

# The *Appealing* Apple



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*"In physical perfectness of form and texture and color, there is nothing in all the world that exceeds a well-grown fruit. Let it lie in the palm of your hand. Close your fingers slowly about it. . . . This apple is not only the product of your labor, but it holds the essence of the year and it is in itself a thing of exquisite beauty."*

Liberty Hyde Bailey, *The Holy Earth* (1915; reprint, Ithaca, N.Y.: New York State College of Agriculture and Life Sciences, 1980), 70-71.



# Introduction

Interdisciplinary publication aims to provide A to Z information about apples in a way that many diverse audiences will enjoy. While adults will delight in the many facets of the apple, a major goal is to help children explore this wonderful fruit through hands-on activities and to appreciate that there is much more to it than meets the eye. The information and activities will be fun and educational for children

ages nine to twelve in informal groups such as 4-H, summer camps, or girl scouts, in home school situations, school-aged child care programs, and school classrooms. By reading the stories, playing the games, and doing the suggested activities, children will learn about apples, how to grow, cook, and enjoy them, and their history. Projects can easily be modified for older or younger children.

Your challenge will be to lead as needed while encouraging young people explore each activity, learn from the experience, and share their results and observations; please use the experiential learning model as your example for this process. You will be able to help youth see how these life skills can be applied to other situations. Most important, have fun!

The activities have been pilot tested intensively in five counties in New York State by extension educators, 4-H leaders, and teachers. Each pilot site reviewed the manuscript, tested activities, and tried recipes. The reviewers completed evaluations and provided critical feedback about readability,

grade level, and age-appropriate nature of the text and activities; the interdisciplinary range of activities; and level of interest among youth. Their contribution was critical to the completion of this publication and is greatly appreciated.

The text and activities are designed to contribute to an understanding of several learning standards in a meaningful yet fun manner. These learning standards include the following:

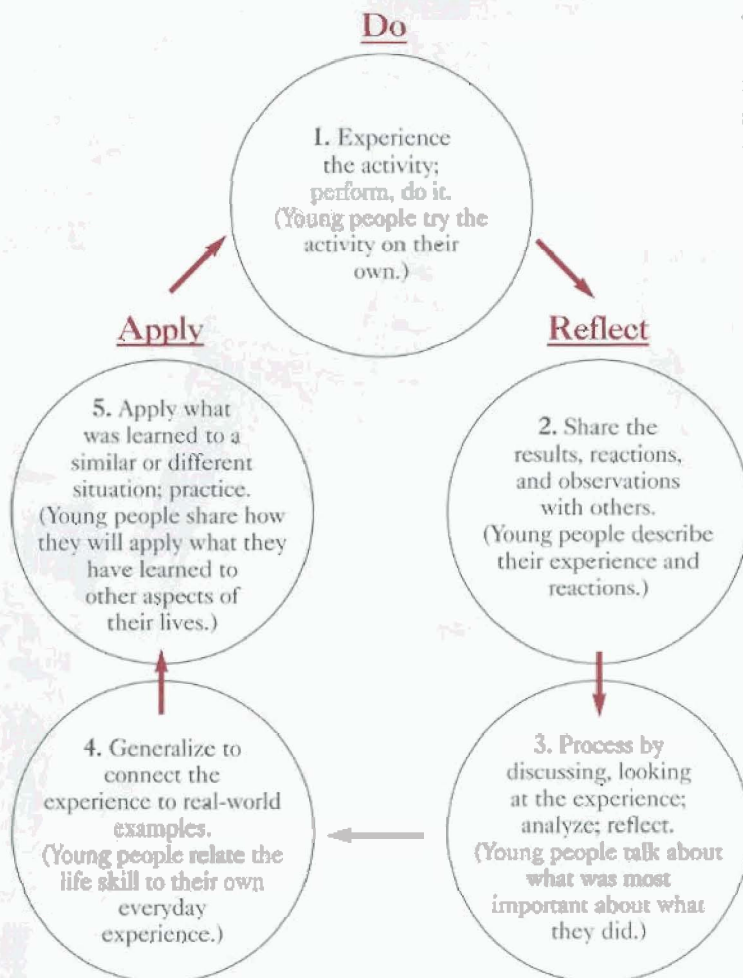
## Health, Physical Education, and Home Economics

Acquire the knowledge and ability necessary to create and maintain a safe and healthy environment.

## Math, Science, and Technology

- Access, generate, process, and transfer information using appropriate technologies.
- Use scientific inquiry to pose questions, seek answers, and develop solutions.
- Understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.
- Apply technological knowledge and skills to design, construct, use, and evaluate products and systems to satisfy human and environmental needs.

## Experiential Learning Model



Source: Adapted from *Curriculum Development for Issues Programming: A National Handbook for Extension Youth Development Professionals* (1992). Cooperative State Research, Education and Extension Service, U.S. Department of Agriculture, pp. 27–28. Also in J. W. Pfeiffer and J. E. Jones (1985), *The Reference Guide to Handbooks and Annuals, Vol. 1–10, 1972–1985* (San Diego: University Associates Publishers and Consultants, 1985).



- Apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions.

### The Arts

- Be knowledgeable about and make use of the materials and resources available for participating in the arts in various roles.

### English Language Arts

- Listen, speak, read, and write for information and understanding. As listeners and readers, students will collect data, facts, and ideas; discover relationships, concepts, and generalizations; and use knowledge generated from oral, written, and electronically produced texts. As speakers and writers, they will use oral and written language that follows the accepted conventions of the English language to acquire, interpret, apply, and transmit information.
- Read and listen to oral and written texts from American and world literature; relate texts to their own lives; develop an understanding of the diverse social, historical, and cultural dimensions the texts represent.
- Listen, speak, read, and write for critical analysis and evaluation.

### Career Development and Occupational Studies

- Be knowledgeable about the world of work, explore career options, and relate personal skills, aptitudes, and abilities to future career decisions.
- Demonstrate how academic knowledge and skills are applied in the workplace and other settings.

### Social Studies

- Use a variety of intellectual skills to demonstrate their understanding of major ideas, eras, themes, developments, and turning points in world history and examine the broad sweep of history from a variety of perspectives.
- Use a variety of intellectual skills to demonstrate their understanding of the geography of the interdependent world in which we live—local, national, and global—including the distribution of people, places, and environments over the Earth's surface.

### Review and Select Activities

The project contains fifteen activities, as well as several stories and many apple games and recipes. Review them to decide which would be most appropriate for your group. Supplies needed are listed. Most are inexpensive and readily available.

### Monitor Success

One way to evaluate children's learning throughout this project is to compile portfolios that illustrate their work and contain samples of activities that they have completed. These portfolios can demonstrate the interdisciplinary range of activities they have engaged in and indicate progress and special accomplishments, perhaps much better than a single survey or other "test" of their learning. Portfolios can be compiled individually or as a group.

You may want to ask children to write down what they know about apples before you begin the project. After the project is completed, repeat the question and ask them what they now know about apples, based on their activities and readings. Their answers are likely to reflect an enhanced understanding of the apple as it is related to science, nutrition, folklore, geography, social studies, and language arts.

A form to evaluate the project may be found at the end of the bulletin.

## The Apple Alphabet

A was an apple pie

B bit it

C cut it

D dealt it

E ate it

F fought for it

G got it

H had it

I inspected it

J jumped for it

K kept it

L longed for it

M mourned it

N nodded at it

O opened it

P peeped in it

Q quartered it

R ran for it

S stole it

T took it

U upset it

V viewed it

W wanted it

XYZ & ampersand

All wished for a piece in hand

Source: Iona Opie and Peter Opie, *The Oxford Nursery Rhyme Book* (Oxford: Oxford University Press, 1955).

# An Apple Story and Legend

## How the Trojan War Started

Once upon a time, the gods had a magnificent party on Mount Olympus. A feast was laid out, the gods' cups were filled with ambrosia, and they made much merriment. Seated at the same table as Zeus, the king of gods, were Hera (his wife), Aphrodite (goddess of love and beauty), and Athena (goddess of wisdom, knowledge, and the martial arts).

All of the gods were invited except for one, Eris, the goddess of chaos and discord. She was not invited because she always caused trouble wherever she went, and she might spoil the party. Eris found out about the party, and she was very angry to have been left out. So she picked a golden apple from a tree in the garden of Atlas. She carved the words "For the Prettiest" into the side of the apple, made herself invisible, and crept into the palace of Zeus. She tiptoed up to Zeus's table and brought a shadow over the entire room. When the shadow cleared, the golden apple was sitting on the table between Aphrodite, Hera, and Athena. Each one of them thought that the apple was meant for her, and they fought over it. They couldn't settle their fight, so they asked Zeus to decide, but he refused to judge—he knew better! They asked all of the other gods; none of them would judge. "We know you too well," they said. "Perhaps someone else should choose, so we won't be accused of playing favorites."

Aphrodite, Hera, and Athena decided that this was fair. Looking out from the top of Mount Olympus, they noticed the prince of

Troy caring for his father's sheep. They came down and stood in front of him, laying the golden apple before them. They told him that this apple was meant for the prettiest of the goddesses and that he had to decide which one of them deserved it. Hera said that if he chose her, she would make him the most powerful king in all the world. Aphrodite told him that if he chose her, the most beautiful woman in the world would fall in love with him. Athena said that if he chose her, she would teach him all the knowledge in the world and he would be the wisest man ever to live.

He chose Aphrodite. Aphrodite brought Helen, the wife of the king of Crete, to him. She fell in love with the prince at once, so he took her with him to be married in Troy. When the king of Crete found out, he gathered his friends to help get his wife back. And that's how the Trojan War started.

*Legend told by Rev. Robert Walter Brown, formerly with Cornell United Religious Work.*



## Points to Ponder

- Why would three goddesses fight over a little golden apple?
- Was it a good idea for the gods to decide not to invite Eris to the party?
- What choice would you have made?



## The Little Red House with No Windows and No Doors but with a Star Inside

Can be read as a story or performed as a play; boy and girl characters can be changed, depending on the genders in your group.

