its food resources. Ask students what happens to natural packaging after food is eaten. Tell students that nature's food will decay (rot) and renew the soil to grow new food; when this happens, we call the material "compost." Tell students some manufactured packaging (such as paper) can also decay and return to the soil. These materials are called "biodegradable." However, when a material goes to a landfill, it doesn't matter if it is biodegradable or not because, in the absence of air, virtually nothing decays in a landfill. You may want to have students explore the idea of biodegradability by having them bury a few items to discover how they change, or by visiting a landfill to discover how little garbage changes once it is buried.

6. Ask students to think about the packages and speculate which materials are biodegradable and which are not. Can they once more sort the packaging, this time into biodegradable and nonbiodegradable categories? Ask students to discuss their choices.

Optional

6a. What happens to packaging after we're finished with it? (throw it away or recycle it) Ask students where packaging goes. (wastebasket, garbage can, dumpster, landfill, incinerator, recycling bin) Ask them what happens to resources used to make packaging when the packaging is thrown away. (they're also thrown away) What does that mean for renewable resources? What about nonrenewable resources? Talk about how nature provides a limited number of resources; when they're thrown away by burying or burning them, they can't be used again. You can also explain that other resources are used to make packaging, such as water and energy. When we throw away packaging, we've also "thrown away" the energy used to make them.

6b. Have students name reasons people would throw away resources. (don't know that resources are limited, trade-offs such as time or convenience) How can we solve the problem of throwing away resources? (use again, buy products with less packaging, recycle)

6c. Ask students which packaging materials can be recycled. Build on what they already know about recycling, such as, when we give resources back to recycling companies they make new items and the resources are used again rather than thrown away. Are there ways to know which packaging materials can be recycled?

Part Two: Packaging Properties

7. Explain to students that all matter has properties. Properties can help us identify objects and give us ideas about the object's use. For example, rubber floats, so rubber would make a suitable

life raft. It wouldn't make a good anchor. Have students choose five types of packaging to examine in terms of their properties.

Take suggestions about which criteria to evaluate, such as strength, ability to hold food, ability to hold beverage, whether it's recyclable, how well it fits on a grocery shelf (stackability), how little or how much space it takes to ship from manufacturer to retailer (ease of transport), or how heavy or light it is. Ask how they would test these properties. (e.g., strength could be tested by seeing how many books the package can hold, or whether it could be cut with scissors)

8. If they were manufacturers, how would they make decisions about the packages they'd use? Pass out the student worksheet ("All Wrapped Up" chart). Do one example with the class, then have the teams work on the other four.

9. Ask the class to think about all they've learned about packaging. Ask them to review the definitions they developed. Which definition do they now think is best? Or would they revise it? Have students copy or revise the definition they now think is best.

WRAP UP

(Students can choose one of the following activities.)

1. Draw three examples of natural packaging, three examples of manufactured packaging that come from renewable resources, and three that come from nonrenewable resources. Or, cut pictures from magazines to make a poster featuring these types of packaging.

2. An acrostic is a "poem" in which each line starts with the letter in a particular word. All the lines in the poem say something about the poem's subject. Make an acrostic using one of the following words: packaging, resources or compost. For an extra challenge, try these: biodegradable, nonbiodegradable, renewable resource or nonrenewable resource. Example for the word "compost:"

> **C**herry pits
> **O**range peels
> **M**ashed egg shells
> **P**ut them in the earth
> **O**n a pile in your garden
> **S**oon they'll decay and
> **T**urn into new soil.

3. Choose a package whose properties you've explored on the worksheet "All Wrapped Up." How could the package be redesigned to improve the "pros" or reduce the "cons?"

EXTENSIONS

---

1. Ask your family to help you investigate the kind of packaging it buys by counting the packages in your own pantry or cupboard. Count the number of products in plastic-wrapped packages, boxes, paper, cans, and bottles or jars. Make a bar graph showing types of packaging and how many of each type. Discuss what you find with your family. What type of packaging is most common in your home?

Alternate (advanced) activity: Visit the supermarket and count the number of aisles devoted to each type of packaged product. Compare the relative use of packaging types. Manufacturers consider shipping, storage, and display space when they decide how to package products. Can you guess why some package types are more common than others? Are there any examples of

unnecessary packaging? If so, how could manufacturers use less packaging and fewer resources? Interview a grocery store manager and ask how store managers decide which packages to stock and sell.

2. Based on what you've learned about packaging and renewable/nonrenewable resources, will you or your family make any different choices the next time you go grocery shopping? Give some examples of what you'll do differently.

REFERENCES

1. Parts of this lesson were adapted from the California Integrated Waste Management Board's curriculum **Closing the Loop**. For more information about this curriculum, call 916/255-2385.

2. Parts of this lesson were adapted from "Package (Re)Package" and "Plastics," 4Rs Project: A Solid Waste Management Curriculum for Florida Schools, 1990, pages 73, 74 and 83.

Have Children create, after completing experiment, mini- scientific method boards

Students will make their own biodegradable plastic and biodegradable peanut packaging.

Week 9:
Day 1

Students will take a no test test on popcorn (in other words just for fun and trivia)
Teachers will read and discuss history of popcorn.

Teacher will discuss popcorn nutrition with students. Students will compare popcorn's nutrition with that of other popular snacks.

Popcorn Science Optional Experiments

Brief Description

Five simple experiments demonstrate what makes popcorn pop.

Objectives

Students will

- hypothesize about the result of five experiments.
- summarize the results of the experiments in a written conclusion.

Keywords

corn, popcorn, percent, hypothesis, inquiry, science, pressure, experiment, steam, temperature, conclusion

Materials Needed

- popcorn kernels for popping
- pan with cover *or* popcorn popper (traditional) *or* or hot-air popper
- oil (not needed if you use a hot-air popper)
- stove (not needed if you use a hot-air popper)
- test tube (optional)
- foil (optional)
- candle (optional)
- matches (optional)
- tongs (optional)
- needle (for teacher only)

Lesson Plan

Popcorn pops because each kernel has a tiny bit of water inside it. When the kernels are heated, the water inside heats up to the point where it exerts enough pressure to burst the kernel open. The soft material inside puffs up as it explodes.

You can present to students a simple experiment to prove that moisture is inside popcorn kernels. Use a test tube for this experiment. Place one kernel of popcorn in the bottom of the tube. Cover the tube with aluminum foil and poke a few small holes in the foil. Use tongs to hold the test tube as you hold it over a lighted candle. The students should be able to see steam escape. Where is that steam coming from? *(The moisture inside the kernel turns to steam.)* If you hold the popcorn over the candle for a few minutes, it should heat up enough to pop. *(The pressure builds up inside the kernel until it bursts.)*

The knowledge that water is inside each kernel of corn might lead students to wonder about some things… Introduce the ideas below and challenge students to hypothesize what will happen and why. *Have students record their hypotheses before completing each experiment. After each experiment, have students record whether they hypothesized correctly or not. If their hypothesis was incorrect, have them record what they learned.*

Note: In each case below, students count out 100 popcorn kernels. Using 100 kernels enables older students to quickly and easily convert the number of kernels that pop or don't pop into percents.

Experiment 1: The Control Experiment.
Before students perform any experiments, have them first set up a control: Count out 100 popcorn kernels. Heat oil until it begins to smoke. Add the popcorn and let it pop. When the popping stops, count how many of the 100 seeds popped and how many did not pop.

Experiment 2: What will happen if there is more water inside the popcorn kernels?
Count 100 popcorn kernels from the same bag used in the control experiment. Soak the kernels in water overnight. The next day, drain off the water and pat the kernels dry. Have students hypothesize what might happen when the kernels are heated and why. Follow the same popping procedure used in the control experiment. When the popcorn is done, count how many of the 100 seeds popped and how many did not pop. Did the kernels with more water pop bigger or faster or better? *(Or was the popcorn too saturated to pop?)*

Experiment 3: What if the popcorn is heated at a lower temperature?
Count 100 popcorn kernels from the same bag used in the control experiment. Heat the oil in the popper to a temperature of *only 250 degrees F.* Have students hypothesize what might happen when the kernels are heated and why. When the popcorn is done, count how many of the 100 seeds popped and how many did not pop. Did the lower temperature pop the kernels bigger or faster or better? *(Or did the lower temperature fail to heat the water in the popcorn kernels enough to pop them?)*

Experiment 4: What if you warm the popcorn kernels before popping them?
Preheat an oven to 200 degrees F. Spread 100 popcorn kernels on a baking sheet and preheat them for 90 minutes. Remove the kernels from the oven and allow them to cool. (Alternative: Leave the popcorn sitting on a very sunny shelf for a few days.) Have students hypothesize what might happen when the kernels are heated and why. Follow the same popping procedure used in the control experiment. When the popcorn is done, count how many of the 100 seeds popped and how many did not pop. Did the preheated kernels pop bigger or faster or better? *(Or did preheating dry up the tiny bit of water inside each kernel, so it would not pop.)*

Experiment 5: What if you poke holes in the popcorn kernels? Will that help the heat get inside and pop the corn more quickly?
If you are doing this experiment with younger students, you might want to puncture the kernels yourself. Use a needle to make several tiny punctures in the outer covering of a handful of popcorn kernels. (Puncturing 100 kernels could take some time; you might prepare the kernels ahead of time or use 10 kernels instead of 100.) Have students hypothesize what might happen when the kernels pop and why. Follow the same popping procedure used in the control experiment. Did the punctured kernels pop bigger or faster or better? *(Or did the holes let more steam escape and prevent pressure from building up inside the kernels?)*

Proof Positive?
Popcorn production is an exacting process. The amount of water inside a kernel of popcorn must be quite precise, as was proven in some of the experiments above. Perhaps students will come up with additional experiments to test other popping hypotheses?

Assessment

Check students' hypotheses and/or explanations of what they learned from each experiment. You might have students write a conclusion summarizing what they learned from the

experiments.

Lesson Plan Source

Education World

Submitted By

Gary Hopkins

Math Extension:

Students survey 20 people of their age group. Use Buttered popcorn, salted popcorn, unsalted tasting .Students will graph the results of test. (test at least 3 different microwave popcorns, of homemade and one store bought.)

Another experiment is to test the volume of popcorn

Objective:
Students learn to measure volume, record/graph findings and draw conclusions based on findings.

Method:
Small group study.

Content:
Divide the class into small groups. Provide each group with a large measuring cup or marked beaker and several brands and/or varieties of popcorn (microwave or bulk popcorn for the popper).

If using bulk popcorn, students can begin by recording the volume of kernels before popping (this number should be the same for all brands/varieties). Each group then plots this initial number on a graph. (One axis indicating brand names, the other axis showing volume.) For microwave popcorn, students will record only popped volume.

Then, let the popping begin! To save time, consider having each group pop one brand/variety and then share results with other groups.

Students measure the popped volume of each brand/variety and plot these figures on the graph.

Follow-Up:
Ask students to identify possible reasons for differences in popping volume.

Students will take end of unit assessment test (optional)

Have students respond to end of unit journal.

Refer back to KWHL Chart. Have students complete the column, What did I learn?

Have students as groups create a new popcorn, complete with container, name and taste.

Upon completion students will share their new product.

Refer to this website for a detailed lesson - suggestion is to modify lesson for elementary school children.

http://www.popcorn.org/client_files/teachtools/business1.pdf

Appendices

Name:_____

Date:_____

Corn…The Beginning
Question Sheet

(Adapted from http://www.kycorn.org/corneducation/cornclass/cornintheclassroom.html)

1. Where was corn first grown?_____

2. What did the Native Americans call corn?_____

3. List some ways the Native Americans used corn._____
_____
_____

4. What corn cooked with beans is called today._____

5. How did the Native Americans celebrate corn?_____
_____

6. What did Chief Massosoit teach the Pilgrims about corn?_____
_____

7. What other uses for corn did the Pilgrims learn?_____
_____

8. How did corn pudding come to be?_____
_____

9. How did "Johnny Cakes" get their name?_____

10. List ways you use corn today._____
_____
_____

(Appendix A)

Corn…..The beginning
Question sheet Answer Key

1. **Where was corn first grown?** Mexico, 7,000 year ago.
2. **What did the Native Americans call corn**? Maize
3. **List some ways Native Americans used corn.** They ate it, dried it, used seed for planting, ground into meal, popped, cooked with beans, stored it, burned it for heat, toys, feed livestock.
4. **Corn cooked with beans is called succotash today.**
5. **How did the Native Americans celebrate corn?** They prayed to the Corn Gods, had festivals at planting and harvest times, chanted, made music, danced Corn dances.
6. **What did Chief Massosoit teach the Pilgrims about corn?** He taught them to stuff their mattresses with the husks, burn the cobs for fuel, make toys from husks, feed to livestock, how to plant.
7. **What other uses for corn did the pilgrims learn?** See Above
8. **How did corn pudding come to be?** The Pilgrims couldn't make their hasty pudding which was made from wheat because they had trouble growing it, so they made it with corn flour and called it corn pudding!
9. **How did "Johnny Cakes" get their name?** Johnny cakes are another name for corn bread. Since the Pilgrims were traveling and cornbread was easy to carry on their journey, they got and name "journey cakes." Over the years the name was shortened.
10. **List ways you use corn today.** Decorations, eating, popping, corn oil, plastics, etc

Appendix B

Blooms Taxonomy Wall Chart

Dalton, J. & Smith, D. (1986) “Extending Children’s Special Abilities – Strategies for primary classrooms” pp36-7

Knowledge

Useful Verbs	Sample Question Stems	Potential activities and products
Tell list describe relate locate write find state name	What happened after...? How many...? Who was it that...? Can you name the...? Describe what happened at...? Who spoke to...? Can you tell why...? Find the meaning of...? What is...? Which is true or false...?	Make a list of the main events.. Make a timeline of events. Make a facts chart. Write a list of any pieces of information you can remember. List all the .... in the story. Make a chart showing... Make an acrostic. Recite a poem.

