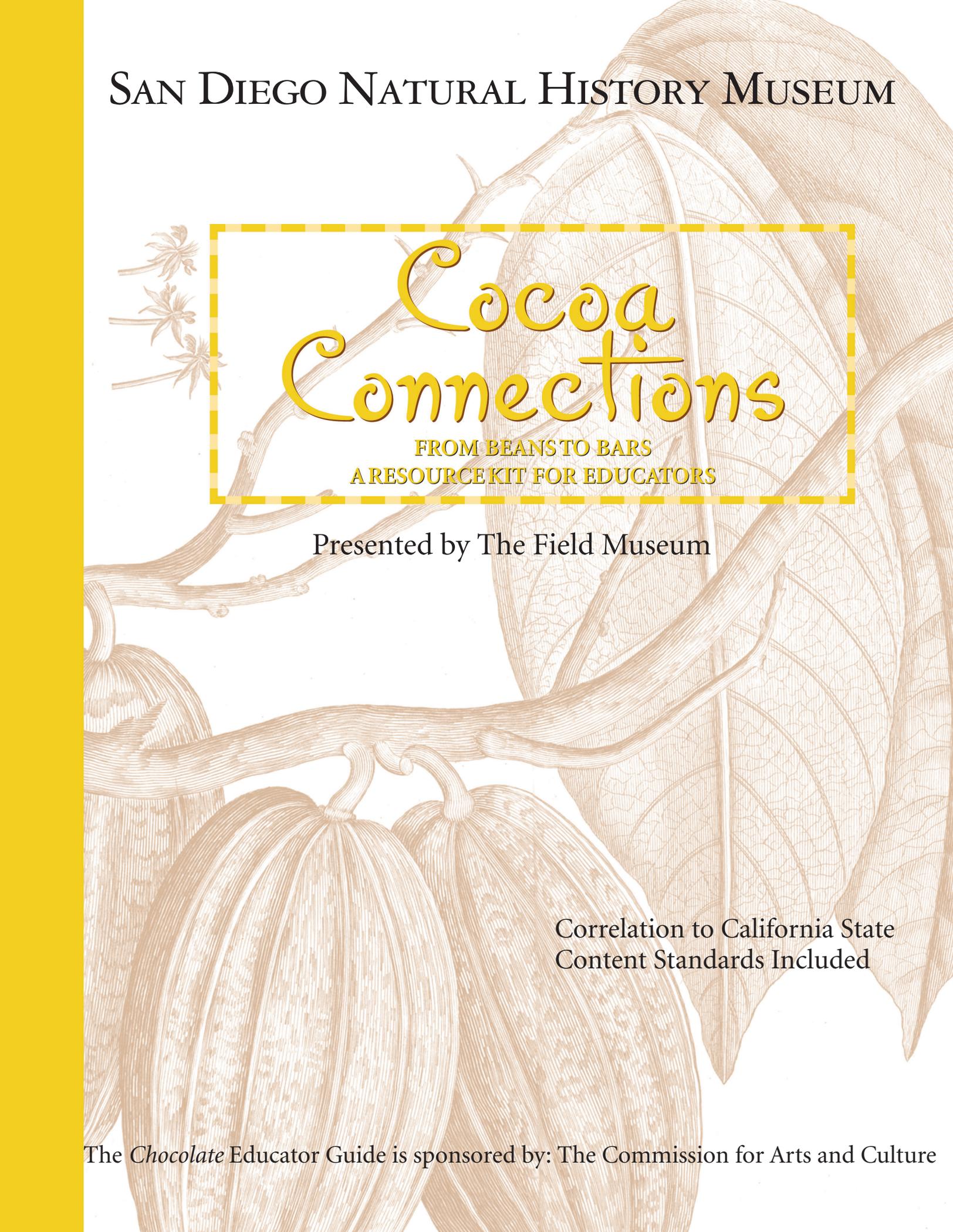


SAN DIEGO NATURAL HISTORY MUSEUM

The background of the cover is a detailed, light brown line drawing of a cocoa tree. It features large, textured leaves with prominent veins, thick, gnarled branches, and several large, oval-shaped cocoa pods hanging from the lower branches. In the upper left corner, there are small, delicate flowers or buds on thin stems. A yellow dashed rectangular border frames the central text area.

Cocoa Connections

FROM BEANS TO BARS
A RESOURCE KIT FOR EDUCATORS

Presented by The Field Museum

Correlation to California State
Content Standards Included

The *Chocolate* Educator Guide is sponsored by: The Commission for Arts and Culture

Cocoa Connections From Beans to Bars

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Cocoa Connections From Beans to Bars

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Cocoa Connections From Beans to Bars

A Resource Kit for Educators

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The **Field**
Museum

Chocolate

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Chocolate

CURRICULUM

Exhibition Overview and Background Information

Chocolate. For many, the rich taste and unique texture of chocolate are among life's greatest pleasures. An exhibition developed by The Field Museum tells the story behind chocolate—a story as rich and captivating as the sweet itself. Emphasizing the long relationship between humans and nature, the exhibition highlights the many threads that are woven to create this story. *Chocolate* explores the lush environment in which the cacao tree originated, how the Maya used its seeds in a favorite drink, how the Aztecs elevated it to the level of treasure, and how chocolate became a commodity in the world marketplace. Visitors will discover chocolate's impact on human cultures and tropical ecosystems through scenic environments, rare artifacts, original video, and interactive exhibition techniques.

There are eight sections in the exhibition. The main messages and topics in each section follow:

Rainforest

Main message: Chocolate comes from the seeds of the rainforest tree called cacao.

Topics:

- Location of cacao rainforests on earth
- Cacao's environment
- Unique parts of the cacao tree
- Cacao's interdependence with rainforest animals and plants

Maya

Main message: The Maya were one of the first people to drink chocolate.

Topics:

- Household use of cacao
- Elite use of cacao by kings and priests
- Cacao hieroglyphs

Aztec

Main message: Cacao was used as currency and also made into a chocolate drink for elite Aztecs.

Topics:

- Cacao was traded over long distances
- Cacao was used as currency
- Cacao was used as a tribute to Aztec emperors
- Cacao was an elite luxury

Europe

Main messages:

- Chocolate came to Europe during the period of conquest
- The cost of cacao beans and sugar made chocolate a drink only the rich could afford

Topics:

- Spain began the world-wide cacao trade
- European countries competed for control of cacao and other foods from around the world
- Chocolate as a status symbol
- Ideas and misconceptions about chocolate
- Spread of chocolate throughout Europe
- Supply of chocolate was built on slave labor

Manufacturing

Main message: Technological innovations and publicity changed chocolate from an expensive luxury item to an affordable mass-produced and mass-consumed product.