### Characters

|               |            |
|---------------|------------|
| Boy           | Girl       |
| Mother        | Mr. Henry  |
| Grandma Henry | Apple tree |
| The wind      |            |

**Boy:** Mom, I'm tired of playing with my toys, and I can't find anything to do.

**Mother:** You know, one time I heard about a little red house with no windows and no doors but with a star inside. Why don't you go out and see if you can find it?

So the boy went to his neighbor's house, and he asked the girl who lived there if she had ever heard of a little red house with no windows and no doors but with a star inside.

**Girl:** I've never heard of such a thing! But come along and let's ask my father. He knows about a lot of things.

**Boy:** Mr. Henry, I'm looking for a little red house with no windows and no doors but with a star inside. Can you tell me where I can find it?

Mr. Henry scratched his head.

**Mr. Henry:** I've never heard of such a thing. But do you know what you can do? Go over to Grandma's. She's very old and very wise and she might be able to help you.

So the boy trotted over to Grandma's house. She was sitting on the porch watching the world go by.

**Boy:** Grandma Henry, I'm looking for a little red house with no doors and no windows but with a star inside. Do you know where I can find it?

**Grandma Henry:** Well, I don't know that I've ever heard of such a thing. But I do know that the wind has been around a long time and has seen just about everything. Why don't you go up the hill where the wind blows the hardest? Maybe it will tell you the answer to your riddle.

The boy trudged up the steep hill. It was a hot day, so he plopped himself down in the shade of the old tree that stood on top of the hill, and he struggled to hear an answer in the whoosh of the wind. And as he sat listening, an apple fell from the tree and bounced off his head. The boy picked up the apple.

**Boy:** This looks like a little red house. There are no doors in it—and no windows! But where is the star?

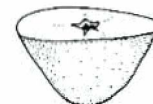
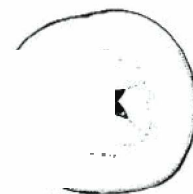
The boy rushed down the hill and into his house.

**Boy:** Mom! Mom! This apple looks like a little red house with no doors and no windows, but I can't find the star.

**Mother:** Look! When I cut it in half, what do you see?

(Teacher/leader or character playing Mother cuts the apple in half horizontally to reveal the star inside.)

*Source: New York Apple Association, Inc., P.O. Box 360, Fishers, N.Y. 14453*



### Points to Ponder

- Why is there a star shape inside an apple?

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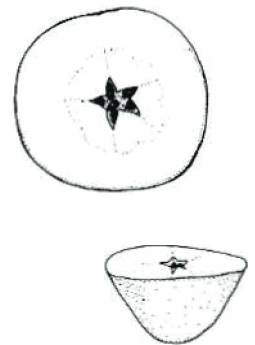
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P.O. Box 350, Fishers, N.Y. 14453



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# Apples through the Ages

Somewhere north of the great Himalayan Mountain range humans first brought wild apples into their gardens from the forests, perhaps five thousand years ago. Vast forests of apple trees still exist in these remote regions of China and Kazakhstan. These first apples were tasty and nutritious, so the fruit's fame spread quickly among travelers and traders between China and the classical empires of Persia, Greece, and Rome.

Apples were grown in the Mediterranean regions of Europe beginning about three thousand years ago. At first this exotic fruit symbolized wealth and luxury. As great fortunes were made in the trade with China, splendid mansions were built around large courtyards planted with apples and other fruit trees, vines, and flowers. A new word for these walled gardens entered the language of classical Rome from Persia—*paradisus*—which soon came to mean an earthly “paradise” as found in the walled gardens. The apple that tempted Eve in the Garden of Eden gave apples their strange botanical name—*Malus*—which meant “evil” in Roman Latin. By the time of Christ, apples were grown throughout the Roman Empire, and a special festi-

val for Pomona, their goddess of the fruit harvest, was celebrated with great feasts and parties, parades, and games.

At first, apples were an expensive delicacy enjoyed mainly by the rich, who showed off their fine gardens and held large feasts with many types of fruit. Then, less wealthy gardeners discovered, or learned from ancient China, that abundant harvests of good fruit could be gathered from carefully propagated “dwarf” apple trees. These were created by grafting the buds or twigs from an especially good apple tree onto young root systems. These young root systems were obtained from sprouts growing on the lower trunk or roots of another special apple tree that would never get much taller than a garden wall. Dwarf trees created this way were clones, or generically identical, but thousands could be obtained from just one “mother” tree.

Every apple contains about a dozen tough seeds that are easily spread by humans, farm animals, and wildlife. Each of these seeds is a unique individual, as different as one human from another. Apple seeds soon found their way from courtyard gardens into fields and farms throughout Europe. Each region came to have its favorites, and by the end of the Roman Empire thousands of distinct types were being grown.

The inherited diversity of apple seeds made them very adaptable to many different environments. They grew into rugged trees that endured storms and drought, cold winters and hot summers, and could grow in rocky soils or steep slopes where other crops failed. Apples were cherished by the Celtic peoples, who spread them into the northern parts of Europe. The Celts made apples an important part of their Samhain or summer's end festival, some of the traditions of which are still followed at Halloween. The Celts also considered the apple a health food, recognizing that it provided vitamins, minerals, and carbohydrates during the long winter months when there were no other fruits to eat. Living in climates too cold for wine grapes, these people also learned that apple ciders would ferment naturally into mildly alcoholic beverages that could be stored in barrels for many months. By the next summer this hard cider would have become cider vinegar, which could be used for pickling and preserving vegetables for use in the lean months of winter.



Unlike most other fruits, apples ripen late in autumn and can retain their flavor and quality for three to five months if kept in a cool, dry location. Apples provided good food for sailors and immigrants on the long journey to the Americas after 1492. Before embarking, pilgrims and pioneers gathered apples from their favorite trees, ate the fruit while crossing the ocean, and saved their seeds to plant in their new farms and gardens. Because each seed is unique, these cherished Old World apples gave rise to thousands of new varieties across America. They were grown in different climates and soils, and farmers soon selected new favorites. By the 1800s more than a thousand apple varieties were being grown in America. Some of the crop was packed in barrels and shipped for sale in distant cities like London, Rome, Peking, and Tokyo—even back to the sites of its ancient origin.

Many of the native peoples in the New World were expert farmers and quickly recognized the value of this new fruit from Europe. One traveling peddler named

John Chapman, better known as Johnny Appleseed, bartered seeds for other goods along the western frontier in the late 1700s. Explorers pushing westward later found large, well-managed apple and peach orchards around the villages of native peoples and thought the fruit always had been grown in the Americas.

Today apples are grown throughout the world. The leading apple-producing countries are Russia, the United States, and China. Other important apple-growing countries include France, Germany, Japan, Italy, Korea, Argentina, Hungary, and Poland. Over two hundred million bushels of apples are grown in the United States each year. The states of Washington, New York, and Michigan are the top producers, followed by California, Pennsylvania, North Carolina, Virginia, and West Virginia.

### Points to Ponder

- **Techniques of cloning fruit trees were first learned thousands of years ago. Scientists now use variations of cloning techniques for medical research and biotechnology. Scientists often look to ancient ways and ancient peoples for ideas about future innovations. Can you name other tools, ideas, or adaptations we have gotten from our ancestors?**
- **Can you explore similarities and differences between Samhain and Halloween? How has Halloween changed over the centuries? How do we use apples in our fall celebrations?**
- **The story of Johnny Appleseed is largely true but partly legend. Can you find out more about him? Can you find out more about William Tell? What did he have to do with the apple?**
- **Why do we traditionally give an apple to the teacher? Where did this custom come from?**

*Take an apple with a stem; turn the stem, counting the number of turns before the stem breaks off. The number of turns indicates the number of children you will have.*



## Following the Apple's Incredible Journey

### Youth will

- gather information to solve a problem.
- observe the route the apple took in its travels around the world and find apple-growing regions of today.

### Materials needed

- A world map or atlas
- A map of the United States

The apple has taken an incredible journey around the world. Use the map and the information in the previous section, "Apples through the Ages," to answer the following questions:

- Can you find the apple's original home on the world map?
- Where are the Himalayan Mountains? From there, trace the route the apple has taken as it has been carried around the world.
- Can you pinpoint today's major apple-producing countries on the map?
- Can you find the states in the United States that produce the most apples?
- What do these regions have in common, as indicated by their location on the map?
- From the map, can you tell why apples are now available all year?

## Apples in Literature

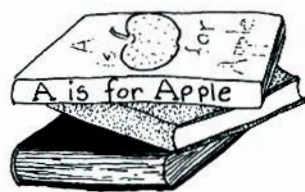
### Youth will

- learn to consider a broad range of information.
- have the opportunity to enjoy the beauty of apples in print and see how apples are used in ways other than for eating.

### Materials needed

- Several children's books that focus on apples (see the References at the end of the bulletin for a list of commonly available titles, or check the children's section of your local library)

Because of their beauty and popularity, apples have been a favorite subject in classical art, literature, pottery, sculpture, and even textile design. Apples have come to symbolize good health, beauty, wealth, and, in the Bible, evil and downfall. The trees themselves symbolize long life and steadfast strength. In this activity, you can experience the beauty of the apple and apple tree firsthand by exploring beautifully illustrated children's books.



*An apple a day keeps the doctor away.*

Visit your local library and gather together several titles from the list in the reference section of this publication. Many nonfiction books are available as well.

Read through the stories.

- Do the apples have any special meaning in the stories?
- Can you find some common themes among the stories?
- Do any of the books provide insights into growing or eating apples? What do the stories teach about apples?

As a follow-up activity, can you do a painting or drawing like the illustrations in the books? Can you make up your own?

Can you write an apple story of your own? You may even want to create a legend using the apple as a symbol for something such as wealth, happiness, or abundance.

## Making Apple Puppets

### Youth will

- learn an aspect of history by creating a product and work on a task with others.
- make a folk toy and explore how toys from another era differ from those today.

### Materials needed

- Small bowl
- Lemon juice concentrate
- A round, firm, bruise-free apple
- Paring knife
- Wooden craft stick
- Two large whole cloves
- Paper towels
- String
- Small sock

In the days before computers, video games, and mass-produced toys, parents often made toys for their children, using whatever materials were at hand. Dolls made from apples were a popular toy in pioneer days. Children can create their own unique dolls.