Comprehension

explain interpret outline discuss distinguish predict restate translate compare describe	Can you write in your own words...? Can you write a brief outline...? What do you think could of happened next...? Who do you think...? What was the main idea...? Who was the key character...? Can you distinguish between...? What differences exist between...? Can you provide an example of what you mean...?	Cut out or draw pictures to show a particular event. Illustrate what you think the main idea was. Make a cartoon strip showing the sequence of events. Write and perform a play based on the story. Retell the story in your words. Paint a picture of some aspect you like. Write a summary report of an event. Prepare a flow chart to illustrate the sequence of events. Make a coloring book.

Application

Useful Verbs	Sample Question Stems	Potential activities and products
solve	Do you know another	Construct a model to demonstrate how it

show use illustrate construct complete examine classify	instance where...? Could this have happened in...? Can you group by characteristics such as...? What factors would you change if...? Can you apply the method used to some experience of your own...? What questions would you ask of...? From the information given, can you develop a set of instructions about...? Would this information be useful if you had a ...?	will work. Make a diorama to illustrate an important event. Make a scrapbook about the areas of study. Make a paper-mache map to include relevant information about an event. Take a collection of photographs to demonstrate a particular point. Make up a puzzle game suing the ideas from the study area. Make a clay model of an item in the material. Design a market strategy for your product using a known strategy as a model. Dress a doll in national costume. Paint a mural using the same materials. Write a textbook about... for others.

Analysis

Useful Verbs	Sample Question Stems	Potential activities and products
analyse distinguish examine compare contrast investigate categorise identify explain separate advertise	Which events could have happened...? I ... happened, what might the ending have been? How was this similar to...? What was the underlying theme of...? What do you see as other possible outcomes? Why did ... changes occur? Can you compare your ... with that presented in...? Can you explain what must have happened when...? How is ... similar to ...? What are some of the problems of...? Can you distinguish between...? What were some of the motives behind...? What was the turning point in the game? What was the problem with...?	Design a questionnaire to gather information. Write a commercial to sell a new product. Conduct an investigation to produce information to support a view. Make a flow chart to show the critical stages. Construct a graph to illustrate selected information. Make a jigsaw puzzle. Make a family tree showing relationships. Put on a play about the study area. Write a biography of the study person. Prepare a report about the area of study. Arrange a party. Make all the arrangements and record the steps needed. Review a work of art in terms of

Synthesis

Useful	Sample Question Stems	Potential activities and products

Verbs		
create invent compose predict plan construct design imagine propose devise formulate	Can you design a ... to ...? Why not compose a song about...? Can you see a possible solution to...? If you had access to all resources how would you deal with...? Why don't you devise your own way to deal with...? What would happen if...? How many ways can you...? Can you create new and unusual uses for...? Can you write a new recipe for a tasty dish? can you develop a proposal which would...	Invent a machine to do a specific task. Design a building to house your study. Create a new product. Give it a name and plan a marketing campaign. Write about your feelings in relation to... Write a TV show, play, puppet show, role play, song or pantomime about...? Design a record, book, or magazine cover for...? Make up a new language code and write material suing it. Sell an idea. Devise a way to... Compose a rhythm or put new words to a known melody.

Evaluation

Useful Verbs	Sample Question Stems	Potential activities and products
Judge select choose decide justify debate verify argue recommend assess discuss rate prioritise determine	Is there a better solution to... Judge the value of... Can you defend your position about...? Do you think ... is a good or a bad thing? How would you have handled...? What changes to ... would you recommend? Do you believe? Are you a ... person? How would you feel if...? How effective are...? What do you think about...?	Prepare a list of criteria to judge a ... show. Indicate priority and ratings. Conduct a debate about an issue of special interest. Make a booklet about 5 rules you see as important. Convince others. Form a panel to discuss views, eg "Learning at School." Write a letter to ... advising on changes needed at... Write a half yearly report. Prepare a case to present your view about...

Blooms Taxonomy Chart

Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
How many types of popcorn are there?	Who do you think discovered popcorn?	Why did changes of popcorn packages occur?			

These are just examples of questions. After you teach the children what each dimension is and what questions are to go in each dimension, the chart becomes easier. Remember that the questions are student driven. As a manager of their thinking, you defer judgement as to where each question should go. The students will suggest to each other the right dimension, if there is question as to location of their created inquiry.

Name_____ Appendix C

Date_____

K	W	H	L
What I know	What I Want to Know	How will I find my answers?	What I learned

Appendix D

Name:_____
Date:_____

Corn Timeline

(Adapted from http://www.kycorn.org/corneducation/cornclass/corninthecclassroom.html)

There were many important historical events that centered around corn. Put the following list in chronological order. Then use the timeline provided to mark each of the given events.

_____1801	Underground railroad transports slaves to freedom;they find corn along the way to survive.
_____1492	Columbus encounters “Indians”cultivating corn as a crop
_____1620	Pilgrims learn to plant corn kernels with herring for a healthy crop of “Indian Corn.”
_____1400	Native American tribes plant corn for a variety of uses.
_____1750	Cornhusk-stuffed mattresses are used in colonial homes.
_____1830	City dwellers begin using Christmas trees decorated with Cornhusk angels.
_____1608	Powhatan’s people save Captain Smith’s starving people with gifts of corn.
_____1966	First Kwanzaa celebration featuring fruits of the harvest Such as corn.
_____1621	Popcorn, as another corn dish, is served at the first Thanksgiving.
_____1540	Coronado sees Pueblo Indians Raising corn near the Rio Grande River.
_____1804	Lewis and Clark set up a corn mill in the Dakota Territory.
_____1825	Erie Canal opens for shipping corn east.
_____1840	Pioneer wagon trains head west on the Oregon Trail carrying “ Journeycakes.”
_____1800	Settlers eat corn in all 3 daily meals.
_____1843	Cornhusk baskets are woven for daily us

Appendix D

Corn Timeline Answer Key

Corn Timeline

(Adapted from http://www.kycorn.org/corneducation/cornclass/cornintheclassroom.html)

There were many important historical events that centered around corn. Put the following list in chronological order. Then use the timeline provided to mark each of the given events.

___9_____1801	Underground railroad transports slaves to freedom;they find corn along the way to survive.
___2_ ___1492	Columbus encounters "Indians"cultivating corn as a crop
___5_____1620	Pilgrims learn to plant corn kernels with herring for a health crop of "Indian Corn."
___1____ 1400	Native American tribes plant corn for a variety of uses.
____7___ 1750	Cornhusk-stuffed mattresses are used in colonial homes.
___12___1830	City dwellers begin using Christmas trees decorated with Cornhusk angels.
___4____1608	Powhatan's people save Captain Smith's starving people with gifts of corn.
___15___1966	First Kwanzaa celebration featuring fruits of the harvest Such as corn.
____6___1621	Popcorn, as another corn dish, is served at the first Thanksgiving.
_____3___1540	Coronado sees Pueblo Indians Raising corn near the Rio Grande River.
____10__1804	Lewis and Clark set up a corn mill in the Dakota Territory.
____11___1825	Erie Canal opens for shipping corn east.
____13___1840	Pioneer wagon trains head west on the Oregon Trail carrying " Journeycakes."
_____8__1800	Settlers eat corn in all 3 daily meals.
____14_ 1843	Cornhusk baskets are woven for daily use.

Appendix E

Name:_____ **Date:**_____

Internet Field Trip

Trip Log

GRADE _____

UNIT TITLE _____

I am studying _____in my science class.

WHAT I ALREADY KNOW ABOUT THIS SUBJECT

_____

_____

OTHER THINGS I WANT TO KNOW ABOUT THIS SUBJECT

_____

_____

_____

_____

_____

_____

WEB SITE

I visited this Web site:

_____

WHAT I LEARNED ON MY INTERNET FIELD TRIP

1. _____

   _____

2. _____

   _____

NEW WORDS

I learned these new words on my Internet Field Trip. Here are the words and their meanings.

WORD	MEANING

WHAT I SAW ON MY INTERNET FIELD TRIP

This is a drawing of _____.

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Appendix F
Deborah Adams

BellaOnline's Native American Editor
Content copyright © 2001-2005 by Julie Spotted Eagle Horse Cooper. All rights reserved.
Legend of the Corn, Lakota

THE GIFT OF CORN

Alone in a deep forest, far from the village of his people, lived a hermit. His tent was made of buffalo skins, and his robe was made of deerskin. Far from the haunts of any human being, this old hermit was content to spend his many years.
All day long, he wandered through the forest, studying the different plants and collecting roots. The roots he used as food and as medicine. At long intervals some warrior would arrive at his tent and get medicinal roots from him for the tribe. The old hermit's medicine was considered far superior to all others.

One day, after a long ramble in the woods, the hermit came home so tired that, immediately after eating, he lay down on his bed. Just as he was dozing off to sleep, he felt something rub against his feet. Awakening with a start, he noticed a dark object. It extended an arm toward him. In its hand was a flint-pointed arrow.

"This must be a spirit," thought the hermit, "for there is no human being here but me."

A voice then said, "Hermit, I have come to invite you to my home." "I will come," the old hermit replied. So he arose, wrapped his robe around him, and started toward the voice.

Outside his door, he looked around, but he could see no sign of the dark object. "Whatever you are, or wherever you be," said the hermit, "wait for me. I do not know where to go to find your house." He received no answer, nor did he hear any sound of someone walking through the brush. Reentering his tent, he lay down and was soon fast asleep.

The next night he again heard the voice say, "Hermit, I have come to invite you to my home." The hermit walked out of his tent to find the person with that voice, but again he found no one. This time he was angry, because he thought that someone was making sport of him. He determined to find out who was disturbing his night's rest.

The next evening he cut a hole in the tent large enough to stick an arrow through. Then he stood by the door, watching. Soon the dark object came, stopped outside the door, and said, "Grandfather, I came to--" But he never finished his sentence. The old hermit had shot his arrow. He heard it strike something that produced a sound as though he had shot into a sack of pebbles.

Early the next morning the hermit went out and looked at the spot near where he thought his arrow had struck some object.

There on the ground lay a little heap of corn, and from this little heap a small line of corn lay scattered along a path. The old hermit followed this path into the woods. When he reached a small mound, the trail ended. At its end was a large circle from which the grass had been scraped off clean.

"The corn trail stops at the edge of this circle," the old man said to himself. "So this must be the home of whatever invited me."

He took his big bone axe and knife and proceeded to dig down into the centre of the circle. When he got as far down as he could reach, he came to a sack of dried meat. Next, he found a sack of turnips, then a sack of dried cherries, and then a sack of corn.

Last of all was another sack, empty except for one cup of corn. In the other corner was a

hole where the hermit's arrow had pierced the sack. From this hole the corn had been scattered along the trail, which had guided the old man to the hiding place.