Topics:

- Inventions
- Advertising

Exhibition Overview and Background Information

World Trade

Main message: Today cacao is valued around the world as a trade commodity, a local food, and a manufactured product.

Topics:

- Who grows cacao
- Who eats chocolate
- Who brings chocolate to the world

Growers

Main message: Cacao farming affects the lives and environment of the people who grow it.

Topics:

- Challenges of growing cacao
- Farmers working together with nature (sustainability)

Chocolate Today

Main message: Chocolate means different things to different people around the world.

Topics:

- Chocolate and food
- Chocolate and family celebrations
- Chocolate and health

Overview

**Oh, divine chocolate!
They grind thee kneeling,
Beat thee with hands praying,
And drink thee
with eyes to heaven.**

- Marco Antonio Orellana,
18th Century

Chocolate shows up every day in a variety of drinks, a multitude of desserts, countless candy bars, and many other forms. For many people, it is one of the key pleasures of everyday life. Yet most consumers probably never stop to consider the tropical origins of the delicious confection melting in their mouths: a rainforest tree called *Theobroma cacao*.

This enticing food can be used as a classroom tool to explore the intimate relationship between nature and culture. Chocolate offers an opportunity to better understand the significance of one natural product, in addition to providing a framework for understanding the ecological interactions and social and economic processes natural products undergo when they become valuable to humans.

There are many threads to the story of chocolate:

A unique tree in a lush tropical environment. A seed so precious it was used as money. A spicy drink and a sweet snack. By examining the places where the natural and social histories of cacao and humans converge, teachers can weave an integrated message of environmental respect and responsibility. Chocolate offers a unique educational experience that can increase students' environmental understanding, enhance cultural awareness, and encourage the celebration and preservation of the Earth's diversity.

Using chocolate as a framework, students can:

- discover the botanical source of chocolate, *Theobroma cacao*, a small tree of the tropical rainforest interior;
- explore the ecological connections between people, plants, insects, and other animals within the tree's habitat;
- investigate cultural interactions and conservation concerns resulting from the cultivation, processing, exchange, and consumption of cacao and other foods; and
- recognize the changing economic and cultural roles of cacao and chocolate in local and global economies over time.

Chocolate Introduction

How To Use This Kit

Contained within this kit you will find the following resources to help you bring the exciting world of chocolate to your students:

- 12 lessons pertaining to chocolate and its relationship with the environment and culture
- chocolate facts, history, and tidbits of information
- chocolate recipes
- chocolate quotations
- lists of books, periodicals, web sites and films to use as tools or references
- list of speakers and ideas for public programs
- color prints of chocolate in various stages of production
- cacao seeds
- cocoa powder

The items you use will depend on the aspect(s) of chocolate on which you wish to focus. There is no one set way to use this kit or any particular order that needs to be followed. It is, rather, a “grab bag” of ideas and tools for you to use as you see fit. If you would like ideas on how to utilize the items in this kit, follow the lessons provided within and try some of the extension activities listed at the back of each section.

Chocolate Introduction

How To Use The Lessons

For convenience, we have chosen to divide the enclosed lessons into two pathways: chocolate from an environmental standpoint and chocolate as a cultural phenomenon. Both pathways contain lessons that build upon each other. You may choose to implement them in the order in which they appear, or use them as standalone lessons to emphasize key understandings. If you want your students to examine how chocolate, people, and the environment interconnect, you may want to use lessons from both pathways.

Below are a list of the lessons enclosed in this kit. Each lesson strives to help students understand fundamental questions about chocolate. Please note that the lessons next to one another usually have a common element, like cultivation or technology. By using these two lessons together, you can help your students focus on a particular aspect of chocolate. By progressing down the lesson column, you can give your students a much broader view of chocolate from an environmental or cultural standpoint.

	Environment	Culture
Origins	Where does chocolate begin?	Who grows chocolate and how does it affect their lives?
Cultivation	What is the anatomy of a cacao tree and how is it cultivated?	How did the Maya and Aztec use and influence the development of chocolate?
Additional Ingredients	What other natural products are connected to chocolate?	How did the Europeans use and influence the development of chocolate?
Technological Influence	What are the connections within the cacao ecosystem and how are they being threatened?	How did the technological advances of the past century affect the use and development of chocolate?
Process	How is cacao harvested and processed?	How is chocolate manufactured?
Change Over Time	How does cacao change over time?	How has chocolate changed through the ages?

Each section starts with reference material to help you identify basic information you'll need to convey to your students. The lessons within each section rely heavily on the reference material presented at the beginning. We recommend that educators read the companion books to The Field Museum's exhibition, *Chocolate: The Nature of Indulgence* and *Chocolate: Riches From The Rainforest*, to further investigate the many facets of this sweet treat. You may also wish to gather more information from the references listed in the back of this booklet.

Chocolate and its Environment

Reference Material

Making Connections to the Natural World

People are inextricably connected to the plant world. We nourish our families with fruits and vegetables, clothe our bodies with cotton, build homes of wood for shelter, and tend gardens for sustenance and leisure. Yet many of the essential links between people and plants are easily overlooked in our increasingly urbanized world. When purchasing aspirin, few people realize its origin in the bark of the white willow. Most of us do not think about the ecological

and economic links between coffee growers and the rainforest when sipping our favorite blend. Who considers plant pests, diseases, or crop sustainability when shopping for a new cotton shirt? With increasing pressure placed upon natural resources, it is critical to raise awareness about our impact and dependence on these resources. And chocolate is an example that not only connects the natural and social worlds, but is interesting and engaging for students.



Chocolate and its Environment

Reference Material

What is the source of chocolate?

Chocolate is made from the seeds of a rainforest tree called *Theobroma cacao* (kah KOW). Cacao trees have flourished in Central and South America for thousands of years, long before people knew what luscious possibilities they held.

Wild cacao trees grow up to 30 feet (9 meters) tall beneath a canopy of taller trees. The canopy trees protect cacao from the intense tropical sun, wind damage, and moisture loss. The cacao tree requires specific conditions to thrive, which is why it grows only within a band approximately twenty degrees north and south of the equator. The understory of the rainforest provides a delicate balance of rain, shade, humidity, nutrients, and protection from the wind that is critical to the tree's survival.