Pour into a bowl enough lemon juice concentrate to cover an apple. Peel the apple, leaving the stem and a small amount of peel around the stem intact. Push the wooden stick into the other end. Roll the apple thoroughly in the lemon juice. Carve a face into the apple, cutting deep dents for the eyes and a slit for the mouth.

## Apple Games

Your cuts should be deep enough so that these facial features are easy to see, but don't cut through the apple. Press one clove in each eye.

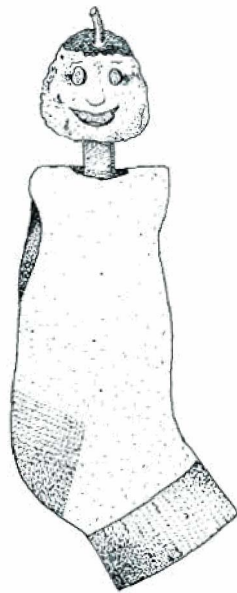
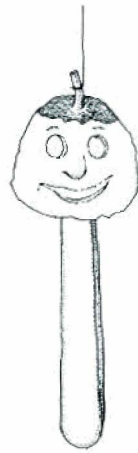
Soak the apple in lemon juice for about one hour. This will help to preserve it.

Remove the apple and pat dry with paper towels. Tie a string around the stem; hang the head in a warm, dry place to keep it from rotting. It will dry completely in about 20 days to one month.

After the head dries, make the body by making a small cut in the toe end of the sock. Pull the craft stick through this hole. Cut side holes in the sock. To use the doll as a puppet, hold the stick with three concealed fingers and place the other two fingers through the holes for arms.

For more elaborate puppets, glue on yarn or corn silk for hair and decorate the sock with buttons, fabric paints, or other decorations.

Store in a dry place.



### Youth will

- participate as team members contributing to a group effort.
- play historic apple games.

Materials vary according to the games, but all are simple and require little other than apples. Some of the games in this sampler date back hundreds of years. All are easy, and some can get quite messy.

**Apple on a Line:** Tie a string to the stem of an apple and tie the string to a support. Spin the apple and try to take a bite from the apple while it is spinning, without using your hands. This game is more difficult if two or three people do it at once.

**Apple on a Mound:** Place a small apple on a large mound of flour. Each person scoops away flour without moving the apple. The person who dislodges the apple has to retrieve it from the flour with his or her mouth.

**Pass the Apple:** Form two teams. Give each team an apple. Team members stand in a line with their hands held behind their backs. The first person tucks the apple firmly under his or her chin. The apple is passed down the line from chin to chin. The team that finishes first wins.

**Apple Scramble:** Scatter several varieties of apples across the floor. Line up players at the end of the room. Call out the name of a variety. Players scramble to pick up the right apple. Any player who doesn't get an apple or chooses the wrong variety is "out." The winner is the one who collects all the right varieties.

**The Longest Peel:** Try to cut the longest peel, in the shortest period of time, without breaking it.

**Apple Feat:** Players sit in two rows, facing each other. Each team has an apple. Pass the apple down the line by holding the apple between the feet. If the apple is dropped, the team starts again. The first team to get the apple from one end to the other wins.

**Apple Prints:** Cut apples through the middle to reveal the star shape. Dip into paint or use an ink pad to make prints on clothing or paper. Textile paints are longer lasting and have exceptional color.

*Source: Beatrice Mayfield, Apple Games and Customs (London: Common Ground, 1994).*

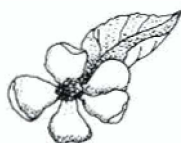


# All in the Family

Animals and plants have families. Look at your own: your family has common ancestors, and some of your family members probably share common traits with you. Apples, too, belong to a family, the rose family, along with raspberries, cherries, plums, strawberries, peaches, and pears. These plants may not seem much alike, but they share some common traits. The similarity is apparent if you look at their flowers. All rose family members have flowers with five petals and five sepals. The five green sepals make up what is called the calyx. As the buds swell, the sepals open to reveal the five petals. Apple flowers are located in clusters of five.

There are many varieties of apples, and they come in many shapes, sizes, and col-

ors. All apples are pome fruits; these are fruits in the rose family that have seeds inside the core. The core of an apple is divided into five sections, and each section usually contains two seeds (note the star shape). Peaches and cherries, which also are in the rose family, are drupes, with a single seed that is surrounded by a hard stone.



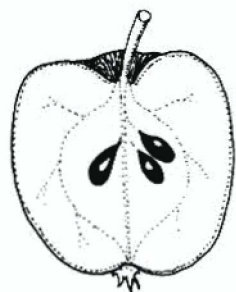
*Apple blossom*



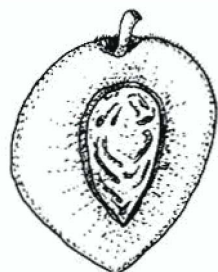
*Strawberry blossom*



*Apricot blossom*



*Apple—pome fruit*



*Almond—drupe*

## Exploring Apple Shapes, Skin, and Eyes

### Youth will

- categorize and select information.
- enhance observation and recording skills by examining apples closely to see that in addition to color differences, apples have many other unique characteristics. This activity will introduce terminology used by apple breeders.

### Materials needed

- As many different varieties of apples as you can gather together, preferably unwaxed
- Pencil and paper

Before beginning the activity, talk about and describe each apple variety. Then look at the characteristics listed below to come up with more detailed descriptions.

Young people may question the significance of such detailed observation. You may want to point out that this information is critical for plant breeders who are developing new varieties. It is also useful for identifying old apple varieties. For example, each year, apple breeders are asked to identify unknown varieties that grow in orchards and backyards. Without these diagnostic tools, it would be extremely difficult to identify apples. Sharp observation is an important skill for a scientist.

Apples come in many different colors, but they also have distinct shapes. Have you noticed how different are the shapes of apples of different varieties?

Scientists use eight terms to describe the shapes of apples. For this activity, they have been simplified into four groups:

Flat  
Round  
Conical  
Oblong

Look at the illustrations, and compare them to your apples. Can you choose the one that most resembles yours? Try drawing the shapes yourself. Can you see the differences?

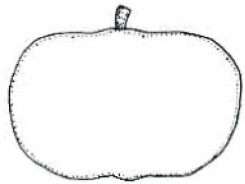
### Skin

How would you describe the skin of the apples? We often refer to their color, but what about other qualities? There are many descriptions for skin characteristics, but we will focus on seven:

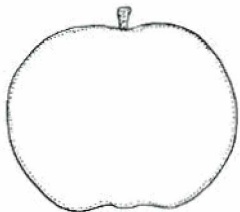
**Bloom** Some apples, such as McIntosh, are covered with a very fine, whitish, waxy film or cloudy bloom. You can often polish off the bloom by rubbing it vigorously with a cloth.

**Blush** This is an area of unbroken color. It can appear as just a small patch or may cover the fruit.





flat



round



conical



oblong

**Lenticels** These are pores that are distributed over the surface of the apple. The apple **respires**, or exchanges gases—a bit like our breathing—through these pores. Lenticels may be very prominent and are usually roundish, although some are more angular.

**Mottling** An apple is mottled when the overlying color is broken, showing the pale skin underneath.

**Russeting** This is a very thin, brown, corklike layer that forms in patchy areas over the skin. It may entirely cover the skin or appear in dustlike patches. Apples with a lot of russeting have names like Roxbury Russet or Rosemary Russet. If it just appears over part of the surface, it is often referred to as **netting**.

**Striped** The fruit may be striped with shades of red. You may see long, unbroken stripes or short, broken “splashes.”

**Texture** Are your apples smooth or rough? Do they feel dry or “greasy?” The greasiness is a wax produced by the fruit.

How would you describe the skin of the apples? Which qualities do they lack? Which do they possess? Write down a description based on your observations.

### Eye

The eye is the last remaining part of the blossom. It is at the base of the apple, opposite the stem. After the petals drop, the eye takes on a distinct form. For this portion of the activity, compare your “eyes” with the illustrations:



convergent



erect



connivent



divergent



reflexed tips

**Convergent**—the tips meet

**Erect**—sepals stand upright

**Connivent**—sepals stand upright with overlapping points

**Divergent**—sepals fall back

**Reflexed tips**—tips of the sepals are bent outward, away from the eye

Write a description of apples’ eyes based on your observations.

Look back over the descriptions. Do the apples look different to you now? Do you see them the same way?

The next time you eat an apple, try to remember some of these characteristics, even if you don’t remember the terms, before you take a bite.

### Resource for this activity:

Roxanne Sanders, *The Apple Book* (New York: Philosophical Library, 1988), pp. 9–10.

# How Does Your Apple Tree Grow?

Apple trees grow best in areas with cold winters, but they are found on every continent except Antarctica. In every season, from winter through fall, something interesting is happening in an apple tree. During the winter, trees are *dormant*, or in a period of rest. Although you cannot see growth during the winter, carbohydrates made in the leaves are moving downward through the tree and into the roots. These carbohydrates, or complex sugars, are used to help the entire tree grow.

When spring arrives, leaf and flower buds swell, preparing for a flush of new growth. First the leaves unfurl and then the flowers open. Bees pollinate the flowers because the trees cannot move pollen on their own. This is so important that growers usually move hives of bees into their orchards just before the trees bloom. Growers plant more than one variety because flowers need to be cross-pollinated. For blossoms eventually to produce fruit, the pollen from one apple blossom has to reach a blossom of another variety. If something interrupts pollination, such as cold, rainy weather or a period of

extreme cold, apple flowers may not be properly pollinated, and trees will set fewer fruit.

By late spring, most of the flowers have opened and have been pollinated. After pollination, the petals fade and fall off, and young fruits begin to swell. The receptacle, or flower stem base, bulges as it grows; it changes shape and becomes less oval and more "appley." These young fruits will become apples that contain seeds with genetic traits of both their parents. All through the summer, the fruits grow, using sugars that have been manufactured in the leaves and water and nutrients from the soil. They get bigger and rounder, and as late summer approaches, their colors deepen and the seeds in the fruits mature.