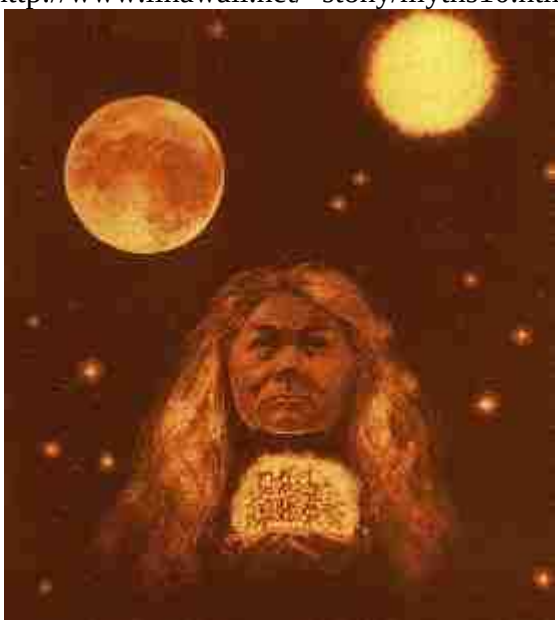
From this experience the hermit taught his people how to keep their provisions while they were traveling. "Dig a pit," he explained to them, "put your provisions into it, and cover them with earth."

By this method, the Sioux used to keep provisions all summer. When fall came, they would return to their hiding place. When they opened it, they would find all their provisions as fresh as they were the day they had been placed there.

The people thanked the old hermit for his discovery of this method of preserving their food. And they thanked him for his discovery of corn, the first they had seen. It became one of the most important foods the Indians kne

A Lore For October

http://www.ilhawaii.net/~stony/myths10.html



Title Unknown by John Kahionhes FaddenAni-Yunwiya, (Cherokee)

The month of October reminds us of the Harvest, so this month we will tell you one of the Cherokee legends of "The Coming of Corn"

Long ago, when the world was new, an old woman lived with her grandson in the shadow of the big mountain. They lived happily together unti the boy was seven years old. Then his Grandmother gave him his first bow and arrow. He went out to hunt for game and brought back a small bird.
"AH," said the Grandmother, "You are going to be a great hunter. We must have a feast." She went out to the small storehouse behind their cabin. She came back with dried corn in her basket and made a fine tasting soup with the bird and the corn. From that point on the

boy hunted. Each day he brought back something and each day the Grandmother took some corn from the storage house to make soup. One day though, the boy peeked into the storehouse. It was empty! But that evening, when he returned with game to cook, she went out again and brought back a basket filled with dry corn.

"This is strange," the boy said to himself. "I must find out what is happening."
The next day, when he brought back his game, he waited until his Grandmother had gone out for her basket of corn, and followed her. He watched her go into the storehouse with the empty basket. He looked through a crack between the logs and saw a very strange thing. The storehouse was empty, but his Grandmother was leaning over the basket. She rubbed her hands along the sides of her body, and dried corn poured out to fill the basket. Now the boy grew afraid. Perhaps she was a witch! He crept back to the house to wait. When his Grandmother returned, though, she saw the look on his face.
"Grandson," she said, "you followed me to the shed and saw what I did there."
"Yes, Grandmother," the boy answered.
The old woman shook her head sadly. "Grandson," she said,'then I must get ready to leave you. Now you know my secret I can no longer live with you as I did before. Before the sun rises tomorrow I shall be dead. You must do as I tell you, and you will be able to feed yourself and the people when I have gone."

The old woman looked very weary and the boy started to move towards her, but she motioned him away. "You cannot help now, Grandson. Simply do as I tell you. When I have died, clear away a patch of ground on the south side of our lodge, that place where the sun shines longest and brightest. The earth there must be made completly bare. Drag my body over that ground seven times and then bury me in that earth. Keep the ground clear. If you do as I say, you shall see me again and you will be able to feed the people."
Then the old woman grew silent and closed her eyes. Before the morning came, she was dead.
Her grandson did as he was told. He cleared away the space at the southside of the cabin. It was hard work, for there were trees and tangled vines, but at last the earth was bare. He dragged his Grandmother's body, and wherever a drop of her blood fell, a small plant grew up. He kept the ground clear around the small plants, and as they grew taller it seemed he could hear his Grandmother's voice whispering in the leaves. Time passed and the plants grew very tall, as tall as a person, and the long tassels at the top of each plant reminded the boy of his Grandmother's long hair.

At last, ears of corn formed on each plant and his Grandmother's promise had come true. Now, though she had gone from the earth as she had once been, she would be with the people forever as the corn plant, to feed them.

The Origin of Game and of Corn

Cherokee

Native American Lore

Long ages ago, soon after the world was made, Kenati, a Cherokee Indian hunter and his wife Selu, lived on Looking-glass Mountain in North Carolina. They had a little son named Good Boy.

Whenever Kenati hunted in the woods, he always brought back all the game his family needed. His wife cut up the meat and washed it in the river not far from their lodge. Good Boy played near the river almost every day. One day his parents thought they heard laughing in the bushes, as if there were two children playing there.

That evening Kenati asked his son, "Who were you playing with today down by the river?"

"He is a boy who comes out of the water and calls himself my elder brother," replied Good Boy.

When Selu washed game in the river again, the parents thought the water boy must grow from the animal blood. She never saw the water boy, because as she approached he disappeared.

One evening, Kenati said to his son, "Tomorrow when your playmate comes out of the water, wrestle with him and hold him down and call me, so we can come and see him." Good Boy promised to do as his father asked.

Next day a wrestling match took place between the two boys. Kenati and Selu were not far away, and at the first call from their son, they ran to see the boy from the river. Compared with Good boy, the other one looked wild.

"Let me go! Let me go!" he cried out. Good Boy held him down until his parents arrived. They took the water boy home with them.

The family kept the wild one in the house form some time, trying to tame him. But he was always disagreeable in his disposition and tried to lead Good Boy into mischief. The family discovered that wild one possessed some magic powers, so they decided to keep him. They named him Wild Boy.

Always Kenati came home from hunting with a large fat deer on his back. Always he was lucky with game. One day Wild Boy said to his brother, "I wonder where our father finds so much game? Let's follow him next time."

In a few days, Kenati took his bow and arrows and went hunting. Shortly afterward the boys followed. Staying out of sight, they saw their father go into a swamp where some strong reeds were growing. With these, hunters usually made arrow shafts. Wild Boy changed himself into a puff of bird's down. A little wind carried him up and onto Kenati's shoulder. There he watched where Kenati went and what he did. The father was not aware of Wild Boy's presence on his shoulder as he gathered reeds and fitted them with feathers.

"I wonder what those things are for?" thought Wild Boy to himself. Kenati came out of the swamp and went on his way into the woods. The wind carried the down off Kenati's shoulders and soon Wild Boy was his normal self again. Still keeping out of sight of their father, the two brothers followed him into the mountains.

When Kenati reached a certain place, he stopped and lifted a large rock. At once, a large buck deer came running out of the hole. Kenati shot it and lifted it upon his back, starting home with his prize.

"Oho!" said the boys. "He keeps the wild animals shut up inside a cave until he needs them. He then kills the game with those things he made in the swamp." They hurried to reach home before their father arrived with his heavy load.

The very next day, the boys wanted to see if they could do as their father had done. First, they went to the swamp and made some arrows. When they came to the big rock, they lifted the cover and instantly a deer ran out, but they forgot to replace the cover.

As they made ready to shoot the deer, another deer came out of the hole, then another, and another--the boys became so confused they forgot what to do next.

Long ago, a deer's tail stuck straight out from his body. When Wild Boy struck at a deer's tail with an arrow, the tail stood straight up. The boys thought it great fun. As another deer ran by, Good Boy swung at it with an arrow so hard that the tail curled over the deer's back. Since that time most deers' tails curl at the end.

All of the deer in the cave came out and disappeared into the forest. Following them were raccoons, rabbits, and all the other four-footed animals. Last came turkeys, partridges, pigeons, and other winged creatures. They darkened the air as they flew away. Such a noise arose that Kenati heard it at his lodge. To himself he said, "I must go to see what trouble my boys have stirred up."

Kenati went to the mountain, to the place of the large rock. There stood the two boys, but all the animals and birds were gone. Kenati was furious with them, but said nothing. He went into the cave and kicked off the covers of four large jars that stood in the back corner.

Out of the jars swarmed bedbugs, lice, and gnats that attached the two boys. they screamed from terror as they tried to beat off the insects. Bitten and stung, the boys dropped to the ground from exhaustion.

When Kenati thought they had learned their lesson, he brushed away the pests. "Now you rascals," he scolded them. "You have always had plenty to eat without working for it. When we needed game, all I had to do was to come up here and take home just what we needed. Now you have let all of the game escape. From now on when you are hungry, you will have to hunt throughout the woods and mountains and then not find enough game."

The two boys went home and asked their mother for something to eat.

"There is no more meat," said Selu. "I will go to the storehouse and try to find something."

She took her basket and went to the two-story provision house set upon poles high above the ground, out of reach of most animals.

Every day before the evening meal, Selu climbed the ladder to the one opening. She always came back with her basket full of beans and corn.

"Let's go and see where she gets the corn and beans," urged Wild Boy to his brother. They followed Selu and climbed up in back of the storehouse. They removed a piece of mud from between the logs and looked through the crack. There stood Selu in the middle of the room with her basket on the floor. When she rubbed her stomach, the basket was half-filled with corn. When she rubbed her legs, the basket was full to the top with beans. Wild Boy said, "Our mother is a witch. Maybe her food will poison us."

When Selu came back to the house, she seemed to know what the boys were thinking. "You think I am a witch?"

"Yes, we think you are a witch," Wild Boy replied.

"When I die, I want you boys to clear a large piece of ground in front of our lodge. Then drag all of my clothes seven times around the inside of the circle. If you stay up all night and watch, next morning you will be rewarded with plenty of corn."

Soon thereafter Selu became ill and died suddenly. The boys set to work clearing the ground as she had said. But instead of the whole piece of ground in front of the lodge, they only cleared seven small spots. This is why corn does not grow everywhere in the world.

Instead of dragging Selu's clothing seven times, they only went around the circle twice, outside and inside the circle. The brothers watched all night, and in the morning there were fully grown beans and corn, but only in the seven small spots.

Kenati came home from a long hunting trip. He looked for Selu but could not find her. When the boys came home, he asked them, "Where is your mother?"

"She turned into a witch and then she died," they reported. Kenati was saddened by the news.

"I cannot stay here with you any longer. I will go and live with the Wolf people," he said.

He started on his journey. Wild Boy changed himself into a tuft of bird's down and settled upon Kenati's shoulder to learn where he was going.

When Kenati reached the settlement of the Wolf people, they were having a council in their town-house. He went in and sat down with the tuft upon his shoulder. Wolf Chief asked Kenati what was his business.

"At home I have two bad boys. In seven days, I want you to go and play a game of ball with them."

The Wolf people knew that Kenati wanted them to punish the boys and promised to go in seven days. At that moment the down blew off of Kenati's shoulder and the smoke carried it up and through the smoke hole in the roof. It came down to the ground outside, where Wild Boy resumed his own shape and ran home fast to tell his brother. Kenati did not return but went on to visit another tribe.

The two brothers prepared for the coming of the wolves. Wild Boy the magician told his brother what to do. Together they made a path around the house, leaving an opening on one side for the wolves to enter.

Next, they made four large bundles of arrows. These they placed at four different points on the outside of the circle. Then they hid themselves in the woods nearby and waited for the wolves.

At the appointed time, a whole army of wolves surrounded the house. They came in the entrance the boys had made. When all were within, Wild Boy magically made the pathway become a high fence, trapping the wolves inside.

The two boys on the outside began shooting arrows at the wolves. Since the fence was too high for the wolves to jump over, they were trapped and most were killed.

Only a few escaped through the entrance and made their way into a nearby swamp. Three or four wolves eventually survived. These were the only wolves left alive in the world.

Soon thereafter, some strangers came from a great distance to learn about the brothers' good grain for eating and making bread. Only Selu and her family had the corn secret.

The two brothers told the strangers how to care for the corn and gave them seven kernels to plant the next night on their way home. They were advised that they must watch throughout the night, then the following morning they would have seven ears of corn. This they should do each night, and by the time they reached home, they should have enough corn for all their people to plant.

The strangers lived seven days' distance. Each night they did as the brothers had instructed them. On the last night of the journey, they were so tired that they fell asleep and were unable to continue the whole night's watch. Next morning, the corn had not sprouted and grown as on the previous six nights.

Upon arriving in their own village, they shared all the corn they still had left with their people. They explained how the two brothers told them the way to make the corn prosper. They watched over the planting with care and attention. A splendid crop of corn resulted. Since then, however, the Cherokee Indians needed to tend their corn only half the year to supply their people.

Kenati never came back to his home. The two brothers decided to search for him. Wild Boy sailed a magic disk to the northwind and it returned. He sailed it to the southwind and it returned, but it did not return from the eastwind. They knew that was where their father was living. They walked a long, long time and finally came upon Kenati with a dog walking by his side.