The cacao tree is very different from the deciduous North American trees with which students are most familiar. The cacao tree's flowers grow directly on the

lower trunk and branches, a pattern called cauliflory. This strategy increases the flower's chances of being pollinated by the tiny flies that live and breed in the rainforest debris surrounding the tree. These tiny flies, called midges, are drawn to the moist leaf litter and rotting cacao pods on the forest floor. This decaying debris creates ideal conditions for midges to live and breed—and it's conveniently located near the flowers they pollinate.

Cacao trees need soil rich in nitrogen and other nutrients, thus the debris surrounding the base of the tree serves another important function—recycling nutrients back to the tree. Decaying plants and animals rotting on the forest floor support a lively growth of fungi. This fungi, in turn, help cacao trees absorb nutrients from the soil. The roots of the cacao tree soak up these nutrients, along with rainfall, from the soil and leaf litter. Stretching across the shallow rainforest soil, the roots also anchor the cacao tree and help prevent soil erosion.



Chocolate and its Environment

Reference Material

Animals, too, have an important interdependent relationship with cacao. Monkeys, rodents, birds, and many other animals live near cacao trees. With their teeth, bills, or claws, these creatures break into cacao pods to eat the sweet pulp inside. Although cacao seeds are packed with nutritious oils, starches, and proteins that provide the energy a seedling needs to grow, they also contain caffeine and theobromine, giving them a bitter taste. This bitter taste discourages animals from eating cacao seeds and causes them to spit out the seeds. This is an important element of the tree's seed dispersal strategy. Cacao trees rely entirely on these animals to spread their seeds along the rainforest floor to start the next generation of trees. Without the intervention of these animals, the pods stay on the tree and rot. The animals' interaction with the cacao seeds is a critical component of the seeds' survival and growth into new trees.

Many birds inhabit the branches of cacao and its canopy trees. Some birds migrate from the north and spend the winter in the branches of cacao trees, while others live year-round in the trees that tower over the cacao in the rainforest. In 1996, in the canopy trees above a Brazilian cacao plantation, scientists discovered a previously unknown bird. They named it the pink-legged graveteiro (grah vah TAY roh). The pink-legged graveteiro and many other canopy dwellers may lose their homes due to habitat loss. A fungus called witch's broom threatens cacao trees in Brazil, and lumber companies harvest canopy trees from rainforests all over the world.

Growing cacao

Cacao farming has changed little since prehistoric times. Because the pods grow directly off the trunk and branches of the tree, machines are not a viable means of harvesting. Instead, farmers must harvest cacao pods and prune the trees by hand. Pods are sliced from the tree with a machete or a small blade, gathered into net bags, then split open so the pulp-

covered seeds can be piled up and fermented. The pulp heats up and disintegrates during the chemical process of fermentation, which is critical to developing the chocolate flavor. Farmers then dry the seeds in the sun on rooftops, tables, or large mats. Some farmers use drying machines to speed up this process. Finally, farmers pack the cacao seeds and ship them to brokers, markets, and factories that will turn them into cocoa powder, cocoa butter, and chocolate.



Chocolate and its Environment

Reference Material

Growing cacao is not the most lucrative business for farmers. First, cacao trees don't produce seeds until they are three to five years old. Second, cacao trees grown in sunny, open areas may produce a higher yield for a while, but are prone to pests, molds, and diseases that can wipe out an entire crop. Finally, cacao farmers are dependent on market prices, which are usually very low. Like other agricultural products, cacao experiences highs and lows in the world market. A rise in consumer demand or a decrease in cacao production drives prices up. But when farmers grow more cacao than consumers will buy, cacao prices fall. Falling prices can devastate a country's economy when it relies heavily on the sale of cacao.

Prices for cacao peaked in the late 1970s. In response to the high prices, farmers planted more cacao trees. Global cacao production peaked in 1996 at 2.9 million tons. Chocolate's worldwide popularity has created high demand for cacao farmland affecting thousands of acres of tropical rainforests. Rainforests

may be cleared completely to grow cacao, or some tall trees may be left to provide shade for the cacao trees. When rainforests are cleared, what's left are open, sunny fields with dramatically lower levels of plant and animal diversity. Cacao trees planted in the sun face increased risk from pests and disease, and the soil quickly becomes unproductive without fertilizers.

Today cacao farmers and scientists are working together to find ways to grow cacao sustainably—that is, cacao that will provide steady income for farmers while limiting damage to the rainforest. Planting cacao under the shade of taller trees increases cacao's lifespan and provides a more diverse habitat for rainforest animals than sunny orchards. When cacao is planted as a buffer on the edge of a rainforest, or in corridors between forest fragments, it can create a habitat for rainforest animals and plants while creating a source of income for people. The shade trees may also produce fruits or nuts, such as Brazil nuts or cashews, which farmers can harvest for extra income.



Lesson - Where does the story of Chocolate Begin?

Objectives

Identify elements of the rainforest specific to the cacao ecosystem.

Begin to make connections between the organisms and elements of the cacao ecosystem.

Materials

- World map or globe
- Books on the rainforest
- Picture card of rainforest ecosystem (appendix section)
- Rainforest Word Sort (P. 11)
- Construction paper and glue
- Class set of Ecosystem Web Maps for brainstorming activity (P. 17)
- Overhead transparency of Ecosystem Web Map

Lesson Plans

Background Activities:

- 1 Introduce students to the cacao ecosystem by:
 - Locating rainforest areas on a map or globe.
 - Exploring books on the rainforest with students. We suggest How Monkeys Make Chocolate by Adrian Forsythe or The Great Kapok Tree by Lynne Cherry.
 - Sharing the picture of the rainforest ecosystem with the class. Ask the students to work in pairs listing everything they observe in the picture. You can direct their thinking by asking them to notice the topography, speculate about the climate (temperature and rainfall), and listing as many plants and animals as they can identify.
 - Help students generate a list of the many organisms and elements that are in the cacao ecosystem and create a general definition for each one.

Instructional Activities:

- 1 Give each group or pair of students a set of the words from the Rainforest Word Sort. Help students identify any words with which they're not familiar. Ask students to group words into categories to which they can give a title. Have students either paste words on a sheet of construction paper and title the categories or make a written list of all the categories and the words that fit into each category.
- 2 Combine pairs or groups and ask students to share their categories with each other. Ask them to pay attention to the similarities and differences in the various lists.
- 3 As a class, share the observed similarities and differences in group lists. Ask students if they would make any changes in their lists after hearing others' reasons for their category choices.