What happens if you plant the seeds from one of these fat, tasty apples? Actually, it's a mystery. Because cross-pollination of two different varieties is required for flowers to set fruit, each seed has the potential to make a completely different young tree, with fruits that may be yellow, red, or green, small or large, sweet or sour. You can never predict just what the results will be. Even if you

know which two varieties were crossed, you still never know what genetic combination the seeds will hold. The same is true with people: you may know who the parents are, but you cannot predict whether the baby will be a boy or girl, what color the hair will be, or the child's personality. Pollen may come from wild apples, crab apples, and other apples in the vicinity, and so the seed may also sprout into a wild apple tree. This genetic diversity is one of the secrets to apples' survival and success.

Many animals and insect pests love to feed on apples. Codling moths, apple maggots, plum curculio, and apple tree borers are just a few of the insects that feed on the trees or the fruit. Diseases such as apple scab, powdery mildew, cedar-apple rust, and fireblight further challenge growers. And then there are birds, deer, voles, and other wildlife that love to devour apples,

branches, and even roots of trees. Home orchardists use a combined, or integrated, approach to pest management that includes many methods other than just spraying pesticides. Cleaning up leaf debris and fallen fruit in autumn, pruning and training trees to open them up for air circulation and sunlight, giving the trees the nutrients they need, and planting disease-resistant varieties are all part of the pest management strategy.

## Points to Ponder

- How does the growth cycle of apples compare with other growth cycles that you may have explored?



*Stolen  
apples  
are the  
sweetest.*

## Growing Apple Trees from Seeds

### Youth will

- observe diversity in plants.
- discover the chilling and growing requirements necessary for apple seeds and compare leaf sizes, shapes, and colors, as well as heights of seedlings.

### Background

This activity requires a fairly long time period but will provide interesting results in the short term as well.

Growing apple trees from seeds will reveal tremendous variation in characteristics such as tree size, fruit size, fruit quality, pest resistance, and the length of time before the tree begins to bear fruit. Although it will take years fully to observe these characteristics, you may see differences in the seedlings their first year, for example, in how rapidly they germinate, how much they grow, their growth habit, and even subtle differences in the color and shapes of the leaves.

This is an excellent activity for demonstrating variation and diversity and a great way to produce a large number of apple trees, but it may not be the best way to get apples of good eating quality. Trees will likely be large, and pruning, training, and controlling pests may present challenges. But they would be suitable for a hedgerow or similar type of planting.

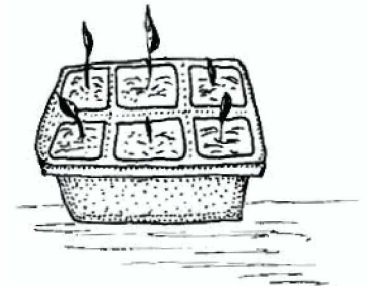
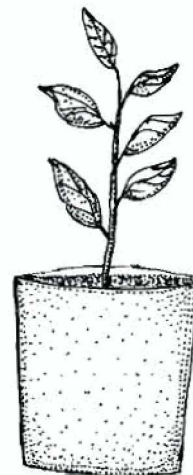
### Materials needed

- Apple seeds
- Plastic sandwich bags
- Damp peat or sphagnum moss (about 1 cup)
- Permanent marker and plastic labels
- Seed starting mix or potting soil
- Cell packs or other small-celled seed starting tray
- Six-inch pots

Place seeds in a plastic bag full of moist peat moss. If you have seeds from more than one variety of apple, use separate bags. Label them with permanent markers, and keep them moist but not soggy.

Place bags in the vegetable crisper of the refrigerator for two to three months, or until the seeds begin to sprout. (As a comparison, try leaving one bag at room temperature; see "Going One Step Further" below.) Check them often because there is variation in the time till seeds will sprout. The crisper is ideal because the best temperature for this process of cold stratification is 40° F. Below 32° is too cold, and above 50° is too warm.

After the seeds have sprouted, remove them from the plastic bags and plant, one per cell, 1/2 inch deep in potting soil or seed starting mix. Place cell packs on a tray on a sunny, south-facing windowsill for two to three weeks. Keep them well watered but not soggy. Then transplant each seedling to a six-inch pot filled with any good potting mix. Place pots on the same south-facing windowsill or under grow-lights. Water whenever the surface of the pots begins to dry out. In mid-May, or around the last frost-free date in your area, the seedlings can be transplanted outside (see the activity "Planting Apple Trees," page 15). Surround each seedling with hardware cloth to protect them from deer and rabbits. By the next autumn you will have young trees that are several feet tall.



### Going One Step Further

- As an experiment, use some apple seeds that have not been chilled. (If you buy them in the store, they may have been in cold storage, so you will need to get them from a source that you know hasn't chilled them.) Plant these seeds along with the seeds that have been chilled, being careful to label each pot. Why didn't the seeds that were not chilled germinate? Why is this important?
- Leave a potted tree indoors where it is warm all winter. Leave another outdoors. In the spring, observe the differences. What do you expect will happen?

*Who sets an apple tree may live to see its end. Who sets a pear may set it for a friend.*



## Apple Tree Shapes

Youth will

- develop wider comprehension of differences among trees.
- enhance observation skills by examining apple trees closely and begin to discover how pruning and training may vary because of an apple tree's shape.

This is a good activity to do when taking a field trip, to add to the richness of the experience and to look more closely at the trees in the orchard. You may want to combine it with "The Great Creature Quest" on page 17.

No materials are needed, but you will need to visit an old apple orchard. A well-tended orchard may not be the best choice for this activity because pruning the trees changes their characteristics. The characteristics of trees that are left to assume their natural shape, such as in an abandoned orchard, will be more dramatic.

Just as apple fruits vary greatly, apple trees have many different shapes. Their bark varies as well and may be red, brown, orange, gray, smooth, shaggy, and so on. Can you detect differences in the bark in the trees you

see on the field trip? Can you identify the shapes of the trees, based on the following illustrations?

Upright

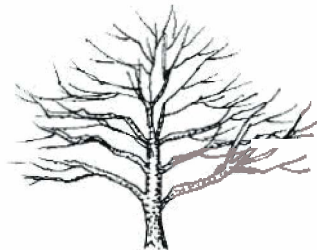
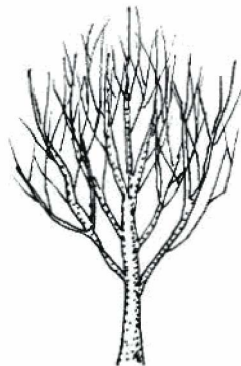
Spreading

Compact

Drooping

You learned in the "Exploring Apple Shapes, Skin, and Eyes" activity that fruits have many more characteristics than you may realize. These characteristics are used to describe fruits in breeding programs. They are ultimately important because they influence our perception of whether we think the fruit looks tasty.

The shape of an apple tree influences how easy it will be to work with the tree. In the section "Playing with Mother Nature," you will read about pruning and why it is important. Fruits grow better on horizontal branches. Vertical, upright growth is much more conducive to growing leaves than fruit. So upright trees are more challenging to prune and train than trees with a spreading habit.



## Examining Apple Leaves

Youth will

- enhance observation skills by examining apple leaves closely and witness the diversity in color and shapes of leaves. This is a good activity to do when taking a field trip. You may want to combine it with "The Great Creature Quest" on page 17.

Materials needed

- Leaves from as many apple varieties as possible

You might think that all apple leaves look alike, but in fact, there are great differences among varieties. This is one more tool that growers and scientists use to distinguish them. The edges of the leaves can be toothed, like a saw, and these teeth, called serrations, have subtle differences. The surface of the leaf might be flat or wavy, and the underside is generally covered with fine hairs. The color may range from blue-green to bright green. Can you see the difference between the acute, or "pointy," and more oval-shaped types?

## Planting Apple Trees

### Youth will

- learn to break tasks into steps for easier completion.
- learn how to plant a tree.

This activity ties in well with Arbor Day.

### Materials needed

- At least two varieties of apple (for cross-pollination)
- Shovel
- Large garbage bag or tarp

You will need to know whether your trees are on standard rootstocks or size-controlling (dwarf) rootstocks. If you are not sure, ask when you buy them.

Optional: Invite a tree nursery employee to plant trees as a demonstration.

It's easy to plant fruit trees but more challenging to make sure that they have all the conditions they need to grow! All fruit trees—not just apples—prefer a sunny site, protected from wind and frost, with a well-drained but preferably moist soil. Ideally, you should prepare your site the year before you plant by testing the soil to check its pH and nutrient level and then modifying the soil by working in whatever ingredients the soil test results say you need. For example, many people need to add lime to raise the pH of the soil to an acceptable level.

It's also important to choose varieties that are suitable for your location. Your best bet is to call the local Cooperative Extension office and find out which varieties are ideal for your region. Cooperative Extension also may have soil test kits and other resources that will be useful. Choose disease-resistant varieties for easier care.

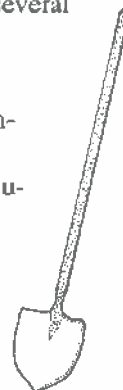
When your site has been prepared, you're ready to go. Early spring is the best time for planting apple trees. Plant as soon as you can work up the ground, before the trees begin to grow. Before you plant, remove broken or injured roots from the trees. Do not let the roots dry out! Unnecessary exposure to sun and wind can kill the trees. To get them off to a good start, soak the roots in a pail of clean, cool water for up to, but no longer than, several hours.

Dig holes large enough to accommodate the tree roots in their natural position. Set the topsoil aside on the garbage bag or tarp. This will keep the area clean and make it easier to dump the soil back over the tree roots.