"You bad boys," rebuked Kenati. "Why have you followed me here?"

"We are men now," they replied. "We plan to accomplish what we set out to do." Wild Boy knew that the dog was the magic disk that had not returned, and had become a dog only a few days ago.

Kenati's trail led to Selu, waiting for him at the end of the world where the sun comes up. All seemed glad to be reunited for the present.

Their parents told the two brothers that they must go to live where the sun goes down. In seven days, the two boys left for the Land of the Setting-Sun. There they still live, overseeing the planting and the care of corn.

The brothers still talk about how Selu brought forth the first corn from her seed. Since that time, the Cherokee tribe refer to her as the "Corn Woman."

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Appendix G

Native American Welcome Play

by Brian Beckenstein (beckensteinb@foxborough.k12.ma.us)
Igo School, Foxborough, MA
Materials Required: costumes
Concepts Taught: Drama -learn about Native Americans

Native American Play
by Brian Beckenstein

Introduction

Welcome to our show.
We are going to take a journey back in time to learn more about the first people to live in America.

Long, long ago, nobody lived in America.
There were animals -huge mammoths,
big wildcats, bison -but no people at all.

Animals may have led the first people here. The animals wandered into America from the frozen North, and hunters came after them.

They crossed a Land Bridge that connected Asia with Alaska. After a while, the oceans rose and covered the land bridge.
The people who were in the Americas were separated from the rest of the world.
These people are known as Native Americans.

These first Americans were scattered all across the Americas. They lived in big groups called tribes. There were hundreds of different tribes in
America. Each one had its own language, its own way of life, and its own name.

For our show, we are going to take a closer look at the 5 regions of our country and the types of tribes that lived there. We will be exploring:
the Eastern Woodlands
the Plains
the Southwest
the Northwest and
the Arctic.

Arctic Region
Guide
Time Traveler
Inuit

Guide: Welcome! I will be your guide.
To learn more about how Native Americans lived,
we will have to travel back in time.
Who will be our brave Time Traveler?

T.T: I will volunteer!!

Guide: Here is our Time Machine.

TT: Wow!

Guide: Before you go, I must warn you!
Once you go back in time,
you can only stay there for a short while.
If you stay too long,
you won't be able to come back.

TT: How will I know when it is time to come back?

Guide: You will hear a bell. When you hear it,
you have to go back in the Time Machine.
Do you still want to be our Time Traveler?

TT: Yes, this is gonna be cool!

Guide: Step inside and off you go! (bell rings)
(To the audience)
Boy, is he in for shock!
Where he's going it's cold, cold, cold!
Can you guess where he's going?
That's right - the Arctic.
Where Alaska and Canada are located.

TT : Boy, it's freezing! I see nothing but snow-covered land. Wait a minute. I see someone coming and they're wearing caribou skin.

Inuit: Welcome, we are the Inuits.
Won't you come out of the cold and join us in our home?
TT: What kind of home is that? It's made out of snow. Are you sure it will keep us warm?

Inuit: Oh, yes! It is called an igloo. It will keep you warm.
We enter through a tunnel that keeps the wind out and the heat in.

TT : Hey, it is warm in here. Boy am I hungry.

Inuit: Would you like something to eat?
Here is some fresh caribou we just hunted.

TT : Uh, this meat is kind of raw.

Inuit: That is how we like our meat.
That is why we are called Eskimos - it means
"eater of raw meat"

TT : How do you get your food?

Inuit: Well, we can't grow our own food in this snow.
We survive by fishing and hunting animals such as seals, caribou, polar bears, whales, and fish.
We use all parts of the animal - flesh to eat,
skin to make hides, and bones to make weapons.

TT: How do you get around this cold land?

Inuit: We rely on dog sleds. We call our dogs “huskies”.
In the warmer weather we travel on the water in boats called kayaks.

TT : Warmer weather? Did you say warm?
When will it get warmer?

Inuit: Well, our winters last very long.
From September to June snow covers the land.

TT: What do you do when it does get warmer?
Wouldn’t your snow house melt?

Inuit: Yes, it does. So in the spring, we make tents covered with caribou skin.

TT: What is that around your neck?

Inuit: This is a seal tooth necklace. We believe it gives
us power over the animals we hunt.

Guide: Oh Time Traveler, Oh Time Traveler!
(bell rings)

TT Well, thanks for showing me your land,
but I have to go now.

Inuit Before you go, please have a necklace.

TT - Thank you!

Great Plains Region

Guide: Let’s choose a new Time Traveler.
I choose Charlie.
Now our Time Traveler is going to a land that is covered with grass and where the buffalo roam.
Any guesses? That’s right -the Great Plains to
meet the Sioux.
Step inside my Time Machine. Off you go!

Soft Snow: Welcome, my name is Soft Snow.
I belong to the Sioux tribe.

TT: Wow, those are interesting tents!

Soft: We call them tipis. They are our homes.
They are made from buffalo skin.

TT: What interesting paintings.

Soft: They are called pictographs. Let me show you.
In the summer 2 chiefs go over the mountains
and hunt a deer. They have a celebration.

Chief: Welcome to our tribe.

TT: Wow, that is beautiful! What do you call it?

Chief: This is a headdress.
Each feather stands for a brave deed.
We wear it for battles and for ceremonies.
Today we are celebrating because the scouts found a
buffalo herd.
We will be moving very soon to follow the buffalo.

TT: Why do we have to leave?

Soft: Hunting buffalo is our way of life.
We are not farmers because we don't have time to harvest crops.
We are always following the buffalo.

Chief: The buffalo provides us with food.
We use all parts of the buffalo.
The skin to make our tipis and clothes.
Our moccasins are made from buffalo skin.
We use the bones as tools and weapons.
TT: Wow, it seems the buffalo are very important to you.

Soft: Yes, but we also rely on horses to help us hunt the
buffalo.
Horses also help us move our tipis.

TT: What do you call those? (points to dream catchers)

Chief: They are called Dream Catchers.
At night when you sleep,
the web catches the good dreams
and makes the bad ones vanish.

Guide: Oh Time Traveler, Oh Time Traveler
(bell rings)
TT: Oh, I have to go.

Chief: Here is a headdress to help you on your journey.

TT: Thank you!

Northwest Region

Guide: Let's choose a new Time Traveler.
I choose Vinny.
Now our Time Traveler is going to a land that is covered with tall cedar trees.
Any guesses?
That's right - the Northwest to meet the Haida.
Step inside and off you go!

Boy: Welcome to our tribe.

TT: This area has a lot of trees.

Boy: Yes, we use them to make our houses, canoes, baskets, and weapons.

TT: Wow, that's an interesting way to hold your baby.

Women: Yes. It is called a cradleboard.
All the women in our tribe take care of the babies.
Won't you help me gather wild berries,
fruits, nuts and seeds.

TT: Don't you grow your own food?

Woemen: We don't need to farm.
Our land provides us with plenty of food.

TT: Don't you hunt wild animals for meat?

Boy: The elk and moose are difficult to catch.
We mostly rely on fruits and vegetables and fish.
We sometimes use our canoes to hunt down whales.
But catching salmon is much easier.
We use traps to catch the salmon. We love salmon!

Women: The winters are hard so during the summer we gather fruits and vegetables and store them in our
Burden Baskets made from the bark of a tree.

TT: What is that big pole in front of your house?

Boy: That is called a Totem Pole.
It is our front door to the house.
The Totem Pole tells a story about our
family through carved pictures of animals.

Guide: Oh Time Traveler, Oh Time Traveler.
(bell rings)

TT: Oh, I have to go.

Women: Before you go, have one of our Burden Baskets
for your journey.

TT: Thank you!

Southwest Region
Guide = _____ Kachina Dancers
Time Traveler = _____
Hopi Girl = _____
Hopi Boy = _____

Guide: Let's choose a new Time Traveler.
I choose Lindsay.
Now our Time Traveler is going to a land that is hot and mostly desert. Any guesses?
That's right - the Southwest to meet the Hopi people.
Step inside my time machine. Off you go!

TT: Boy, it sure is hot here. This land is like a desert.
Wait a minute. I don't believe it!
I actually see a garden up ahead.

Girl: Welcome to our village.

TT: You have a beautiful garden.
How do you make it grow in this desert?

Boy: We dig ditches and canals that help store water for the plants.

Girl: We are a peaceful people. We are farmers.
The women own the houses and land. We build the homes, cook, weave baskets, and make pottery.

Boy: The men at our village hunt, plant crops, weave clothes for the family, and perform most of the religious ceremonies.

TT: Your homes are spectacular!

Girl: They are made from adobe clay.
We call them pueblos.

TT: Why are they built on those flat mountains?

Boy: We call those flat mountains mesas.
We chose that area to help protect us from enemies.

TT: Where are the doors to your homes and why do you have these ladders?

Girl: We don't have front doors.
To enter our home you have to climb the ladders.

Boy: This helps protect us from enemies.
When enemies approach, we quickly pick up the ladders so they can't enter our homes.

TT: What do you eat?

Boy: Once in a while we will eat meat, but not too often because there are not many animals in the desert to hunt.

Girl: Most of the time we eat things made with corn.
Tonight we are having piki, it's a thin cornbread.
Would you like some?

TT: Thank you! It's delicious!

Girl: Tonight we are having a special ceremony.
We will be praying to the Kachina Gods.
(Kachina Dancers enter)

Kach: We honor the Kachina Gods.
We pray that they will bring us water.
Water is very important to us
because we live in the desert.
We need water to make our crops grow.
Oh Great Spirit, please let it rain!
(Kachina Dancers throw confetti)

(bell rings)

TT: Wow, what a wonderful celebration.
I'd like to stay, but I have to go!

Eastern Woodlands

Guide = Time Traveler =
Mohawk Girl = Mohawk Boy =

Guide: Let's choose a new Time Traveler. I choose Samantha.
Now our Time Traveler is going to a land that has many trees.
Here's a hint, it's where your home is located.
That's right - the Eastern Woodlands to meet the Mohawks.
Step inside my Time Machine. Off you go!

TT: Hey, this looks familiar -trees and grass.
Wow, look at that garden! There's corn, beans, and squash.

Girl: Welcome, my name is Beautiful Dawn.
I belong to the Mohawk tribe.
You look hungry. Would you like some food?

TT: Yes, please!

Girl : I will be helping my mother prepare
succotash.
TT: What's that?

Girl: I boil corn and beans together.
It's delicious!

TT : Mmm. This corn tastes great!

Girl: Oh yes, corn is very special to us.
We use it for food. We use the corn husks to
make hammocks, mats, slippers and dolls.

Boy: Squawk, squawk.

TT: Who are you and what are you doing?

Boy: My name is birdwatcher.
I am trying to scare the crows away.
We don't want them eating any of our seeds.
One day I will be a great warrior and the birds
will fly when they see the sight of me!
My father is teaching me how to hunt.

TT: What do you hunt?

Boy: We hunt mostly deer. We use it for food.
We use deerskin for our clothing.

Girl: Come, Birdwatcher, the storytelling is about to begin!

Boy: Come to our house.

TT: Wow, this is a very large house! It's like a barn

Boy: It is called a long house.
It is made out of elm poles covered with thick
sheets of elm bark.

TT: Wow, there are a lot of people inside.
Is this your family?

Girl: We share our house with about ten other families.
There can be about 40 people living together in this house.
Shhh, the storytellers are about to start.

The Rabbit and the Turtle
Storyteller
Storyteller
Rabbit =
Turtle =

Story# Gather around and I will tell you a story about a rabbit and a turtle.
Everyone knows that rabbit is a great runner.
But he would boast and boast about how fast he was.

Rabbit: Look at me! I am the fastest animal here.
I'm number one!

Story#: This made the turtle, who we all know is not the fastest animal, very upset.

Turtle: Oh, that rabbit! He's always showing off.
I have a plan that will keep him quiet.
Oh Rabbit, oh Rabbit. I challenge you to a race.
We can race across four mountains.

Rabbit: (laughing) Oh, that is the funniest thing I
ever heard.
You, a turtle, outrun me!? You're on!
I will even give you a head start.

Turtle: Let us meet here tomorrow morning
and then we will race.

Story#: Rabbit dashed home. But turtle had other plans.
He sent for his family.
They all agreed to help turtle.
The next morning, all of the animals came to watch the race.
As planned, turtle was given a head start over
the first ridge.
Rabbit dashed over the first ridge and said...

Rabbit: I'll pass that turtle in no time at all.