AND/ OR

- 1 Ask students to complete the Ecosystem Web Map. You may want students to work in pairs or place them in small groups of three to four students per group.
- 2 Have students place all of the organisms and elements from the class generated list somewhere on the web.
- 3 As a class, share the webs and look for similarities and differences. Ask students to explain why they chose to place organisms and elements on certain parts of the web.

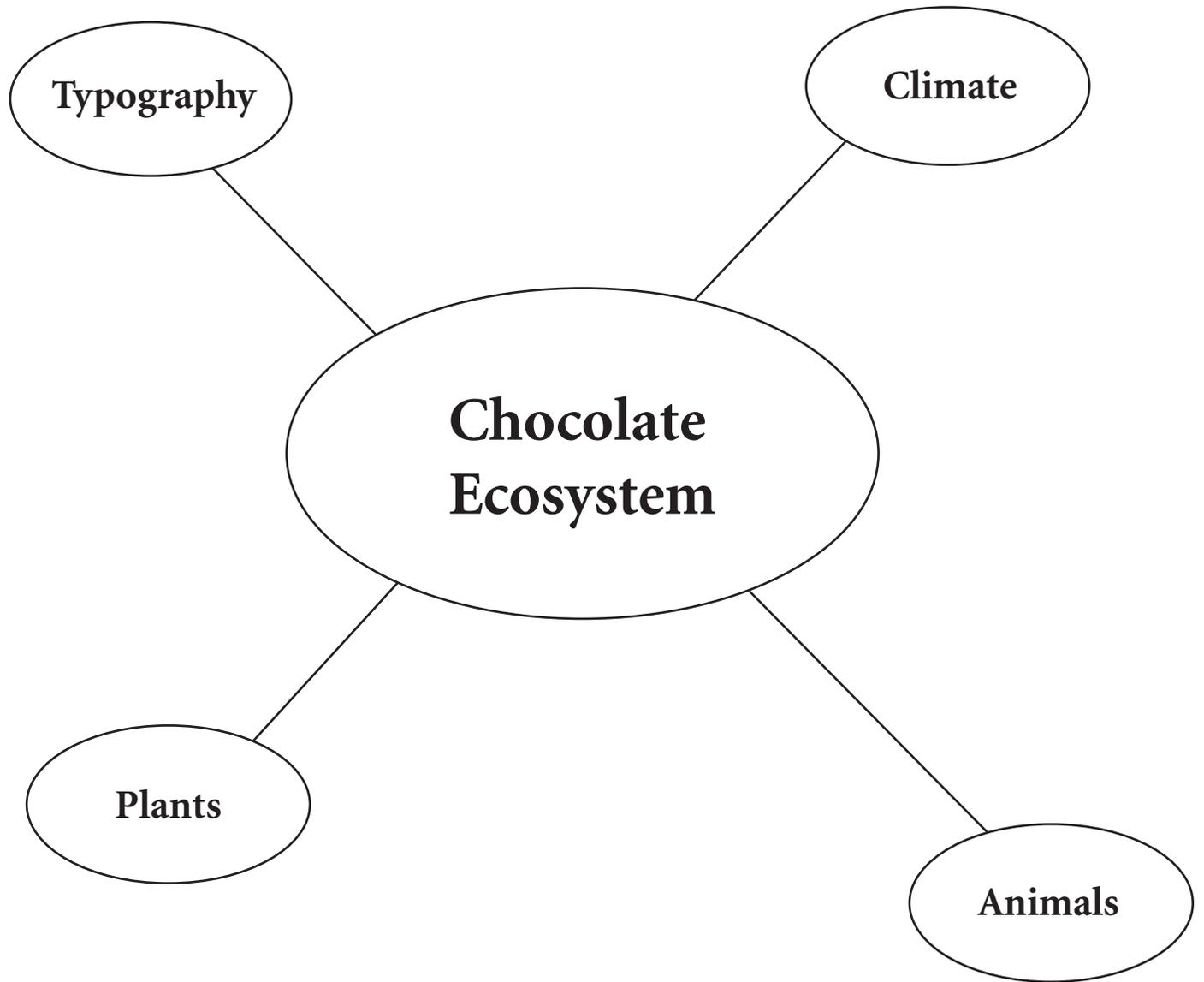
Rainforest Word Sort

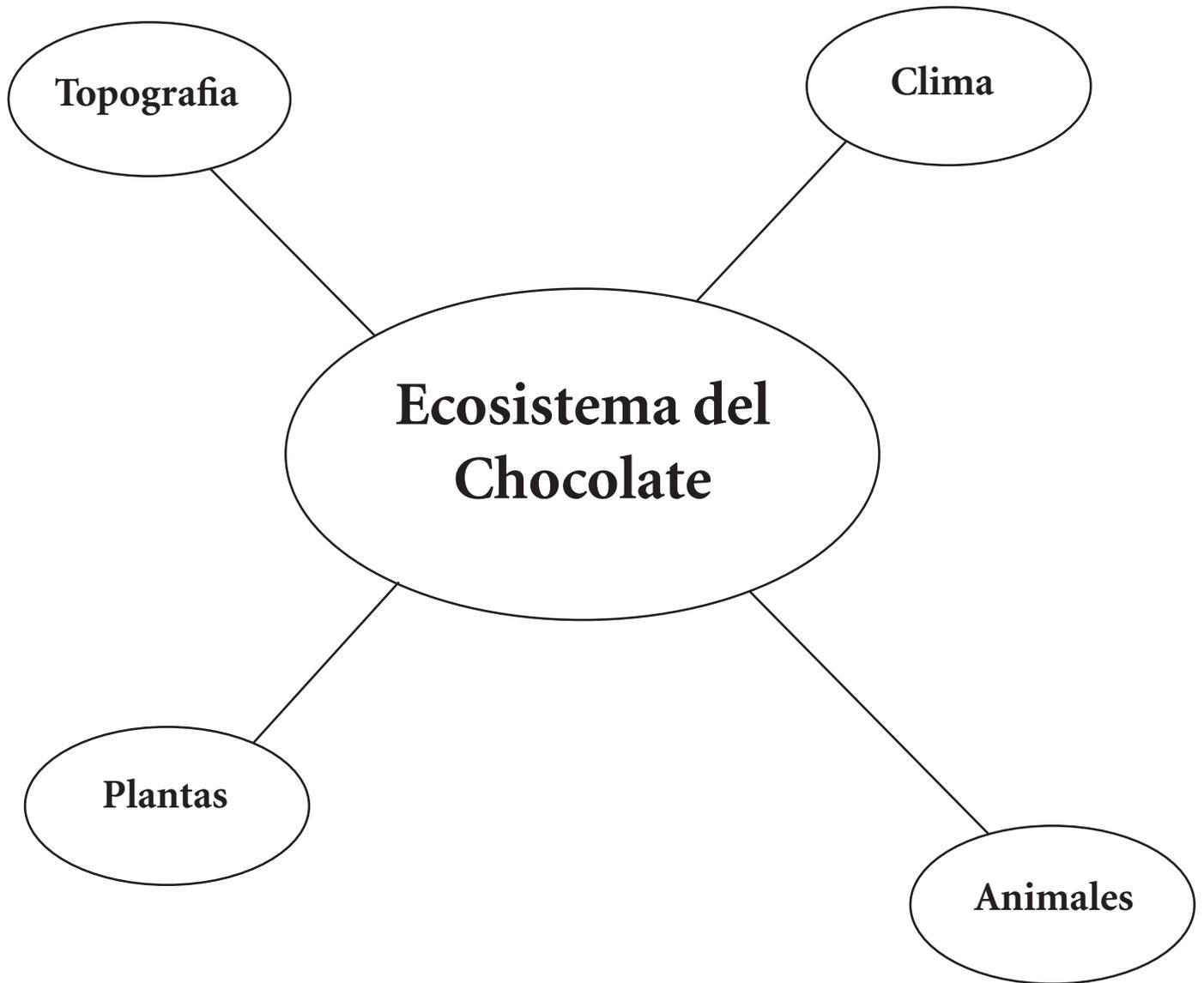
SHADE	RAINFOREST	BIRDS
MONKEYS	SUGAR	FLOWER
VINES	HUMIDITY	BRAZIL
FOOD	BIODIVERSITY	CANOPY TREES
SEEDS	LEAF LITTER	CENTRAL AMERICA
TROPICS	RODENTS	LUMBER
CACAO TREE	RAINFALL	INSECTS
PULP	FUNGI	NUTRIENTS
FRUIT	SOUTH AMERICA	GHANA
CHOCOLATE	BITTER	SWEET
PODS	PLANTATIONS	CACAO SEEDS

Grupos de Palabras de Bosque Tropical

VERSIÓN EN ESPAÑOL

SOMBRA	BOSQUE TROPICAL	AVES
MONOS	AZUCAR	FLOR
VIÑAS	HUMEDAD	BRASIL
COMIDA	BIODIVERSIDAD	ÁRBOLES DE COPA ALTA
SEMILLAS	HOJAS DESCOMPUESTAS	CENTRO AMERICA
TRÓPICOS	ROEDORES	MADERA
ÁRBOL DE CACAO	LLUVIA	INSECTOS
PULPA	HONGOS	NUTRIENTES
FRUTA	SUR AMÉRICA	GHANA
CHOCOLATE	AMARGO	DULCE
VAINAS	PLANTACIONES	GRANOS DE CACAO





Lesson - What is the Anatomy of the Cacao Tree and How is it Cultivated?

Objectives

Identify the anatomy and features of a cacao tree.

Identify the environmental conditions cacao trees need in order to survive.

Identify how cacao is cultivated.

Materials

- Drawing materials (markers, color pencils, crayons, etc.)
- Picture card of *Theobroma cacao* (appendix section)
- A class set of copies of *Theobroma cacao* in its natural environment (appendix section)
- A class set of copies of Cacao Research Worksheet (P. 17)
- A class set of copies of the “Growing Cacao in Your Backyard” scenario (P. 19)

Lesson Plans

Background Activities:

- 1 Ask students to imagine what a plant that grows chocolate might look like. Have them think about the following questions:
 - Which part of the plant would the chocolate come from?
 - Would the plant have a chocolate smell? taste?
 - Would they be able to grow this plant in their backyard?
- 2 Provide students with drawing materials and ask them to make a picture of the chocolate plant they envision. Remind them to include all of the parts of the tree (roots, flowers, etc.) and the surrounding environment.
- 3 Show students the picture of *Theobroma cacao*. Have them compare their drawings to the real chocolate plant.

Instructional Activities:

- 1 Provide each student with a copy of *Theobroma cacao* in its natural environment. With your assistance, have students label where the following features are located: cacao pods, cacao flowers, the cacao’s lower trunk and branches, canopy trees, ground debris (leaf litter and rotting cacao pods), roots, and leaves.
- 2 Ask students to compare *Theobroma cacao* with the deciduous North American trees with which they’re familiar. What are the similarities and differences of the leaf size and shape, tree size and shape, seed pod, and area where the tree flowers and grows its seed?
- 3 Discuss environmental conditions needed to grow cacao (climate, soil content, protection from elements, symbiotic midge relationship, etc.). You might want to have students research this information independently (or in groups) from books or web sites. Or you might want to introduce the information to them as a class. Either way, students can use the research grid to help them organize their information.
- 4 Give students the “Growing Cacao in Your Backyard” Scenario sheet. Ask them to imagine the following: You have just inherited a large amount of land near your home. Your Uncle Louie thinks you should use the land to grow and harvest cacao. He is convinced that by doing so, you can beautify your neighborhood and make a considerable profit on the cacao you harvest.

(lesson continued on back)

Lesson - What is the Anatomy of the Cacao Tree and How is it Cultivated?

Lesson Plans (continued)

5 Ask students to use the information they gathered about the cacao and its natural environment and write a letter to their Uncle Louie explaining:

- Why they cannot and do not want to grow cacao on their newly acquired land and what they will do with the land instead.
- Why they do want to grow cacao and what modifications they will need to make to the land and surrounding environment for that to happen.

Encourage students to support their reasons with the information they learned about the cacao tree. Challenge them to also be creative and think beyond just the environmental concerns.

Some questions they might consider:

- What would be the cost of each modification they would need to make?
- What size harvest might they yield?
- What is the current market price per ton of cacao and how much would they make from a single year's harvest?

Cacao Research Worksheet

Activity

Draw and describe a cacao tree and its natural habitat.

Draw and describe the cacao pod and its contents.

Describe how the cacao tree is cultivated for human use.

Describe the climate and soil content needed for the cacao tree to survive.