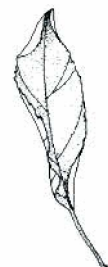
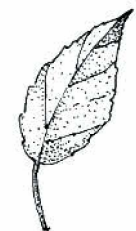
Set trees on standard rootstocks at about the same depth or an inch or two deeper than they were grown in the nursery. (You will be able to see the line on the tree where the soil stopped when the tree was in the nursery.) Plant trees that have been grafted onto dwarf rootstocks so that the graft union is about two inches above the ground level. (You will see a slight swelling or change in bark texture that indicates where the graft union was.) If this union of a dwarf tree is below the soil line, roots may develop that cause the tree to lose the dwarfing effect.

Move the tree up and down gently an inch or so as you shovel soil back over the roots. This helps to settle the soil under and around the roots and gets rid of air spaces. Pick up the tarp and empty the rest of the soil over the roots. Lightly tamp the soil, and water immediately. Give trees a good soaking each week unless you receive plenty of rainfall. Do not mix fertilizer into the hole—it can damage the roots. Dwarf trees may need to be staked.

Enjoy your trees for many years to come!



*The apple never falls very far from the tree.*



# Playing with Mother Nature

Growers want to be able to predict what varieties of trees they will grow. After all, their customers may want to buy McIntosh, Gala, Ginger Gold, or Macoun—not just any apple! Apple growers rely on a practice called grafting to ensure that they plant a known variety.

Grafting is a most amazing process. It allows you to combine two different trees into one. Each adapts and nurtures the other so that they can both survive. Most related trees can be grafted together. For example, apple buds can be grafted onto pear branches or peach branches onto almond roots. The trick to grafting is to gather dormant buds or twigs (called “budwood”) from

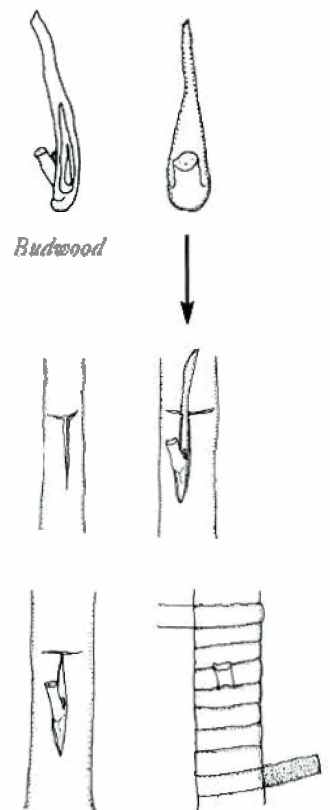
recent branch growth on a “mother” tree that you want to propagate. Twigs from the outer young branches are best for grafting, and the best times to gather them are in early spring or late summer. If the green cambium layers of one bud or twig and another branch or young tree trunk are placed together at the right time of year—and then held tightly together inside a waterproof bandage or wax layer—they will fuse.

After the cut has been made, it needs to heal quickly because the roots need the leaves and the leaves need the roots. It is to the tree's advantage to ensure that the graft “takes.”

It is important to understand that if you graft a McIntosh

bud or scion, the new tree will be McIntosh, and all the apples will be McIntosh apples. Every McIntosh or Granny Smith apple tree in the world came from a single mother tree more than 150 years ago. As long as people keep grafting their budwood onto new rootstocks, these fruit trees could live forever.

We graft to produce a certain known variety. Growers are concerned about the other “side” of the graft as well. The tree rootstock that the graft is placed into is important, too. Most growers and home gardeners prefer small trees that are easy to care for and pick from. That is why varieties are usually grafted onto rootstocks that will influence the tree's growth to make it small in stature.



*Men grafting in the early 1920s.*



Dwarf trees take up less space, too. Some growers plant more than 500 dwarf trees in an acre, whereas larger trees are planted about 25 to the acre. Thus grafting gives us known varieties that we prefer to eat and smaller trees that are easier to work with and can be harvested without ladders.

*Pruning* is another way to influence a tree by playing around with Mother Nature. Pruning is a way of trimming and cutting trees to change the shape and ultimately to increase the number and quality of apples. Pruning is done so that more sunlight will reach all parts of the tree. Apple trees growing wild and unpruned will become thick with growth. Growers and home gardeners begin pruning trees when they are planted and each year thereafter to make sure that they grow into more of a pyramid, or Christmas tree-like shape. Another benefit of pruning is that opening the tree up to more light and air circulation may result in fewer diseases. Apple trees that are well pruned and cared for are usually productive for 40 to 80 years.



*The ideally shaped apple tree*

## The Great Creature Quest

### Youth will

- gather information needed to solve problems and record information.
- become aware of the incredible diversity of life in an orchard.

This activity will enhance observation skills and will add to the educational value of a field trip. You may want to combine it with the activity "Apple Tree Shapes" on page 14. It may be more fun to work in teams. You should be aware of whether any participants have allergies to any insects before undertaking this activity.

This activity involves visiting an apple orchard, and early autumn is the best time to do it.

### Materials needed

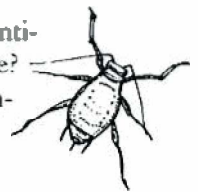
- Magnifying glass or hand lens
- Containers with lids (such as those used for ricotta or cottage cheese)
- Paper and pencils
- Natural history, bird, and insect field guides

Get off the beaten path and go into the orchard. Find as many creatures as you possibly can. Don't hesitate to look in the tree canopy, on the leaves, among the flowers, on (and in) the fruit and the twigs and stems, and under the bark scales on the trunk. Crawl around in the grass and get close to the ground. How many insects, worms, spiders, or even mice or voles are in the grass? Are there eggs attached to undersides of leaves? Use the containers to house creatures for identification. Take note of things that you can see but cannot catch. Make a list of everything you find. You may want to draw pictures of creatures to try to key out later if you do not have a field guide.

**Caution:** Scoop insects into the container with a leaf or stick; do not touch insects that may sting or bite. Release the insects after identifying them.

If you see birds, can you identify them using the field guide? You are likely to see the common crow, hawks of various species, mourning doves, nuthatches, robins, and many others.

How many birds, insects, worms, and other creatures did you find? In what general group did you find the most insects? Birds?



# Apple Picking Time

Apples have a rich and fascinating history. Their beauty is enjoyed in art and literature, and they are used in many social occasions. But the pleasure is in eating them! Anyone who has ever crunched a freshly picked apple, sipped a mug of cool apple cider on a warm fall day, savored a thick slice of apple pie, or enjoyed freshly made applesauce knows just how good apples are. But before you can enjoy them, you need to harvest them.

Apples begin to ripen in late summer. Home gardeners pick apples when they are ripe and store them in root cellars or other cool areas such as the house basement.

The earliest varieties are harvested in late July to August; picking continues through October.

Most home gardeners gauge ripeness by the taste of the fruit, but growers often rely on special instruments to ensure that apples are at the perfect stage for picking (see sidebar on page 19). Growers with apple orchards harvest dessert, or eating, apples by hand, just as home gardeners do. Apple pickers handle the fruits gently to keep them from bruising. They place the apples in special canvas bags with openings at the bottoms. When a bag is full, they open the bottom and

carefully empty the apples into large bins. A few growers now use mechanical harvesters to pick apples that will be used for applesauce, vinegar, jellies, juice, and cider.

After apples are picked, they are held in a cool area before being cleaned and graded. Tractors pick up big wooden crates or bins of apples and empty the apples into tanks of water. The apples then pass along rubber conveyor belts, where they are dried and sorted by size and fruit quality. Some apples may be shipped to stores, while others are processed into various products. The apples that are not used right away are

stored. Growers used to rely on cool temperature alone, placing apples in large cold storage rooms. Today, many place apples in sealed rooms with a reduced amount of oxygen, so that atmosphere is an important component as well. This is called controlled atmosphere storage, or CA storage. Apples respire, or breathe, even after harvest. As they use up oxygen and give off carbon dioxide, they gradually soften and ripen, but they will not rot for many months. Reducing the oxygen in special storage rooms slows the process of gradual ripening so apples stay fresh longer. This is why you can enjoy a

*A busy harvest season, late 1910s to early 1920s.*



crunchy apple in February as if it had just been picked from the tree.

Some apples are better for out-of-hand eating, while others are better for cooking or cider. Some keep well, and others need to be used right away or they will get soft and mealy.

### Why Eat Apples?

Apples and other fresh fruits are tasty fast foods. They are conveniently packaged in their skins, ready to wash and eat.

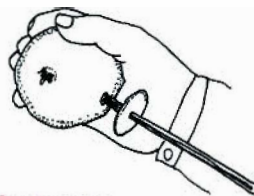
Eating plenty of fruits and vegetables can help reduce the risk of developing heart disease, certain cancers, and other chronic diseases. Fruit and vegetables also promote a healthy digestive system and are naturally low in fat and sodium.

### Apple Technology.

Growers and scientists use instruments to provide them with information about apples before they are picked. Computers calculate important information such as length of the growing season, weather and climate patterns, and presence of insects and diseases. A refractometer measures an apple's sugar content. A penetrometer is used to measure the firmness of an apple.



*Refractometer*



*Penetrometer*

### Apple Careers

Youth will

become aware of a variety of occupations and careers and of research possibilities.

- explore similarities and differences between careers that involve work with apples.

This activity also helps young people explore the food system and how food is moved from farm to table.

As a group, brainstorm careers associated with apples. The first jobs that come to mind may be ones related to growing and handling apples, but there are many more. Use the following list of questions to get started.

- Where do apple trees come from? Where do you buy them?
- What jobs are associated with growing apples? List as many as you can think of from planting through harvest.
- What happens to apples after harvest?
- How are apples moved from the farm to their next destination?
- How are apples prepared in different ways for sale?
- Name the places that sell apples.

- Can you name a fancy apple product geared for a high-end market?
- Who markets and promotes apples to the public?
- Does someone in your county teach orchardists and home gardeners how to grow apples?
- Who researches the best way to grow apples?
- Who develops new varieties?

Optional: Explore one career in depth. See if you can find out more about apple careers in your community or from the Internet. Can you locate on the World Wide Web a university horticulture department that includes a pomologist, or apple specialist? Which of the above careers seems the most interesting? Is there someone you can interview to find out more?



## The Taste Test I

Youth will

- gather information to help their decision making.
- discover how attractiveness (including color and presence of blemishes) can influence our perception of taste.