Story#: But much to rabbit's surprise, he saw turtle going over the next ridge.
Rabbit raced over the second ridge and said...

Rabbit: Ah! I'll pass that old turtle this time!

Story#: But once again, rabbit saw turtle going over
the next ridge. So Rabbit raced over the
third ridge and said...

Rabbit: Ah! I'll pass that old turtle this time!
I just know it!

Story#: But as Rabbit came down the other side of
the ridge,he saw Turtle cross over the finish line!

Rabbit: I can't believe it! How could you win the race?

Turtle: It was an easy race. I asked my family to help me.
You see, we all look alike, so each one of us climbed a different ridge.

Story#: And that is how the turtle taught rabbit that it
is not a good thing to boast and brag.

TT: - Wow, what a great story! (bell rings)
Oh, I gotta go.

Guide: I call all Time Travelers.
What did you learn?

TT#1: I learned about the Inuit Tribe that lived in the cold Arctic region. They live in snow houses called igloos. They hunt caribou and use dog sleds to travel. In the summer they live in tents covered with caribou skin.
They use kayaks to travel on the water to
catch fish.
They gave me this seal tooth necklace.

TT#2: I traveled to the grassy Great Plains and met the Sioux tribe. They were always on the move because they hunted the buffalo.
They used all parts of the buffalo.
They lived in tipis made from buffalo hides.
They gave me this beautiful headdress.

TT#3: I traveled to the Northwest and met the Haida.
They built houses out of trees.
They made large Totem Poles that showed the family history.
They loved salmon!
They gathered fruits and vegetables in this
Burden Basket.

TT#4: I traveled to the Southwest and met the Hopi.
They are a peaceful people who were able to
farm thedeserts. They built clay houses
called pueblos.

TT#5: I traveled to the Eastern Woodlands and met the Mohawks. They live in large long houses.
They hunt animals and farm the land.
I heard a great story about a rabbit and a turtle.

Guide: Wow! Let's hear from others.

We learned that Native Americans across the country had different cultures and ways of life just like we do today. The Native Americans lived in and respected this land for a long time.

However, European Explorers started coming to this New World. Unfortunately, many Native Americans
lost their freedom and could not fight the powerful weapons the Europeans had brought with them.

The Europeans had also brought with them diseases that killed many of the natives. Many of the Native Americans were forced to live on reservations.
The people and land of the Americas would be forever changed.

Today, modern life is difficult for Native
Americans.
Most Native Americans feel that they are living in two worlds: the world of their ancestors and todays modern world.
Perhaps someday the two ways of living will not
be so different. More people are learning to
appreciate Native American ways.
They realize that the first Americans knew how
to enjoy their families and use the land wisely.

Appendix H

Vocabulary

gluten- A protein in wheat allowing bread dough to rise and stretch.
gross profit- Total income before expenses are subtracted.
mill-To grind wheat into flour or meal.
net profit-The final profit after all expenses have been subtracted.
value-added products-A product that has been through some kind of processing that adds value to it.
yeast- Tiny fungi that produce carbon dioxide to make bread rise and beverages to ferment.

More Words to define:

corn	seed	farming	germination	corn	Syrup

				futures	
Starch	refining	Fermentation	ethanol	sweetener	Bioproduct
Corn oil	livestock feed	Popcorn	protein	fiber	Maize
Cultivation	pollen	hybrid corn	ear	grass	Pollination
Sweet corn	grain corn	Silk	tasselling	'three sisters'	flint corn
Corn husk doll	corn shuck	'knee high by the 4th'	grower	dent corn	flour corn
Leaf	'Corn Palace'	Cornstalk	market	cornbread	Corncob
Corn-on-the-cob	roasting ear	Kernel	tortilla	bushel	zea mays Linnaeus
Indian corn	elevator	Harvest	corn belt	corn picker	candy corn

Appendix I

Diagrams for Kernels of corn and corn plant

http://www.coloradocorn.com/resources/kids/professor_kernel/name_corn_parts.pdf

http://www.backyardnature.net/fl_corn.htm

http://maize.agron.iastate.edu/general.html

Parts of the kernel of corn.

1. **Endosperm-** Starchy part of the kernel; provides food for the sprouting plant.
2. **Germ-** live part of the kernel from which the corn plants develops when planted.

3. **Pericarp-** Hard covering that protects the kernel.
4. **Tip Carp-** When the kernel attaches to the cob of the ear.

Parts of the corn plant

1. **Tassel-** At the top of the corn stalk; produces pollen.
2. **Crown Roots-** Roots that act as anchors in the ground for the plant
3. **Ear –** Tough shell that encloses the grain or kernel of corn
4. **Stalk-** is stem of the corn. Responsible for being the roadway of nutrients to corn
5. **Silk**- stigma of the cornplant which catches pollen
6. **Prop Roots**- root that is seen above ground
7. **Leaf**-part of plant where food is produced

Appendix J

Farming through History

(adapted from http://www.kycorn.org/corneducation/cornclass/3truefalse.pdf)

Read each statement carefully, deciding whether you believe it to be true or false. In the space provided, mark T for true, or F for false.

1. __ Most farmers work from 9 a.m. to 5 p.m.
2. __ In the 1600's Native Americans showed settlers how to plant corn.
3. __ Colonial children worked to keep birds and animals out of corn fields
4. __ Today's farmer uses satellites in farming.

5. __ Early settlers had plenty of wheat and bread and did not need corn.
6. __ Pioneer children had fun removing corn husks at a husking bee.
7. __ Use of corn products helped keep early settlers from death in America.
8. __ Fish helped corn plants to grow and produce quality kernels.
9. __ Corn husks are thrown away as a useless part of the corn plant.
10. __ Most consumers buy and eat sweet corn.
11. __ Corn is used for food only.
12. __ Silage is the type of corn fed to farm animals.
13. __ Some dolls and decorations are made from corn husks.
14. __ Americans eat more rice than corn.
15. __ Expensive equipment helps today's corn farmer produce more per acre.
16. __ Popcorn is an American Favorite that began with Native Americans.
17. __ corn in America is raised for United States use only.
18. __ Native Americans used corn in religious ceremonies and creation stories.
19. __ Weather can be controlled through satellite farming.
20. __ Corn farmers measure their yields in bushels of kernels produced/sold.

Answer Key

Farming through History

(adapted from http://www.kycorn.org/corneducation/cornclass/3truefalse.pdf)

Read each statement carefully, deciding whether you believe it to be true or false. In the space provided, mark T for true, or F for false.

1. __F Most farmers work from 9 a.m. to 5 p.m.
2. __T In the 1600's Native Americans showed settlers how to plant corn.
3. __T Colonial children worked to keep birds and animals out of corn fields.
4. __T Today's farmer uses satellites in farming.
5. __F Early settlers had plenty of wheat and bread and did not need corn.

6. __T Pioneer children had fun removing corn husks at a husking bee.
7. __T Use of corn products helped keep early settlers from death in America.
8. __T Fish helped corn plants to grow and produce quality kernels.
9. __F Corn husks are thrown away as a useless part of the corn plant.
10. __T Most consumers buy and eat sweet corn.
11. __F Corn is used for food only.
12. __T Silage is the type of corn fed to farm animals.
13. __T Some dolls and decorations are made from corn husks.
14. __F Americans eat more rice than corn.
15. __T Expensive equipment helps today's corn farmer produce more per acre.
16. __T Popcorn is an American Favorite that began with Native Americans.
17. __F corn in America is raised for United States use only.
18. __T Native Americans used corn in religious ceremonies and creation stories.
19. __F Weather can be controlled through satellite farming.
20. __T Corn farmers measure their yields in bushels of kernels produced/sold.

Appendix K

Name:_____
Date:_____

Hats off To Farmers
http://www.kycorn.org/corneducation/cornclass/5hatsoff.pdf

What do you think of when you hear the word "farmer"? What picture comes to mind? Perhaps a man wearing overhauls and a straw hat riding on a tractor or milking a cow?

This is a common misperception. Today's farmers wear many hats. They are scientists, mathematicians, economists, supervisors, environmentalists, and accountants

Farmers are true entrepreneurs who make many important business decisions. Did you ever imagine a farmers as one who sits at a computer making spreadsheets or who reads the Wall Street Journal?

A generation ago may have found a farmer consulting the phases of the moon or an almanac before planting, but today's farmers use satellites, computers, sophisticated machinery, and a college degree to assist them.

Technology is increasingly becoming the farmer's friend. Imagine a satellite analyzing the soil's moisture or slope of the land so it is known what/where to plant to produce the most productive yield. Or how about a global positioning system on the tractor or a computer that automatically spreads fertilizer in the exact amounts needed. Farmers must continuously educate themselves to keep informed of new methods.

FARMERS- Scientists, Mathematicians, Economists, Supervisors, Environmentalists, Accountants and Students

One farmer who wears these many hats is **Bob Koch. (pronounced " Coke")** of Shelby County, Kentucky. Mr. Koch has a Bachelor's Degree in Economics. As a farmer he uses tools such as the **Wall Street Journal** or his computer to check out the Chicago Board of Trade reports, make spreadsheets, and keep his records/books, and taxes. He continually attends classes to learn the newest farming methods, and uses his math skills to solve problems.

His advice to young farmers: "Good business skills are the most important for analyzing problems, developing and modifying plans. Concentrate on business skills because technology changes so quickly."

Farming is a year-round occupation for Mr. Koch. In the winter, marketing plans are made as to what to grow, educational opportunities are taken advantage of, and meetings with grain specialists are a few ways he spends his time. The spring brings planting, contracts, and fertilizing. During the summer, Mr. Koch goes through and weed pests. If there are any problems, Mr. Koch will decide how he can help his crop and still make the most money. Being environmentally friendly is a must. "I have lots of money invested in my land and I don't want to poison the future growth," says Mr. Koch. And of course fall brings the harvest which is one of the busiest times on the farm.

Corn is Mr. Koch's largest income crop, with half grown to feed his cattle, and half to sell. Bob Koch is proud to be a Kentucky farmer!

Another proud Kentucky farmer is Mike Ellis of Worth & Dee Ellis Farms in Eminence, Kentucky. Although he makes his living farming, his concerns are the same as those of urban businessmen; too little time for family and friends, insurance and fair wages for his employees, and keeping the ledger in balance. Weather and pricing may be out of Mr. Ellis's hands, but little else escapes his watchful eye on his family farm.

Some might say the more things change, the more they stay the same. For Mike Ellis, there are still crops to rotate, yields to calculate, grains to store and haul to buysers, and an ever-changing market to consider. What are the greatest challenges for Mr. Ellis today? - Balancing family and career. His day begins by 7:30 a.m. and often ends at 9:30 p.m. Farming activities consume most of the hours of the day and evening.

His advice for future farmers includes: " Start early, learn as much as you can, and work toward a degree in agricultural education. Like so many 21st century careers,

math, science and technology play an important role in getting the job done well. Staying in school and studying are important steps toward becoming a successful farmer."

When all is said and done, our high-tech farmers want people to appreciate where their food comes from, that the land and soil we depend on is precious and ours to protect, and that farming is still hard work, long hours and filled with deep satisfaction.

Links to United States Maps and U.S. Corn Production

http://www.enchantedlearning.com/geography/outlinemaps/usa.shtml
http://www.edhelper.com/geography/Fifty_States.htm
http://www.kycorn.org/corneducation/cornclass/3uscornprod.pdf

Appendix L

Directions: Label the top 5 corn producing states, then color in the top 15 cor producing states. Can you tell where the "Corn Belt" is located?

Name _____ Date _____

The United States of America

© edHelper.com

Appendix M

Name_____

Date_____

The "Farmer in the Web" Song

http://www.kycorn.org/corneducation/cornclass/5song.pdf

Here's a corny little ditty to reinforce the concept of interdependence! Sing to the tune of "The Farmer in the Web" Act out the song as you sing, if you Feel Corny enough!

The farmer in the web, the farmer in the web
Everyone needs farmers, oh, the farmer in the web.

The farmer grows the corn, the farmer grows the corn.
For animals and people oh, the farmer grows the corn.

The trucks take the corn, the trucks take the corn.
To the plants and markets, oh, the trucks take the corn.

The chefs cook the corn, The chefs cook the corn.
For all of our enjoyment, oh, the chefs cook the corn.

Consumers eat the corn, Consumers eat the corn,
We support the farmers using products made from corn.

On each other we depend. Each other we depend.
From farmers to consumers, on each other we depend.