Draw and describe how the cacao tree is protected from the elements.

Draw and describe the symbiotic relationship between the midge and the cacao tree.

Hoja de Investigación del Cacao

VERSIÓN EN ESPAÑOL

Actividad

Dibuja y describe un árbol de cacao
y su hábitat natural.

Dibuja y describe el contenido
de la mazorca del cacao.

Describe cómo el árbol del cacao es
cultivado para el uso del ser humano.

Describe el clima y el contenido de la tierra
necesarios para que sobreviva el árbol de cacao.

Dibuja y describe cómo se protege al árbol del
cacao contra los elementos naturales.

Dibuja y describe la relación simbiótica entre
los dípteros y el árbol de cacao.

Lesson - What Other Natural Products are Connected to Chocolate?

Objectives

Identify other natural ingredients used to make chocolate products.

Explore the regions where cacao and the other natural ingredients used to make chocolate products grow and how they are harvested and processed.

Materials

- A class set of Natural Ingredient Webs (P. 22)
- An overhead transparency or poster-size copy of the Natural Ingredient Web
- Candy bar wrappers
- A class set of the Natural Ingredient Research Guide (P. 24)

Lesson Plans

Background Activities:

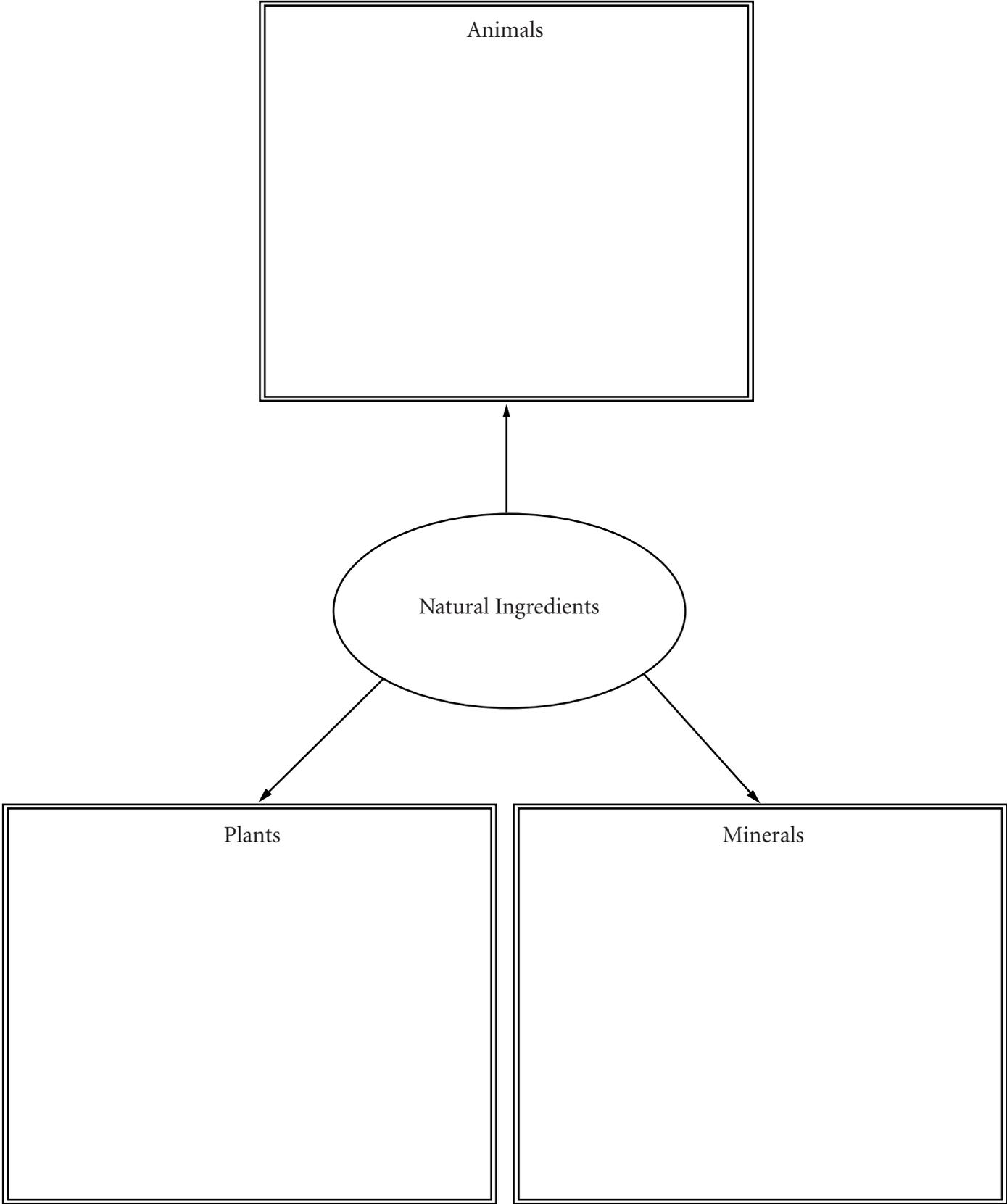
- 1 Ask students to think of their favorite meal.
- 2 Give each student a copy of the Natural Ingredient Web. Have them break their meal into all of its natural ingredients and place them in the appropriate spot on the web. You might need to do one together as a class first to help students understand how to break foods into their natural ingredients such as: milk, sugar, cinnamon, salt, peanuts, etc.

Instructional Activities:

- 1 Ask each student to bring in the wrapper of one of their favorite candy bars.
- 2 Using the label, have students make a list of all of the natural ingredients in their candy bar.
- 3 As a class, compile a list of all of the natural ingredients used to make chocolate products.
- 4 Either in groups or individually, ask students to choose one or two of these natural ingredients. Using the Natural Ingredient Research Guide, have students identify what their ingredient looks like in its original form (before processing), where and how it is grown, how people harvest and process it, and its relationship to chocolate (environmentally and economically).
- 5 Once students have completed their research, have them create a page that conveys all of the information they have learned about their natural ingredient(s). Compile the pages into a class book or bulletin board.