### Background

Apples vary greatly in looks and taste. Sometimes the apples that are the most beautiful don't taste the best. In this activity, you will discover which apples really taste best—and you may discover something about what can influence peoples' food preferences as well.

The time of year will have some bearing on the outcome of this taste test; you may even want to repeat it a couple of times throughout the year. Late in the winter, some apples that have been in storage may have a mealy texture.

### Materials needed

- Five varieties of apples from local supermarkets. Try to include several of the following: Red Delicious, Empire, Granny Smith, Fuji, Golden Delicious, Crispin, IdaRed, McIntosh.
- Towel
- Paper plates
- One or two people to serve as helpers
- Knife to cut samples
- Blindfolds

**Tip:** read through the activity and label plates with variety names in advance.

First, wash the apple samples and buff dry with a towel so apples are shiny. Place each apple on a plate and write the name of the variety on the plate. Ask participants to rank apples from one to five, with one as their favorite and five as their least favorite. They can do this based on what they already know about the apple or on the apples' appearances.

After washing their hands, the helpers can prepare the apples for tasting by cutting slices of each variety for all participants. Place a blindfold on each participant except for the helpers. Provide each participant with five plates, each containing a slice of a different variety. Label each plate with the variety name.

Ask the blindfolded participants to take a bite of each variety and then rank them from one to five, favorite to least favorite. The helpers may need to assist the participants by helping them move their plates.

When everyone is finished, remove the blindfolds and discuss the rankings.

Did participants rank the varieties the same for appearance and taste or did their choices differ?

## The Taste Test II

Youth will

- develop a wider understanding of apple varieties.
- observe different apple flavors and the tremendous diversity in apple fruits.

### Background

Many people are interested in "heirloom," or antique, varieties of apples (as well as other crops). Some prefer the heirlooms because of the importance of preserving genetic diversity; others may be seeking to recreate a landscape reminiscent of an earlier time, particularly those involved with living history museums and historical societies. Of course, there are gardeners who just like to try unusual varieties. Whatever the reasons, this is a lively way to see and taste many of these old apple varieties.

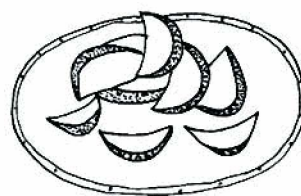
This activity makes a great community event and has been a highlight for harvest festivals, fairs, workshops, and other events. Organize a tasting, tie in some other activities, and you'll be on your way to an annual event.

### Materials needed

- As many apple varieties as you can possibly find. Include familiar and uncommon apples if you can. If you're near an apple-growing region, invite growers to share their most obscure items.

### Points to Ponder

- Did people have the same preferences?
- Some people say that Americans "eat with their eyes." What does this mean?
- How do you define quality?
- What do your findings indicate about judging based on appearances?
- Do you think participants would have made the same choices if they could have seen the samples when tasting?



Empire

You may be surprised at what they come up with, such as 'Wolf River,' 'Fameuse,' 'Twenty Ounce,' and even 'Esopus Spitzenburg.'

- Plates and knives for each variety

Bland-tasting crackers for sampling between tastes

- Apple taste test ballots found on page 28

Optional: Blackboard or flip chart

Place a whole apple on each plate and cut up pieces of another apple of the same variety to put on another plate. Replenish the pieces as they are eaten. Participants may want to eat crackers between tasting the different apples.

Ask participants to look at the whole apple, noting its appearance, shape, color, and aroma.

Hand out taste test ballots and ask participants to fill them in.

On the blackboard or flip chart, you may want to list taste and texture characteristics: Is it tart, sweet, bitter, or sour? Are the skins noticeably tough or tender? Is the apple texture mealy, hard, juicy, crisp, or soft?

Describe the cut apple. Does it stay white or turn brown?

Which variety is best for out-of-hand eating? Which are best for cooking?

### Points to Ponder

- How many unfamiliar apple varieties did you receive? How many were "heirlooms"?
- How did some of the older varieties taste? Some were grown for cider and may not be as good for fresh eating.

Which were favorites of Thomas Jefferson? How would you find out?

- Which was the best tasting? Which were the worst?

*Better an apple given than eaten.*

## Making Dried Apple Rings

Youth will

- learn an aspect of history through creating a product and enjoy working on a task with others.
- create a nutritious snack that has been popular for hundreds of years.

Background

Drying apples concentrates their sweetness. They were a popular snack in colonial days, when other sweets were a rarity. People hung strings of apples near the fireplace to dry. You can try this if you have a fireplace, or you can speed up the process by using your oven. The lemon juice acts as a preservative and prevents discoloring. This recipe makes about 30 rings.

Materials needed

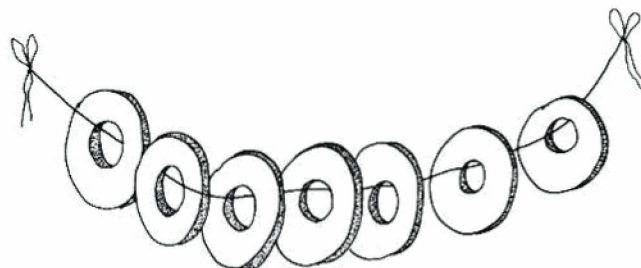
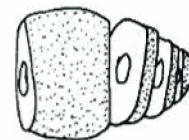
- 4 apples (Golden Delicious is an especially tasty choice)
- Knife to cut apples
- 1 tablespoon lemon juice
- 3 tablespoons water
- Shallow dish
- Paper towels
- Sturdy thread or twine

Peel, core, and slice the apples into rings about 1/8 inch thick. Mix the lemon juice and water in a shallow dish. Dip each apple ring into the mixture and pat dry with a paper towel.

Thread the twine or thread through the center of each ring, leaving several inches of thread at each end. Hang in a warm, dry place—ideally near a fireplace, radiator, or sunny window. Space the apple rings so that they don't touch each other. The rings will take about two weeks to dry completely; they will be leathery and chewy when dried. Taste them from time to time to see if they are ready. Store in plastic sandwich bags.

If you can't wait two weeks, place rings on a drying rack on a baking sheet. Put the tray in a 150° oven and let dry for about 4 to 5 hours, flipping each ring after about 2 hours. Let cool and store.

These rings can also be used to make dried apple ring wreaths.

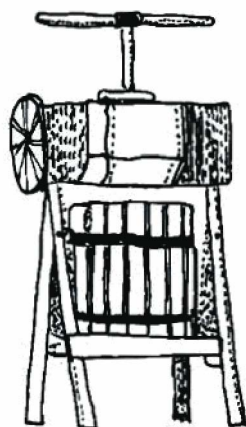


# Cider Making

Cider is the juice inside each apple. To make cider, apples are broken or mashed into tiny pieces, and the juice is pressed out of them. The remaining pulp or "pomace" can be used for compost or fed to rabbits, cows, deer, or other wildlife. Thousands of new and old cider mills dot the countryside in New England. Some old internal combustion engines are still functioning in traditional cider houses.

The "rack and cloth" press is the most common. Half a ton (1,000 pounds) of apples are first washed, then inspected to make sure that they are clean and whole. Then they are fed into a grinding mill that mashes them into a texture resembling that of applesauce but with seeds and skin included; the taste and aroma in cider come from the skins as

well as flesh. Next, the pulp is pumped or scooped into a strong woven cheesecloth placed in a square frame above a wooden rack such as an open checkerboard of thin oak slats crosswise to each other. After each cloth is filled with about five gallons of pulp, it is folded over snugly and another rack and cloth are placed on top. When a dozen or so racks and cloths are filled and stacked in a pile about three feet high, the "cheese" is finished and can be rolled into a big viselike press that applies a pressure of 2,000 to 3,000 pounds per square inch to the whole stack. The cider seeps and gushes out through the cloth and runs into a large tub beneath the press, leaving a solid pomace behind. The cider is then filtered once more and quickly pumped into a refrigerated tank for storage. Each pressing yields about 50 gallons of sweet, fresh, delicious cider.



## Making Fresh Cider at Home

Youth will

- develop the capacity to consider alternatives and choices.
- create a healthful beverage that they can compare to purchased apple juice.

Materials needed

- Clean, intact apples (each bushel box of apples will make about three gallons of fresh cider)
- Knife to cut apples
- Cider press; or large blender or food processor; or a large stainless steel soup pot and potato masher
- Cheesecloth
- Pitcher for fresh cider
- Apple juice from the store (for comparison)

Choose clean, intact apples. Do not use dropped apples or apples that show signs of bruising or decay. Drops may be exposed to more harmful microbes than apples on the tree. Damaged or decaying fruit could promote the growth of harmful microorganisms that might be present.

Small cider presses are available from some garden supply catalogs. Someone in your community might have one that could be borrowed for this activity—you may want to ask around. Local growers may know of individuals with small presses. These cider presses are made from oak or maple wood and have a masher that shreds apples into small pieces in a cylindrical tub. A screw press and plate compresses the mash to squeeze out the cider.

If a press is not available, you can use a large blender or food processor to mash or "pulp" the apples. Or slice apples finely into a large stainless steel soup pot and crush with a potato masher. Use only stainless steel or wood for pressing or storing cider because the juice reacts with iron or aluminum containers.

Whichever method you use for mashing, once pulped, you will need to squeeze the cider out. To do this, wrap the mash in several layers of clean cheesecloth. Twist the cheesecloth as tightly as you can over a large bowl to extract and collect the juice. Compost the remaining pomace.



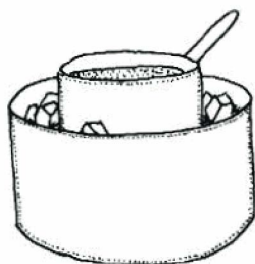
Unfortunately, scientists warn that some apples may be contaminated with harmful microorganisms that can make people sick. Young children and elderly people are particularly vulnerable to foodborne illness.

You can make safe cider by following the guidelines below. The heating process is called pasteurization. Besides making the cider safe to drink, it will make it last much longer than if it had not been heated.