Appendix N

Excerpt from Charles Estep's Farm Diary, August, 1884 - Primary Source

Nineteenth century farmers often kept hand-written diaries of their farming activities: planting, raising and harvesting crops. The following is an August 1884 excerpt from Charles Estep's "Farm Diary 1883-1886." His farm on Musgrove Highway later became the Fred Bulling Farm in Sebewa Township, Ionia County, Michigan. Today, farmers often keep track of their crops on computers. Historians and scientists use diaries and computer print-outs to study farming practices and trends over time.

As you read these passages, think about what it must have been like to be a farmer during the 1880s. What would it have been like to raise crops and care for animals without electricity or tractors? How would it have been similar or different? Compare life on a farm 100 years ago to living on a farm today. How did farm families communicate then? How did they get to town to do their shopping?

(Words in bold are defined at the end of the excerpt.)

Friday, August 1st, 1884. Perry cut some oats yesterday. He came over this morning. I went out and found they were too green and got him to wait until next week. I worked in the corn a little and bound up some oats.

Saturday, 2nd. I cultivated corn this forenoon. Afternoon I bound what oats that were cut. I patched a little fence. I went to see Bro Lapo. He is very low. He cannot speak out loud. We went to the Corners.

Sunday, 3rd. I went to Sunday School and to prayer meeting. Attendance was fair. My teeth do not fit as well as they did before.

Monday, 4th. I cultivated corn until supper time. I took Dora over to Soule's at noon. Perry Arnold cut some oats today. It has been **showery** rather this afternoon so I have not bound any oats today.

Tuesday, 5th. A little showery this forenoon. I **handled** over some manure. Perry helped me part of the forenoon. Afternoon he cut and I bound oats.

Wednesday, 6th. Perry is not here today. I helped S. Otto to thresh some this morning. The machine broke. I did not go back to help finish up. I bound oats the balance of the day.

Thursday, 7th. My cattle got into Brownfield's corn yesterday after supper. Today I drew some rails and fixed the fence higher part of the way. I finished **binding** all the oats that are cut.

Friday, 8th. Perry finished cradling the oats today. I went to Portland to take my **teeth** to have them fixed over. They are worse than ever they were. He is going to reset them again. Ella Estep rode out to Father's with me.

Saturday, 9th. This forenoon I moved some manure. I finished fixing the line fence and bound oats. Afternoon I finished binding and **shocking** my oats and moved a little manure. In the evening we went down to John's to hear about Wallace. He had sold his farm and is going to Kansas.

Sunday, 10th. I went to prayer meeting. We had a good meeting and good Sunday School. C. S. Lawrence was here a while this afternoon.

Monday, August 11th, 1884. Today I moved some manure so I could get a place to stack my straw. Also I set some posts and put rails over the top so as to cover with straw for a calf shed. It sprinkled a little this morning. Nora was here a little while this evening. They have disposed of their place and are going to Kansas.

Tuesday, 12th. This forenoon I drew a load of lumber for the parsonage. Afternoon I went to Portland and got my teeth again. They fit very well this time. Ella Estep rode home with me and came back again.

Wednesday, 13th. I drew sand for the parsonage today. Bro Carter drew with his team. Bro. Yager and Bro. Dietrich helped to get it out of the pit. I broke a tire on my last load and went over to Luke LaLonges (West Sebewa) and got it fixed, I borrowed a wheel of Austin.

Thursday, 14th. George Baldwin helped me draw my oats today. We had seven loads. Part of them were wet yet.

Friday, 15th. I did but little today. I finished the oat stack, marked out a headland, set a stump on fire and the fire ran all over the piece. In the afternoon my head ached, so I did not work.

Saturday, 16th. This forenoon I picked up a load of stones and plowed. In the afternoon I went to the Covenant meeting. This evening I went to Sebewa Corners. It has been extremely warm for a few days.

Sunday, 17th. I attended Sunday School and prayer meeting. Our attendance was very light today.

Monday, l8th. This forenoon I plowed and picked up a load of stone. Afternoon fire broke out in my meadow and got into the corner of the woods and burned quite a lot of fence. I had Mr. Leak, Mr. Day, George and Charley Lapo to help me. It was a hard job.

Tuesday, 19th. Today I plowed and picked up stone. I am plowing my oat **stubble**. The weather is very warm and very dry.

Wednesday, 20th. This forenoon I plowed and picked up a load of stone. Afternoon I went down home to see if they wanted me to help them thresh.

Thursday, 21st. I went down home and helped thresh part of the day. The rest I picked stone and plowed. Father and Bion had 971 bushels of wheat.

Friday, 22nd. I picked up a load of stone and plowed today.

Saturday, 23rd. Foe was sick all night last night. After breakfast I went down and got Mrs. VanHouten to come and see her. She said we had better send for a doctor right away, so I went down home and started Bion after the doctor and got Mother. Then I went and got Mrs. D. Leak. In the meantime Mrs. Olry came. Dr. Smith came at two o'clock. At about four o'clock our baby was born, a bouncing healthy boy of 8 and 3/4 pounds. Foe was very sick, indeed. Mother stays all night.

Sunday, 24th. Father came down this morning and spent the day. Lil Leak went to Sunday School and opened the church. In the afternoon, Mrs. Lawrence, Mrs. Olry, Mrs. Carter, Mrs. Maggie Leak, Miss Anna and Della Aves, Miss Sayer, Dora, Libbie

and Hattie and Glenn called.

Monday, August 25, 1884. It rained a very little this morning. I took Mrs. Olry home. She stayed all night last night. I went to the corners and got home after two o'clock. I mowed some weeds after I ate my dinner. Foe and baby are smart.

Tuesday, 26th. I helped George Baldwin to log today. It has been a nice cool day to Work. Mars. Farrel and Mrs. Olry called this evening.

Wednesday, 27th. I finished plowing for wheat today. I only planted my oat stubble of six acres. I expect to put 9 acres of corn [in the] ground.

Thursday, 28th. I was down to Mr. Ralstons and borrowed a baby crib. I borrowed a **drag** down home. I went out and dragged a while. It commenced to rain too hard to work most of the time. I went and got Mrs. D. Leak to come and dress the baby.

Friday, 29th. I picked up chunks and dragged today. It has been quite warm for a team today. Foe and the baby still **keep smart**.

Saturday, 30th. I fixed up some fence today that we tore down when the fire broke out and dragged. I have got my oat ground piece dragged both ways. It looks very well.

Sunday, 31st. I wrote a letter to Christopher Leak this morning, then I went to prayer meeting and Sunday School. We had a good meeting today. We had a fair attendance. Maud and Louis Estep were here this afternoon, also Lil and Hattie and also Lute, Louise, Ezzie and Hugh and Rose Dietrich were here this morning.

- **binding:** putting into bundles, bundling
- **drag:** tool to break up the soil
- **handled:** shoveled
- **keep smart:** look good and stay in good health
- **shocking:** stacking
- **showery:** raining
- **stubble:** cut-off portion that stays in the fields
- **teeth:** dentures

Charles Estep's complete diary is in the State Archives of Michigan.

Michigan Historical Center, Department of History, Arts and Libraries
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Appendix O

http://www.colonialwilliamsburg.com/history/teaching/enewsletter/volume2/september03/primsource.cfm

Slave Work Song: "Shuck That Corn Before You Eat"

Caller: All them pretty gals will be there
Chorus: Shuck that corn before you eat.

Caller: They will fix it for us rare,
Chorus: Shuck that corn before you eat.

Caller: I know that supper will be big,
Chorus: Shuck that corn before you eat.

Caller: I think I smell a fine roast pig,
Chorus: Shuck that corn before you eat.

Caller: I hope they 'll have some soft drinks there,
Chorus: Shuck that corn before you eat.

Caller: I think I'll fill my pockets full,
Chorus: Shuck that corn before you eat.

The Culture of the Corn Shuck

African transplants to colonial Virginia arrived largely empty handed. However, much of their culture was maintained through music and dance. As both a source of entertainment and a means of survival, music and rhythm played an important part in the everyday lives of slaves.

Autumn for slaves meant additional labor associated with the harvest. This season was also a time when plantation masters were able to pay their debts and prepare the fields for spring planting. As an incentive, many masters promised to reward their slaves with special meals, rations of whisky, and the opportunity to associate with slaves from other plantations in return for the quick completion of harvesting tasks, such as corn husking. Some masters even allowed slaves from different plantations to compete against one another in an effort to complete the corn husking the quickest. According to the 1870 book *Reminiscences of an Old Georgia Lawyer* written by Garnett Andrews and published in Atlanta, Georgia, all the slaves in the neighborhood were invited to his neighbor's barn to take part in just such an activity.

To make harvesting tasks less monotonous slaves created songs to match the rhythm of the actions required to complete the harvest. Some of these songs are known as "call and response," in which one individual sings a line and the rest of the group answers in chorus.

The lyrics of the song "Shuck Dat Corn Before You Eat" mention what the slaves could look forward to in return for their labor. The word 'shuck' and the second syllable in 'before' were stressed to provide a rhythm for the activity. At these points in the song, slaves knew to step forward on the right foot, grab the top of the corn with the left hand, and cut the top off with the right hand. In this way, all members of the group worked together to efficiently and quickly complete the task.

For additional information on call-work songs and music within the slave community, consider the following books:

- Silverman, Jerry, *Just Listen to This Song I'm Singin': African-American History Through Song* (Millbrook Press, Brookfield, Ct., 1996).
- Fischer, Miles Mark, *Negro Slave Songs in the United States* (Citadel Press, Sacramento, Ca., 1991).
- Cooper, Michael L., *Slave Spirituals and the Jubilee Singers* (Houghton Mifflin, Boston, Mass., 2001).

* According to *Slave Community* by John Blassingame, planters offered their slaves whisky and a big meal in exchange for their labor at a corn shuck, p. 117.

Appendix P

Why Corn Dolls Have No Features

http://www.kycorn.org/corneducation/cornclass/3cornhuskdoll.pdf

Long after the Maker of All Things created the Iroquois, he placed upon Earth Mother plants and animals for their use. Among these were three kindly sisters, Corn, Beans, and Squash known as O-ness-ta (Sustainers of Life). One day gracious Corn Spirit, looking up to the Maker of All Things, asked if there was still more she could do for the Indian people. Pleased by her request, Maker of All Things gave to certain human beings the skill to make a doll people from her husks. Among the first dolls was one beautiful corn husk doll, lovely and graceful. People traveled many arrow flights simply to look at her. Corn husk doll became vain. "No one is as beautiful as I," she would say as she gazed at her reflection in the Sacred Pool's still waters.

In great displeasure Maker of All Things thought about this vain doll. He feared other corn husk dolls and even Iroquois children might imitate this foolish one. Then would come envy, discontent and much trouble. Sky Sachem (chief) decided to end the evil before it spread too far. He summoned his Owl Messenger (Gwa-Oh) who obediently left his perch upon the Great Celestial Tree that brushed the Sky Ceiling and flew down vast spaces through the Cloud Sea finally stopping upon a Spruce Tree above Sacred Pool of Water.

There the messenger found the handsome doll kneeling as usual before the mirror-like pool arranging many colored flowers in her silky hair. She was so involved in combing her hair she did not see her visitor. The Owl, Gwa-Oh, looked at the conceited figure and scolded, "You see, I am a wise bird, so listen closely. You were intended by Maker of All Things to spread joy, companionship, and friendliness among his children. Instead, because of your vanity, you have aroused envy and distress in their hearts. This must stop before sorrow and sadness spread throughout the Iroquois lodges." The bird ruffled his feathers as he said, "Look hard into the Sacred Pool vain one. Vain people are soulless. Soulless creatures should have no faces. Your beautiful face I now wipe away." "No, no," begged the terrified doll. She tried to leave, but Owl's eyes stopped her. As she pleaded, a sound of a high bird's song was heard and suddenly her pretty face disappeared. Gwa-Oh told the crying doll, "So that others may not be hurt by your vainness, you must walk Earth Mother without a face though you may still see and hear as before. You may continue to speak with the Spirits of our Brothers of Woods and Fields and Streams. But with the Iroquois, save for certain chosen ones, you may talk only through dreams.

"It has pleased our Maker of All Things to make differences among people, only it is wrong for one person to hold himself better; you are as good as I am, but no better. Go now, foolish one, and perform the task which is your right and should be your joy. Go and learn to be humble and content. Go and make Earth Mother's children happy."

Corn Husk Doll
Directions
http://www.ontariocorn.org/classroom/husk2.html

HARVEST CORN DOLLIES

In England, where corn refers to any grain, such as wheat, rye, or oats, good luck harvest figures called corn dollies are made each year. You can make your own from corn.