- Wash all apples with running water that is safe to drink. Scrub each apple thoroughly with a clean vegetable brush.

After making your cider, you must heat it to kill any harmful microorganisms that might be present.

- If you have a chef's or a candy thermometer, heat and stir the cider until it reaches 170°F. Keep it at this temperature for half a minute, then cool the cider. If you do not have a thermometer, heat and stir the cider until it boils, then remove from heat.



*Ice bath*

- Cool the cider quickly to preserve the fresh taste. Place the metal cooking pot in a sink filled with a large volume of ice and some water. Stir the cider until it is cool.
- Pour the cooled cider into clean containers and cap. Store the cider in the refrigerator.

Pour the cider and the purchased juice into cups and taste.

- How do the two compare?
- Which do you like better?
- How are the flavors different?
- Which is thicker and has more texture?

*One bad apple spoils the whole bunch.*

### Apple Math

Apples are measured by the bushel. A bushel contains about 110 to 115 medium-sized apples, weighing roughly 40 pounds. The United States exports more than six million bushels of apples each year.

There are 2,500 apple varieties grown throughout the United States.

One apple contains about 80 calories.

|                            | Large  | Medium | Small  |
|----------------------------|--------|--------|--------|
| Diameter                   | 3 3/4" | 2 3/4" | 2 1/4" |
| Number of Apples per Pound | 2      | 3      | 4      |

### Yield per Apple

|                |            |            |         |
|----------------|------------|------------|---------|
| Sliced/Chopped | 2 cups     | 1 1/3 cups | 3/4 cup |
| Finely Chopped | 1 1/2 cups | 1 cup      | 3/4 cup |
| Sauce          | 3/4 cup    | 1/2 cup    | 1/3 cup |

Source: New York Apple Association, Inc.  
P.O. Box 350, Fishers, NY 14453

# Apple Recipes

## Keep Your Apples Fresher, Longer

Apples can be kept crisp and crunchy for quite a long period in storage, but here are some ways to ensure maximum freshness.

- If you pick your own apples, handle them as gently as you can to minimize bruising.
  - Refrigerate apples that you do not plan to use right away.
  - Always store apples in the refrigerator crisper in a paper bag or loose plastic bag with holes for ventilation.
- Keep away from strong-tasting foods such as onions.
- Do not store apples near cut flowers or leafy vegetables. A natural gas called ethylene given off by the apples will encourage the blossoms to fade and wither more quickly and may damage the leafy vegetables. For the same reason, placing apples with bananas, peaches, avocados, and other fruits will help them to ripen more quickly.



## Apple Sandwiches

Apples give a sweet flavor and a satisfying crunch when added to sandwiches. Try the following:

Apple slices with peanut butter

Cheese and apple slices

Chopped apple mixed with tuna and mayonnaise

Chopped apple and egg salad

Cream cheese with raisins and apple chunks

## Apple Cinnamon Toast

2 tablespoons sugar

1 teaspoon cinnamon

1 apple

4 slices bread

2 teaspoons margarine

Preheat oven to 375°. Measure sugar and cinnamon in a small bowl; stir to combine. Wash and core apple. Cut apple into thin slices. Place bread on baking sheet. Spread margarine on top side of each slice of bread. Arrange apple slices on bread. Sprinkle apples with cinnamon-sugar mixture. Bake at 375° until bread is toasted, about 10–15 minutes.

*Recipe from Patricia F. Thonney, A Pyramid of Snacks (Ithaca, N.Y.: Cornell Cooperative Extension, Division of Nutritional Sciences, Cornell University, 1998).*

## Hot Mulled Apple Cider

Enjoy this warm, spicy drink on a crisp fall day—there is nothing finer! Makes 10 to 16 mugs of cider (depending on size of mug).

1 gallon of apple cider

4 sticks of cinnamon

Heaping teaspoon of whole cloves

1/4 teaspoon of nutmeg

1 orange, sliced

Optional: 1/4 cup of brown sugar

Optional: cheesecloth

In a large enamel, stainless steel, or other nonreactive cooking pan, combine the cider, the spices, and an orange slice.\* Gently warm over medium heat. Simmer for about 15 minutes. Remove the spices by pouring the cider through a strainer or by dipping a small strainer into the pan and scooping them out. Pour into mugs and float a slice of orange on top of each one.

You can tie the spices in a square of cheesecloth so you don't need to strain them out afterward. For a sweeter beverage, add the brown sugar.



## Tips

- To prevent apples from getting soft too quickly, store in the refrigerator and take them out only as needed.
- Always wash apples before eating or cooking with them.
- Peeled or cut apples discolor quickly. To prevent this, place cut apple pieces in a solution of 1 tablespoon of lemon juice in one quart of water.

## Homemade Applesauce

Homemade applesauce is delicious by itself or in recipes that call for applesauce. This recipe makes about 5 cups of sauce (about 8 to 10 servings).

4 pounds of cooking apples  
1 to 1 1/2 cups water

Stick of cinnamon

1/2 cup sugar

Cut apples into quarters. Core each quarter and peel. Place in a 4-quart saucepan along with water. Add stick of cinnamon and bring to a boil. Reduce heat; cover and simmer for 10 minutes or until apples are tender. Uncover and remove cinnamon. Remove from heat and let cool. Mash apples with a potato masher until smooth. Stir in sugar.

If you prefer chunky applesauce, add sugar before cooking and just lightly mash the apples.

An alternative to this recipe is to leave the apple skins on while cooking. After they are cooked, press the apples through a food mill to remove the skins. If you use red-skinned apples, you'll get pink applesauce.

Mix-ins. For an applesauce treat, stir in cinnamon, nutmeg, raisins, crumbled graham crackers, chopped nuts, dried cranberries or blueberries, fresh or frozen berries, granola, or a spoonful of jam.

## Apple Butter

This delicious, thick spread is great on toast or muffins and in sandwiches. It will keep for more than a month in the refrigerator in a container with a sealable lid.

9–10 apples, peeled, cored, and cut in small chunks

1 cup of apple cider

1 teaspoon cinnamon

1/2 teaspoon nutmeg

1/4 teaspoon allspice

Place the apples and cider in a large enamel, stainless steel, or other nonreactive saucepan. Cover and cook over low heat for 1/2 hour, or until the apples are soft. Remove from the stove and allow to cool. Divide into two or three batches and purée each in a blender or in the bowl of a food processor. Pour the puréed mixture into a 9" x 13" baking pan. Sprinkle the spices over the surface and mix in. Place baking pan in a preheated 300° oven.

Bake for about 2 to 3 hours. Stir every 20 minutes or so. The apple butter will darken to a rich brown and will become very thick. Remove from the oven, cool, and keep in a container with a tight-fitting lid. Apple butter keeps up to three weeks in the refrigerator.

## Baked Squash-Apple Casserole

This is an easy, unusual way to use apples.

1 small (2 pounds or less) butternut squash

2 apples, cored, peeled, and sliced

1/2 cup brown sugar

1/4 cup cold butter or margarine

1 tablespoon flour

2 tablespoons oatmeal

1/4 teaspoon cinnamon

1/4 teaspoon nutmeg

Preheat oven to 350°. Pare, seed, and cut squash into small slices. Place squash and apple slices in a 7" x 11" baking dish. Blend the rest of the ingredients with your fingers or a fork until crumbly. Sprinkle over squash and apple slices. Cover and bake for 45 to 50 minutes. Serves 6 to 8.

## After-School Applesauce Spice Cake

2 1/2 cups all-purpose flour

1 1/2 teaspoons baking soda

1 teaspoon ground cinnamon

1/4 teaspoon baking powder

1/2 cup softened butter or margarine

3/4 cup sugar

3/4 cup brown sugar

2 eggs

16 ounces of applesauce

3/4 cup raisins

Preheat oven to 350°. Combine the first four ingredients. In a mixing bowl, beat butter until creamy. Add sugars and beat until well combined. Add eggs, one at a time, beating one minute after adding each egg. Add dry ingredients and applesauce and continue beating until well blended. Stir in raisins.

Grease and lightly flour a 9" x 13" baking pan; pour in the batter. Bake in oven for 45 minutes or until a toothpick inserted into the center comes out clean. Cool and enjoy as is or with your favorite icing. Makes about 12 pieces.



*An apple pie without some cheese is like a kiss without a squeeze.*



## Apple Pancakes

These pancakes are moist and delicious!

- 1 egg
- 3/4 cup skim milk
- 1 cup all-purpose flour
- 1 tablespoon sugar
- 1/2 teaspoon salt
- 1 tablespoon baking powder
- 1/2 cup chopped apple

In a large mixing bowl, beat egg. Add remaining ingredients and stir with a spoon or whisk until batter is smooth. Heat griddle or frying pan over medium-high heat. The pan is ready when a few drops of water bounce around. Pour batter from a large spoon (about 1/4 cup per pancake); turn when puffed and full of bubbles, cooking second side until golden brown. With a spatula, lift pancake from the griddle to a serving plate.

*Recipe from Patricia F. Thonney, Muffins & More (Ithaca, N.Y.: Cornell Cooperative Extension, Division of Nutritional Sciences, Cornell University, 1999).*

## Simple Fruit Salad

- 2 apples, cored and chopped
- 2 bananas, peeled and sliced
- 2 oranges, peeled and chopped
- 1 small can pineapple chunks

Mix ingredients together. Try with different combinations of fruits, such as pears, peaches, or plums.

## Local Waldorf Salad

This classic salad is easy to make and tastes great. Put a spin on it by trying to use as much locally grown produce as you can. Even celery can often be found at farmers' markets. Serves 6.

- 2 to 3 cups chopped apple
- 1 cup cheddar cheese chunks, preferably cheese made in your home state
- 1 cup green or red grapes
- 1/2 cup diced celery
- 1/2 cup of hickory, pecan, or walnut pieces
- 1/2 cup raisins, dried blueberries, or dried cranberries
- 1/3 cup mayonnaise
- 1 tablespoon fresh lemon juice

Toss all the ingredients in a large bowl. Stir well to coat with mayonnaise and lemon juice. Chill until ready to serve.

## Autumn Cider Beans

These beans have a deep, rich flavor and will enhance any fall meal. Great for Thanksgiving! Serves 8.

- 3 cups dried white navy beans
- 1 small diced onion
- 7 tablespoons molasses
- 1/4 cup prepared mustard
- 2 tablespoons tomato paste or 3 tablespoons ketchup
- 1 teaspoon salt
- 1 teaspoon black pepper
- 1/2 teaspoon thyme
- 1 tablespoon cider vinegar
- 2 tablespoons soy sauce

2 1/2 cups fresh, boiling apple cider

Rinse and clean the beans. Place in a pot with enough cold water to cover by an inch and leave overnight. (Or bring to a boil, turn off the heat, and leave for one hour.) Drain and rinse the beans and again add enough cold water to cover. Bring to a boil, reduce heat, and simmer for 45 minutes. Skim and discard any foam that rises to the top as the beans simmer. Turn off the heat and drain beans well.

Preheat oven to 325°. Place the beans in an ovenproof casserole. Stir in all the remaining ingredients and pour in boiling cider just to cover the beans. Cover and bake for 2 to 3 hours. Check every half-hour—if beans appear too dry, add several tablespoons of cider.

## Apple Muffins

- 2 cups all-purpose flour
- 1/4 cup sugar
- 1 tablespoon baking powder
- 1/2 teaspoon cinnamon
- 1 egg
- 1/4 cup vegetable oil
- 1 cup skim milk
- 1/2 cup finely chopped apple

Preheat oven to 400°. Grease bottom only of 12 medium muffin cups. Measure flour, sugar, baking powder, and cinnamon into a large mixing bowl. Stir to combine ingredients. Crack egg into a small bowl and beat with a fork to combine white and yolk. Make a well in the center of flour mixture; add egg, oil, and milk. Stir batter just until dry ingredients are moistened; batter will be lumpy. Fold in chopped apple. Divide batter among muffin cups, filling each about half full. Bake 20 minutes, until firm to touch.

*Recipe from Patricia F. Thonney, Muffins & More (Ithaca, N.Y.: Cornell Cooperative Extension, Division of Nutritional Sciences, Cornell University, 1999).*

# References

Eames-Sheavly, Marcia, and M. P. Pritts. 1995. *The Home Fruit Planting*. Rev. ed. Ithaca, N.Y.: Cornell Cooperative Extension. IB156. This comprehensive publication covers all aspects of tree and berry fruit planting and maintenance.

Mayfield, Beatrice. 1994. *Apple Games and Customs*. London: Common Ground. (ISBN 1-870364-12-0) This delightful little book covers traditional games, stories, songs and rhymes, sayings, seasonal customs, and superstitions.

Morgan, Joan, and Alison Richards. 1993. *The Book of Apples*. London: Ebury Press. This book richly details the natural and cultural history of the apple. It includes a directory and beautiful watercolors of apple varieties.

Proulx, Annie, and Lew Nichols. 1997. *Sweet and Hard Cider: Making It, Using It, and Enjoying It*. Pownal, Vt.: Storey Communications. A thorough "how-to" book, with instructions on how to select and grow cider-apple trees, recipes, and many good photos and illustrations.

Rosenstein, Mark. 1996. *In Praise of Apples*. Asheville, N.C.: Lark Books. Written as a harvest of history, horticulture, and recipes, this is an excellent cookbook, with many unusual, delectable recipes.

Sanders, Roxanne. 1988. *The Apple Book*. New York: Philosophical Library. This book provides an extensive index of apple varieties, detailed descriptions, and over one hundred pages of beautiful illustrations.

## Some Recommended Apple Resources and References for Children

### Fiction

Gibbons, Gail. 1984. *The Seasons of Arnold's Apple Tree*. New York: Voyager Books, Harcourt Brace. As the seasons pass, Arnold enjoys a variety of activities as a result of his apple tree. Included are a recipe for apple pie and a description of how an apple cider press works.

Hall, Zoe. 1997. *The Apple Pie Tree*. New York: Scholastic. The book describes an apple tree as it grows leaves, flowers, and fruit, while in its branches robins make a nest, lay eggs, and raise a family. A recipe for apple pie is included.

Hippely, Hilary Horder. 1996. *A Song for Lena*. New York: Simon & Schuster Books for Young Readers. Lena's grandmother tells about the time when her mother in Hungary shared some freshly made strudel with a beggar who repaid her hospitality with a beautiful song. A recipe for apple strudel is included.

Hutchings, Amy, and Richard Hutchings. 1994. *Picking Apples and Pumpkins*. New York: Scholastic. Spend the day with Kristy, her family, and her two best friends as they pick apples and pumpkins at Battleview Orchards.

Kurtz, Shirley. 1992. *Applesauce*. Intercourse, Pa.: Good Books. In this book for kids ages 4 to 10, a family works together to make enough applesauce to last through the coming winter. Directions are provided for canning applesauce.

Nightingale, Sandy. 1996. *Cider Apples*. San Diego: Harcourt Brace. At the magical moment between the old year and the new, a young girl and her grandmother enlist the aid of some fairies to save their apple trees.

Priceman, Marjorie. *How to Make an Apple Pie and See the World*. New York: Knopf. Because the market is closed, the reader is led around the world to gather the ingredients for making an apple pie.

Rockwell, Anne F. 1994. *Apples and Pumpkins*. New York: Aladdin Paperbacks. In preparation for Halloween night, a family visits Mr. Comstock's farm to pick apples and pumpkins.

Schertle, Alice. 1995. *Down the Road*. San Diego: Browndeer Press. Hetty is very careful with the eggs she has bought on her very first trip to the store, but she runs into trouble when she stops to pick apples.

Slawson, Michele Benoit. 1994. *Apple Picking Time*. New York: Crown. This book is easy to read and provides an interesting cultural view of apple picking. It is beautifully illustrated.

### Nonfiction

Bourgeois, Paulette. 1990. *The Amazing Apple Book*. New York: Addison-Wesley. The book tells how to plant apple seeds, the anatomy of an apple tree and blossoms, and about different kinds of apples, along with fun and educational projects, recipes, legends, facts, and nutrition. It is suggested for grades 2 to 5 but adaptable to a wider audience.

Johnson, Sylvia. 1983. *Apple Trees*. Minneapolis: Lerner. The book describes the life of an apple tree throughout the year and explains phases of plant growth and development. There are beautiful illustrations and photos. It is geared for older elementary and middle school youth.

Kellogg, Steven. 1988. *Johnny Appleseed*. New York: Morrow Junior Books. With the help of good quality pictures, the story of John Chapman, better known as Johnny Appleseed, is told.

Lawlor, Laurie. 1995. *The Real Johnny Appleseed*. Morton Grove, Ill.: Albert Whitman. This very informative book has detailed text, good quality wood engravings, historical illustrations, and a good bibliography. It is good for older youth.

Micucci, Charles. 1992. *The Life and Times of the Apple*. New York: Orchard Books. Easy to read, informative, interesting, covering a wide range of topics. Excellent illustrations.

Nottridge, Rhoda. 1991. *Apples*. Minneapolis: Carolrhoda Books. Easy to read, interesting historical anecdotes, along with drawings and photos. Very good kid-friendly recipes.

Schnieper, Claudia. 1987. *An Apple Tree throughout the Year*. Minneapolis: Carolrhoda Books. Excellent photos by Othmar Baumli capture apple production from the bud to the consumer. One tree is singled out and followed through various seasons. Included in the discussion are insect and disease pests, predators, and problems in growing acceptable apples. The glossary is excellent. The book is recommended for older elementary youth.

Storey Gills, Jennifer. 1993. *An Apple a Day*. Pownal, Vt.: Storey Communications. Many apple activities are provided, including recipes, games, facts and projects, and illustrations. The activities are easy to follow. The book can be used in all the elementary grades.

## Other Resources

New York Apple Association  
P.O. Box 350  
Fishers, NY 14453-0350  
716-924-2171  
Fax 716-924-1629

For grafting information, refer to the How, When, and Why of Grafting <http://instruct1.cit.cornell.edu/courses/hort494/graftage>.

# Apple Taste Test

| Variety | Appearance | Aroma | Color | Taste | Other<br>Texture | Comments? |
|---------|------------|-------|-------|-------|------------------|-----------|
|         |            |       |       |       |                  |           |
|         |            |       |       |       |                  |           |
|         |            |       |       |       |                  |           |
|         |            |       |       |       |                  |           |
|         |            |       |       |       |                  |           |
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|         |            |       |       |       |                  |           |
|         |            |       |       |       |                  |           |
|         |            |       |       |       |                  |           |

Do you have a favorite? \_\_\_\_\_

Least favorite? \_\_\_\_\_



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**I**n the beginning, apples grew wild somewhere north of the Himalayan Mountain range. Today apples are a common part of our lives. We eat them. We see apple trees along roadsides, and some people even have an apple tree near their homes. We buy candles that “smell” like apples. We know about their nutritional value.

But do you know a mythological story about a golden apple? Are you aware of the interesting history of the culture of apples? Where is the star in an apple? You’ll find out in *The Appealing Apple*.

In this 28-page publication you’ll go on the apple’s incredible journey. It is designed for adults to use with youth age 9 to 12 but it’s adaptable for other ages, and everyone who reads this will enjoy the lore in it.

After reading and doing the activities, everyone will know about the apple’s original home, will be able to identify the major apple-producing countries today, and will learn what these regions have in common.

Other activities include making apple doll puppets, exploring apples in literature, and playing historic games using apples. You’ll also learn about what makes an apple, an apple and how apple trees grow, flower, and produce their fruit.

Taste tests, making cider, and career information are included as well as several easy and unusual recipes using apples. The references include fiction and nonfiction choices.

*The Appealing Apple* is the fifth in a series of horticulture/cultural diversity publications by Marcia Eames-Sheavly. The other titles are

*The Three Sisters: Exploring an Iroquois Garden*  
(reprinted in a revised edition)

*The Humble Potato: Underground Gold*  
(co-authored by Tracy Farrell)

*The Great American Peanut*

*Rice: Grain of the Ancients*