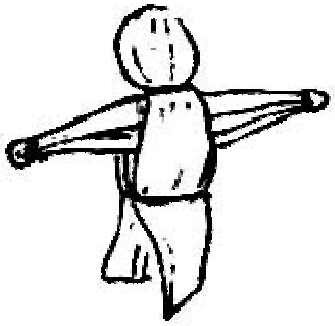
CORNHUSK FIGURE

- Corn husks, fresh or dried, about 6-8 pieces.
- String
- Cotton balls, about 4
- Scraps of cloth, yarn, beads, and pipe cleaners (optional)

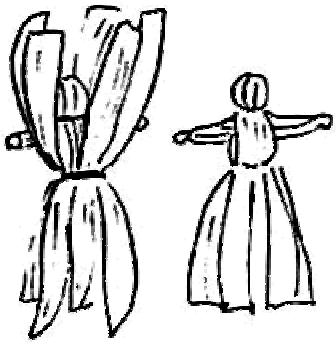
Note: If you are using dried husks, soak them in water to soften them. Fresh husks need no special preparation.

Step 1: Take a strip of husk and place a few cotton balls in the middle, twisting and tying it with string to make a head.

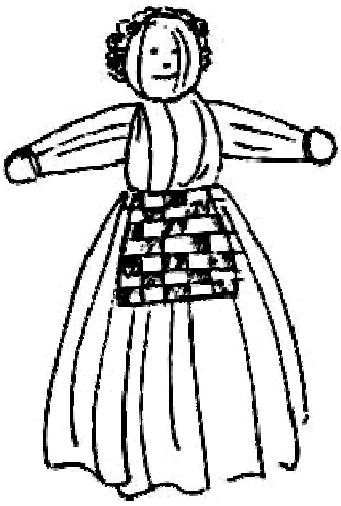
Make some arms by folding another husk and tying it near each end to make hands. Slip the arms between the husks that extend under the head. Tie the waist with string.



Step 2: Arrange enough husks around the figure's waist so that they overlap slightly. Tie them in place with string.



Step 3: Fold the husks down carefully. For a woman wearing a long skirt, cut the husks straight across at the hem. to make a man, divide the skirt in two and tie each half at the ankles. Let the figure dry completely.



Step 4: You can leave you figure as is, or give it a face, hair, or even some fancier clothes. Use a fine-tipped marker to draw facial features. Glue some fuzzy yarn on for hair. Add some tiny beads for buttons, and bits of fabric for aprons or vests. A pipe cleaner staff or cane will help the man stand upright.

Ontario Corn Producers' Association (OCPA)
90 Woodlawn Road, West, Guelph, Ontario, N1H 1B2, Canada
Telephone (519) 837 1660, Fax (519) 837 1674,
E-mail ontcorn@ontariocorn.org

Appendix Q

Story of the Three Sisters

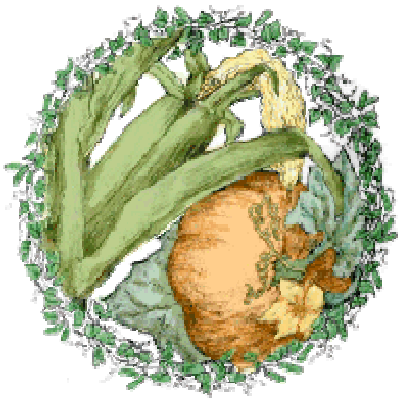
An old Iroquois story tells how Sky Woman, the creator of the world and everything in it, gave corn, beans and squash to the Iroquois people. The three vegetables were perfect companions. The corn stalks gave the beans a support to climb up. The roots of the beans added nitrogen to the soil to feed the corn and squash. The big, prickly leaves of the squash kept corn-loving raccoons away.

These three vegetables provided many Native North Americans with a healthly diet. The Iroquois name for the Three Sisters means"life support."

Below is for older children:

http://callisto.si.usherb.ca/~klik3101/hst762/iroquois/sisters.htm

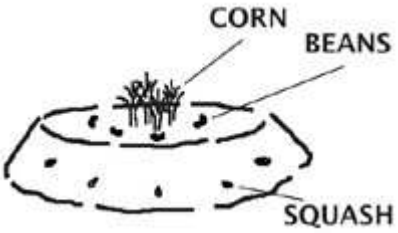
Planting a Three Sisters Garden...



The Three Sisters all work together. Critters will find it harder to invade your garden by interplanting your corn, beans and squash. The corn stalk serves as a pole for the beans, the beans help to add the nitrogen to the soil that the corn needs, and the squash provides a ground cover of shade that helps the soil retain moisture.

---

1. In late May or early June, hoe up the ground and heap the earth into piles about a foot high and about 20 across. The centers of your mounds should be about four feet apart and should have flattened tops.



2. First, in the center of each mound, plant five or six corn kernels in a small circle.

Sarah's Three Sisters

3. After a week or two, when the corn has grown to be five inches or so, plant seven or eight pole beans in a circle about six inches away from the corn kernels.

4. A week later, at the edge of the mound about a foot away from the beans, plant seven or eight squash or pumpkin seeds.

5. When the plants begin to grow, you will need to weed out all but a few of the sturdiest of the corn plants from each mound. Also keep the sturdiest of the bean and squash plants and weed out the weaker ones.

6. As the corn and beans grow up, you want to make sure that the beans are supported by cornstalks, wrapping around the corn. The squash will crawl out between the mounds, around the corn and beans.

Enjoy your harvest!!!

Appendix R

Name_____
Date_____

Corn Calendar	
Week One Date _____	
Week Two Date _____	
Week Three Date _____	
Week Four Date _____	
Week Five Date _____	
Week Six Date _____	
Week Seven Date _____	
Week Eight Date _____	
Week Nine Date _____	
Week Ten Date _____	
Week Eleven Date _____	
Week Twelve Date _____	

Appendix S

Name_____

Date_____

Scavenger hunt for corn and corn by products

Location of my house where is found the products	Type of product	How often do you use it? (you can include other family members)

Appendix T

Products of Corn

Frozen foods
Fruct
Fuel ethanol
Gypsum wallboard
Ink for stamping prices in stores
Insecticides
Instant coffee & tea
Insulation, fibreglass
James, jellies and preserves
Ketchup
Latex paint
Leather tanning
Licorice
Livestock feed
Malted products
Margarine
Mayonnaise
Mustard, prepared

Paper board, (corrugating, laminating, cardboard)
Paper manufacturing
Paper plates & Cups
Peanut butter
Pharmaceuticals - The Life Line of The Hospital
Potato chips
Rugs, carpets
Salad dressings
Shaving cream & lotions
Shoe polish
Soaps and cleaners
Soft drinks
Starch & glucose (over 40 types)
Syrup
Tacos, tortillas
Textiles
Toothpaste
Wallpaper
Wheat bread
Whiskey
Yogurts

Of 10,000 items in a typical grocery store, how many would you guess would contain corn in one form or another?

Of 10,000 items in a typical grocery store, at least 2,500 items use corn in some form during the production or processing

How Corn is Used in Some of these Products

Cake Mixes

Cake mixes use a pregelatinized corn starch that will form a paste in cold or warm water. In baked goods that use yeast for rising, dextrose is used as a yeast nutrient.

Candies

Corn syrup is used in hard candies to provide a body giving them chewiness and a desirable mouthfeel without excessive sweetness. Candies that are coated use a pyrodextrin corn starch for the coating.

Carbonated Beverages - Coke

High fructose corn syrup (HFCS) blended with sucrose in a 50/50 blend is sweeter than the same concentration of sucrose. The use of HFCS in carbonated beverages is common throughout Canada and the U.S.

Cookies

Corn starch, corn flour or dextrose may be found in cookies.

Corn Flakes

The flaking grits are cooked to a rubbery consistency with syrup, malt, salt and flavouring added. After tempering, the cooked grits are flattened between large steel rolls, followed by toasting in travelling ovens to a golden brown colour.

Corn Starch

Corn starch is derived from the wet milling process and is an important manufactured product. Some uses depend on the properties in the dry state, but most applications relate to its properties as a cooked, hydrated paste.

Corn Meal

Corn meal is a popular dry corn product because of its long shelf life. It is used to produce an assortment of chemically leavened bread and fried products like corn bread and muffins.

Cosmetics

Corncobs, when finely ground, are relatively dust free and very absorbent. This absorbency makes corncobs useful carriers for pesticides, fertilizers, vitamins, hand soaps, cosmetics and animal litters.

Granola Dips/Granola Bars

Some types of Granola Dips use dextrose as a sweetener.

Gypsum Wallboard

Starch-containing corn flour is gelatinized during the manufacturing process; It functions by controlling the rate of water loss during drying of the board. Soluble carbohydrates migrate to the surface and control the rate of crystallization of the gypsum, providing a strong bond between the gypsum and the liner.

Instant Coffee & Tea

Maltodextrins are derived from the wet milling process. They are a dextrose equivalent product of complete solubility but little or no sweetness. Maltodextrins are sprayed on instant tea and coffee to keep the granules free flowing. This solution is also used in instant soup mixes or other packages where the contents must be be kept free flowing.

Mars Bar & Twix Bar

Many candy bars contain corn syrup.

Paint and Varnish

Tetrahydrofurfuryl alcohol is a resin developed from processing corncobs. These resins are useful in the paint and varnish industry as solvents for dyes, resins, and lacquers.

Paper Products

Paper products use raw starch in the manufacturing process. The properties of high paste viscosity and strong gels are useful in specially coated papers. Pyrodextrins are also used for paper manufacturing for the adhesive property on remoistenable gums for postage stamps and packaging tape.

Pharmaceuticals

Aspirin - an oxidized starch paste, which dries to a clear, adherent, continuous film, is spread in a thin layer over the aspirin.Intravenous - some IVs consist of dextrose and water solutions.

Antibiotics - preferred carbohydrate sources are corn syrup, dextrose, corn starch, lactose and sucrose. Cornsteep liquor was early found to provide a ready source of soluble nitrogenous nutrients plus unknown growth factors that stimulate antibiotic production.

Over 85 different types of antibiotics are produced using corn.

Snack Foods - Corn Chips & Doritos

These snack foods are generally made from whole corn (cornmeal). The high starch content of cornmeal and flour is important in giving a high puff in preparation of extruded (pressed) snack products in which a delicate corn flavour is desired.

Spark Plugs

Starch is used in the production of the porcelain part of spark plugs.

Tire, Rubber

In the production of tires, corn starch is sprinkled on the molds before pouring the rubber, to prevent the rubber from sticking to the molds.

Toothpaste

Sorbitol, which is produced from the corn sugar dextrose, is used in toothpaste as a low-calorie, water-soluble, bulking agent.

Appendix U

Make your own Biodegradable Packing Peanuts

Packing peanuts are made of nearly 100 percent corn. These peanuts are totally water soluble
and biodegradable!
Materials:
Package of frozen corn

piece of cheesecloth
potato masher
Iodine
paper cups
stir stick
Tablespoon and teaspoon
slotted spoon
water

Directions:

1.Thaw a package of frozen corn and place in bowl.

2.Crunch up the corn with a potato masher and cover with water. Let stand for 24 hours.

3.Remove from bowl with a slotted spoon. Allow water to stand for another 15 minutes.

4.Gently pour off the water through a piece of cheesecloth, allowing the starch to become trapped in the cloth.

5.You can see and feel the starches left in the cloth. Use a small portion of the cheese-
cloth to demonstrate the presence of starch. Place a drop of iodine on that portion. If
starch is present, the iodine changes from reddish-brown to blue-black. Allow the remainder of the cheesecloth to dry overnight.

6.The starch has now dried overnight and turned into powder. Feel and taste the powder. Now mix 1 tablespoon cornstarch with 1 teaspoon water in a paper cup. Stir with a stick until it forms a workable paste. If you microwave the mixture on high for 15 seconds, it will provide a more consistent product for examination. You have made a biodegradable packing peanut!

7.Study your peanut and compare it to a Styrofoam peanut by putting both into separateglasses of water. Watch what happens. Which peanut would be best for the environ-ment and why? Also try burying them in soil and compare results.

Appendix V

http://www.kycorn.org/corneducation/cornclass/8peanut.pd

JOLLY TIME AND THE AMERICAN HISTORY OF POPCORN

1492 Columbus receives popcorn from the Native Americans.

1620	The first Thanksgiving includes bowlfuls of popped popcorn brought by Native Americans.
1700s	Colonial women from Boston to the Carolinas make the first breakfast cereal by pouring milk and sugar over popped popcorn.
1885	Popcorn is introduced to Sac County, Iowa farmers. Because of the area's ideal growing conditions, Sac County quickly gains the reputation as the "popcorn capital of the world." Yet consistency is a problem – you have to pop a lot to enjoy just a few tasty morsels.
1914	The *American Pop Corn Company*, makers of *JOLLY TIME Pop Corn*, is born. Cloid H. Smith creates America's first branded popcorn and the first popcorn available on the grocer's shelf.
1920s	The majority of popcorn is sold in bulk. Local vendors operate popcorn wagons on busy corners. Nearly all the popcorn grown is of the white variety.
1930s	*JOLLY TIME'S* radio program, "General Jolly Time and his Pop Corn Colonels," makes popcorn poppers available by mail for just one dollar. Though money is tight during the Depression, a 10-ounce tin of *JOLLY TIME* pops enough popcorn for an entire family and costs as little as a dime. As more and more movie theaters add popcorn machines, popcorn's popularity also grows.
1939	On its 25th birthday, *JOLLY TIME* is named the "World's Largest Pop Corn Producer." *American Pop Corn Company* sells 75,000 cases of *JOLLY TIME* cans.
1949	Within one decade, the number of cases sold of *JOLLY TIME* cans increases more than six-fold to 500,000.
1956 - 1957	Arthur Godfrey, on his popular CBS radio show, broadcast nationwide, personally endorses *JOLLY TIME* as "the world's best popcorn."
1968	*JOLLY TIME* enters the realm of national network television advertising with spots on the popular game show "Let's Make A Deal."
1976	Over the past decade, *JOLLY TIME* sales in pounds more than double and quadruple in dollars.
1972	Wrede Smith, Cloid's grandson, serves as The Popcorn Institute President.

1980	The nationally known weight loss franchise, Weight Watchers®, embraces popcorn as an accepted Weight Watchers program snack. Later, medical experts endorse popcorn as high-fiber food and recommend it to diet-conscious people.
1983	*JOLLY TIME'S* first microwave popcorn launches and takes the country by storm. *JOLLY TIME* Natural Butter Flavored and Natural Flavor are introduced first, followed by Cheddar Cheese Flavor in 1988.
1986	Popcorn ranks in the top 5% of the fastest growing snack food categories.
1988	Americans eat 12.9 billion quarts of popcorn annually, or 52 quarts per person, 70% of which is eaten at home.
1991	*JOLLY TIME* introduces American's Best®, the first nationally distributed popcorn to display the Better-Life® grains seal on its label. The seal guarantees the popcorn has been grown without chemical pesticides.
	Also that same year, 100% All Natural Butter Flavored and Natural Flavor Microwave Pop Corn become the first national brand of microwave popcorn to be packaged without artificial flavors, colors or preservatives.
2000 - Present Day	*JOLLY TIME* continues to develop as many as 500 hybrids each year in its ongoing effort to produce the highest quality popping and best tasting popcorn.
	JOLLY TIME is the only brand to give the choice of both golden, fluffy yellow and tender, tasty white popcorn in all of its product lines.
	JOLLY TIME is now run by the fourth generation of Smiths – Carlton and Garrett Smith (a.k.a. Garry) – first cousins and great grandsons of Cloid H. Smith, company founder.

Appendix W

JOLLY TIME Pop Corn "Pop Quiz" Questions

Woodrow Wilson was president… and the first popcorn brand—JOLLY TIME was introduced. What year was it? **1914**

The average popcorn bowl holds eight cups of popped popcorn. At this rate, how many bowls of the crunchy snack do you think an American munches each year?
29 bowls

Americans eat a majority of their popcorn…
While catching the latest flick at the movie theater
In between the Ferris wheel and the roller coaster
Curled up on the couch at home, watching a video
Cheering with the crowd in the stands at a sporting event

I'm sweet and creamy and start from an udder. I'm America's favorite popcorn flavor—popcorn with **BUTTER**!

Pop two tablespoons of JOLLY TIME Pop Corn kernels and you'll make how many cups of popped popcorn?
Enough to fill a sack—4 cups
Enough to fill a hand—1 cup
Enough to fill a bowl—8 cups
Enough to fill a party—20 cups

Yes, JOLLY TIME was born here, and if you're witty, you know I produce more popcorn than any other U.S. city. Which city am I? **Sioux City, Iowa**

Who is the "founding father" of American popcorn?
Pop Weaver
Cloid Smith
Orville Reddenbacher
P.T. Barnum
Cloid Smith founded the American Pop Corn Company in 1914 and established

JOLLY TIME as the first popcorn brand.

Dieters love popcorn. Without the butter or oil, a serving of popcorn contains
No calories
Just one calorie
About 20 calories
About 100 calories

In order to pop, the internal temperature of the popcorn kernel must reach:

98.6 degrees Fahrenheit
212 Degrees Fahrenheit
350 Degrees Fahrenheit
450 Degrees Fahrenheit

I'm not east or west, but somewhere in the middle. While other states are wide, I'm more long and lean. Racecars and golden domes call me home. And no state tops the amount of popcorn that is grown on my turf! Which state am I?

Indiana

How much bigger is a popped kernel than an unpopped one?

Double its original size (volume)
Triple its original size (volume)
40 times its original size (volume)
100 times its original size (volume)

JOLLY TIME Pop Corn has been a family favorite for 90 years. In the 1950s, there was a very famous television family who loved JOLLY TIME and even did ads for the company.

Ozzie and Harriet Nelson (and Rick and David)
The Cleavers—Leave it to Beaver
The Ricardos—I Love Lucy
The Bunkers—All in the Family

In the 1970s, there was a famous game show during which Monty Hall would reveal JOLLY TIME Pop Corn behind door #1, #2 or #3—the show was called… **Let's Make a Deal**

How did the people of colonial times eat popcorn?

As a breakfast cereal—popped with a little sugar and milk on top
Molded into patties for "popcorn burgers"
As croutons on a salad
Ground into flour for making popcorn bread

Popcorn is grown in two varieties. One is very nutty and crunchy—this is yellow popcorn. The other is very sweet and tender. This type of popcorn is… **White**

When motion pictures really got popular in the 1920s, what innovative solution did JOLLY TIME Pop Corn offer to theater operators complaining of too much noise during the shows?

Ear plugs
Softer popcorn that didn't crunch as much
Popcorn bags with slits on the side that couldn't be popped
D. Popcorn wagons with glass enclosures

What are the three most common methods of cooking popcorn?

Microwave
Popcorn popper—especially those that pop with hot air
Hot oil on the stove

Of what material is popcorn primarily composed?

Fiber
Corn syrup
Hard starch
Water

For the perfect pop, what percentage of moisture should a popcorn kernel contain?

Less than 1%
About 14%
About 50%
D. Nearly 100%

JOLLY TIME Pop Corn air-dries its popcorn for peak popping performance. The corn is stored in storage cribs a whole city block long and two stories high. How much popcorn do you suppose each crib holds?

4,000 pounds, enough to feed a small town
400,000 pounds, enough to feed the city of Des Moines
4 million pounds, enough to feed the people in the entire state of Alabama
24 million, enough to feed every American

When JOLLY TIME was first produced, it was sold in cardboard boxes. In the 1920s, the company pioneered a new storage technology, packaging pop corn in

Plastic jars
Glass jars
Wooden boxes
Metal cans (the forerunner of today's soda cans)

Popcorn isn't a new snack. It has been around for ages. Popcorn kernels were found by archeologists in New Mexico that were how old?

About 100 years old
About 600 years old
About 1,600 years old
About 5,600 years old

There is a very special month for popcorn—it is called Popcorn Popping Month. This is when the weather begins to get cooler, and people stay inside to enjoy the comforts of home—like popcorn! Which month is it?
October

What actually makes a popcorn kernel pop?

Continued growth after it is removed from the corn ear
Heat causes the shell to crack releasing the starchy substance
Heat causes the moisture to turn to steam. As the pressure builds up the kernel pops.
A desire to release the child within

VII. Name the five types of corn.
Sweet corn, field corn (for cattle), white milling corn for baking, popcorn for popping and seed corn for planting

The first Americans to snack on popcorn were:
Columbus and his crew
Native Americans
Pilgrims
Revolutionary soldiers

Native Americans brought popcorn to the pilgrims as a gift the first Thanksgiving

What are the three most popular popcorn flavors in the U.S.?
Buttered
Caramel
Cheese

Which city is considered the "popcorn-eating capital of the U.S.," because its citizens eat so much of the fluffy stuff?
Chicago
Des Moines
Milwaukee

D. Minneapolis/St. Paul

Making Corn Grow...

Originally, the word *corn* meant a little particle of something, such as a seed or grain of wheat. Eventually, the meaning of the word broadened until it also came to describe the important grain crop we know today. The English who came to America hundreds of years ago saw Native Americans growing crops and called the most imporant one *corn*. But back home, *corn* still meant wheat, because it was the most important English crop. Our corn was—and is—known as *Indian corn* or *maize*.

1. _ corn *A great oak grows from it*

   (Acorn)

2. _ corn *To despise or look down on*

   (Scorn)

3. Corn _ _ *You often turn it when you walk or ride*

   (Corner)

4. Corn _ _ *First cousin to the trumpet*

   (Cornet)

5. _ _ _ corn *A famous fictitious one-horned animal*

   (Unicorn)

6. _ _ _ corn *Our Founding Fathers wore this hat*

   (Tricorn)

7. Corn _ _ _ *It projects from a building roof*

   (Cornice)

8. _ _ _ _ _ corn *This animal "lives" in the sky*

   (Capricorn)

9. Corn _ _ _ _ _ _ *An overflowing horn of plenty* (Cornucopia)

10. _ _ _ _ _ _ _ corn *It goes with salt*

    (Peppercorn)

11. Corn _ _ _ _ _ _ _ *A blue summer bloom*

    (Cornflower)

12. Corn _ _ _ _ _ _ _ *Laying it makes a building official*

    (Cornerstone)

Bonus: If you have raised a good corn crop, this one should be easy…
Add *H* to *STARVE*, scramble the letters, and make a new word.

The gathering of a crop is a: _____
(Harvest)

Additional Resources

http://www.ncga.com/education/main/index.html
http://www.ksgrains.com/corn/edu.html
http://www.cornfieldmaze.com/planting_teachers.html
http://www.stanleyfarms.com/page.php?pageid=b5588dfa1f0e01fabf295082ccf40b3z

Popcorn

http://www.popcorn.org/teachers/index.cfm?usernav=html
http://www.popcorn.org/client_files/teachtools/business1.pdf

Popcorn! Read about it.

Pop up a big bowl of popcorn to enjoy while reading these fun books about popcorn...especially for kids!
If you know of other books about popcorn, send the title and author to us.

The Biggest Popcorn Party Ever in Center County
Jane Hoober Peifer, Marilyn Peifer Nolte (Illustrator)
Date Published: January 1987
Previously reluctant to share their popcorn crop with friends, a barn fire pops Henry and Martha's stored kernels and they decide to have the grandest party ever.

Corn - 140 recipies: roasted, creamed, simmered + more
Olwen Woodier
Date Published: 2002

If You Take a Mouse to the Movies
Laura Joffe Numeroff, Felicia Bond (Illustrator)
Date Published: 2000
If you take a mouse to the movies, he'll ask you for some popcorn. When you give him the popcorn, he'll want to string it all together. Then he'll want to hang it on a Christmas tree. You'll have to buy him one...

Popcorn
Frank Asch

Popcorn at the Palace
Emily Arnold McCully
Date Published: September 1997
When young Maisie Ferris and her father take the long trip to England to try and sell popcorn to the English, they are a great success. But will her newfound fame get Maisie an audience with Queen Victoria, the person she'd most like to meet?

Popcorn Magic
Phylliss Adams, Virginia Johnson
Date Published: December 1991
Older sister Ann helps Brad and Pam pass a rainy day by showing them how heat makes a popcorn kernel change shape. By choosing a specific page, the reader determines the story's ending.

Popcorn Plants
Kathleen V. Kudlinski
Lerner Publications 1998

Popped Culture: A Social History of Popcorn in America
Andrew F. Smith
Date Published: 1999

Science Fun With Peanuts and Popcorn
Rose Wyler
Date Published: 1986

The Popcorn Book
Tommie DePaola

The Popcorn Dragon
Jane Thayer, Lisa McCue (Illustrator)
Date Published: February 1991

The Popcorn Shop
Alice Low, Patti Hammel (Illustrator)
Date Published: 1993

The Popcorn Tree
Carolyn Mamchur, Laurie McGaw (Illustrator)
Date Published: September 1998

What Makes Popcorn Pop?
Dave Woodside
Atheneum Publications 1980