Natural Ingredient Web

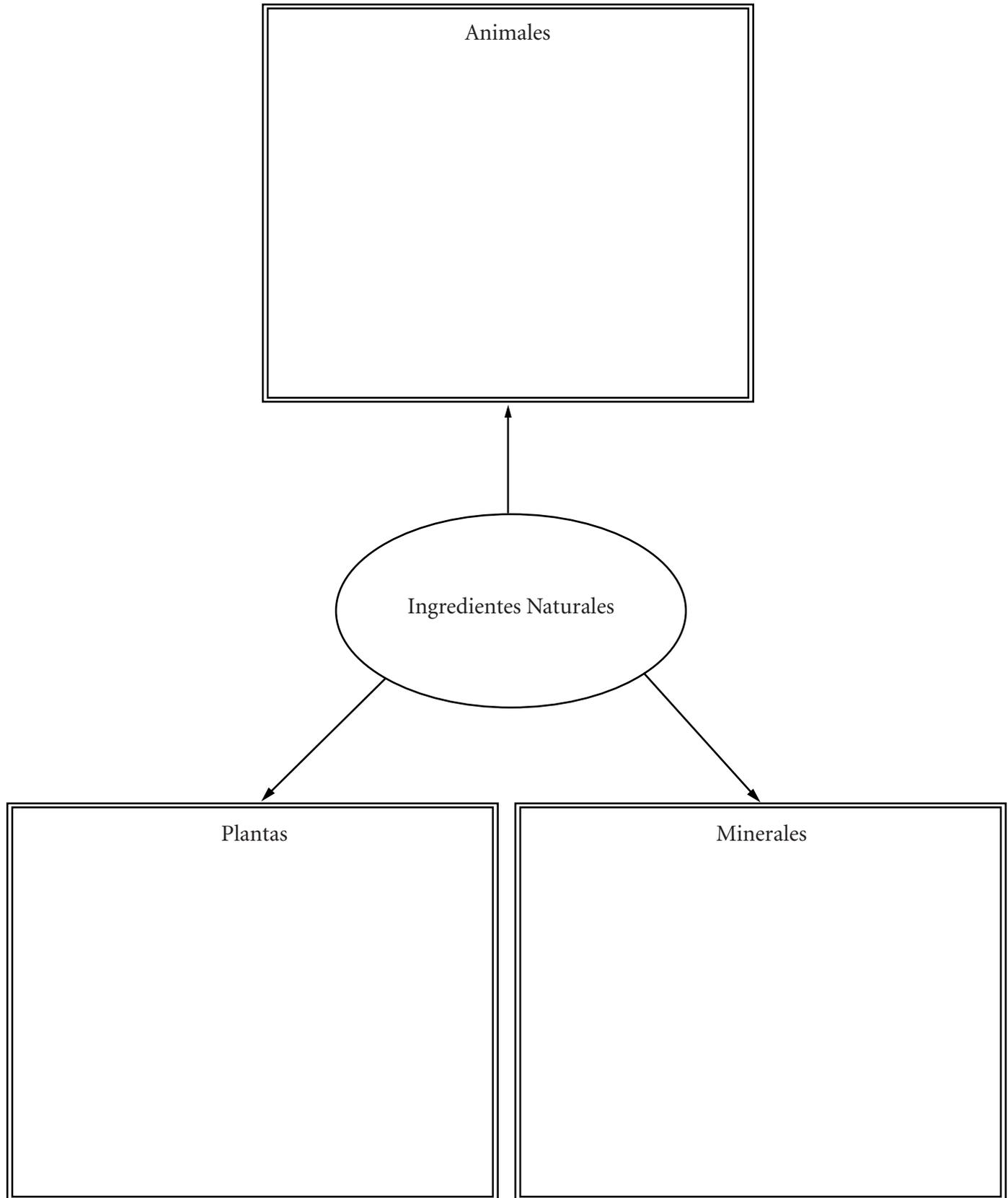
Activity



Red de Ingredientes Naturales

VERSIÓN EN ESPAÑOL

Actividad



Natural Ingredient Research Guide

Activity

Name of natural ingredient:

Type of ingredient (animal, plant, mineral):

Draw and describe what your ingredient looks like in its natural state before it is processed.

Draw and describe the natural environment of your ingredient.

Draw and describe how your ingredient is gathered/harvested.

When, where, and by whom was your ingredient first combined with chocolate?

Draw and describe how the cacao tree is protected from the elements.

Describe how your ingredient is linked economically to chocolate.

Guía de Investigación de Ingredientes Naturales

VERSIÓN EN ESPAÑOL

Actividad

Nombre del ingrediente natural:

Tipo de ingrediente (animal, planta, mineral):

Dibuja y describe cómo se ve el ingrediente en su estado natural, antes de que lo procesen.

Dibuja y describe el medio ambiente de tu ingrediente.

Dibuja y describe cómo se cultiva y se cosecha tu ingrediente.

¿Cuándo, donde y por quién tu ingrediente fue combinado con chocolate por primera vez?

Dibuja y describe como el cacao es protegido de los elementos.

Describe como tu ingrediente se relaciona económicamente al chocolate.

Lesson - What are the Connections Within the Cacao Ecosystem and How are They Being Threatened?

Objectives

Explore the interconnections between the organisms in the cacao ecosystem.

Explore the consequences of change in the cacao ecosystem.

Identify the factors that are threatening the cacao ecosystem.

Materials

- 2 balls of string or yarn
- Cacao Web Cards (P. 28)

Lesson Plans

Background Activities:

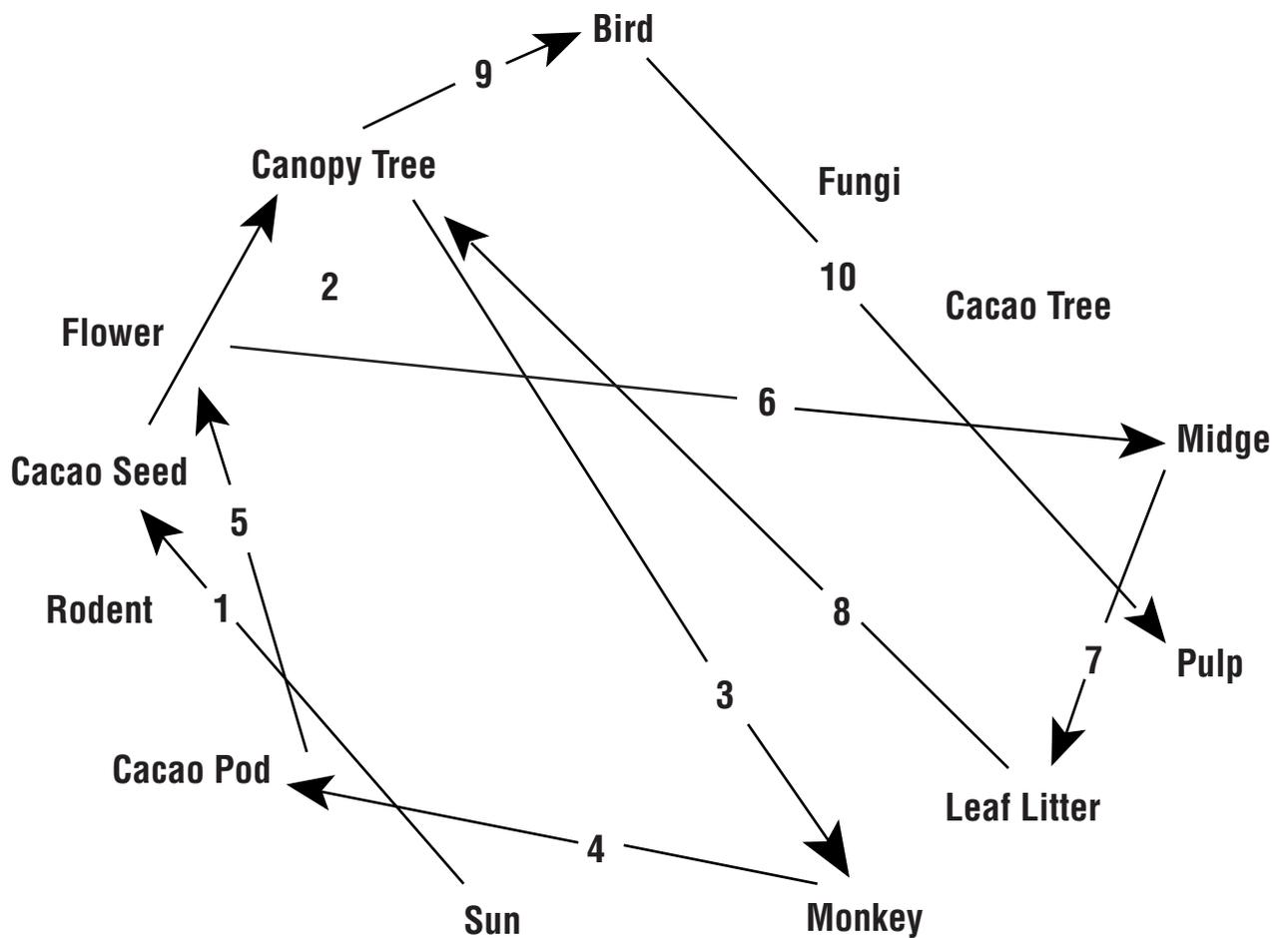
- 1 Review the organisms that are part of the cacao ecosystem (see environment lesson: Where Does Chocolate Begin?).
- 2 Write two of the organisms on the board. Have students brainstorm ways that the two organisms are connected (e.g. one eats the other, one provides a home for the other, etc.). Have students try to generate at least ten ways the organisms are connected. (This will be difficult but will challenge them to think past the most obvious or common connections.)

Instructional Activities:

- 1 Divide students into groups of 5-10 and pass out the Cacao Web cards, one for each student.
- 2 Ask students to start with the person who holds the SUN card. The person holding the SUN card (there should be one in each group) will hold onto the end of the string or yarn. Then they will toss or pass the ball of string to someone else in their group while explaining the connection between the SUN and the new card the other student is holding. The ball of string is to be passed from student to student connecting the cacao web. Students may be thrown the string more than once during the creation of the web. It is important that every card be included by the end of the activity. *See example on the next page.*
- 3 The web continues to be built until all members of the group are holding onto at least one piece of the string.
- 4 Next, remove one card (person) from the group. They need to gently lay down their card and the string they are holding. Each person holding a card connected to the removed card explains why he or she is affected by the loss.

Discuss the following questions with the groups as the activity continues:

- *What is the effect of that one loss?*
 - *How many parts of the web are affected by the loss?*
 - *What is the ripple effect?*
 - *What might cause such a loss?*
- 5 After the students have found all the connections among the organisms, ask them to set the cards and string down in place and copy the energy web they created onto paper. You may want them to work in pairs for this part of the activity.



The sun → cacao seed: the sun will provide energy for the seed to sprout and grow

The cacao seed → canopy tree: the seed needs the shade in order to sprout

The canopy trees → monkey: monkeys live in the canopy trees

The monkey → cacao pod: monkeys eat the pulp in the pods

The cacao pod → flower: pods grow from pollinated flowers

The flower → midge: flowers are pollinated by the midge

The midge → leaf litter: leaf litter provides ideal living conditions for the midge to live and breed

Leaf litter → canopy trees: the leaf litter provides nutrients for the canopy trees

The canopy trees → bird: birds inhabit the branches of the trees

SUN

BIRD

LEAF LITTER

FLOWER

FUNGI

CACAO TREE

MIDGE

MONKEY

CACAO POD

SWEET

PULP

CANOPY TREES

VERSIÓN EN ESPAÑOL

SOL

AVE

HOJAS
DESCOMPUESTAS

FLOR

HONGOS

ÁRBOL DE
CACAO

DÍPTERO

MONO

MAZORCA DEL
CACAO

DULCE

PULPA

ÁRBOLES DE
COPA ALTA

Lesson - How is Cacao Harvested and Fermented?

Objectives

Identify the parts of a cacao pod.

Identify and sequence the steps required to harvest and ferment cacao seeds.

Materials

- Picture card of the interior of a cacao pod (appendix section)
- Cacao seed
- A class set of the Interior Diagram of a Cacao Pod (P. 33)
- A class set of the Cacao Map (P. 31)
- Art supplies to create a 3-D model (clay, papier-mâché, paint, etc.) Optional

Lesson Plans

Background Activities:

- 1 Review the anatomy of *Theobroma cacao*.
- 2 Show students the interior view of a cacao pod and ask them to speculate which part of the pod is actually used to make chocolate.
- 3 Show students the cacao seeds and tell them that this is the part of the plant used to make chocolate.

Ask them to consider:

- *How is the pod removed from the tree?*
 - *How is the seed removed from the pod?*
 - *What has to happen to the seeds before they become chocolate?*
- 4 Share with students the process by which cacao is harvested and fermented. We suggest reading the beginning of *Cocoa Ice* by Diana Applebaum or pgs. 50 - 55 of *Vanilla, Chocolate, & Strawberry* by Bonnie Busenberg with your students to familiarize them with the process.

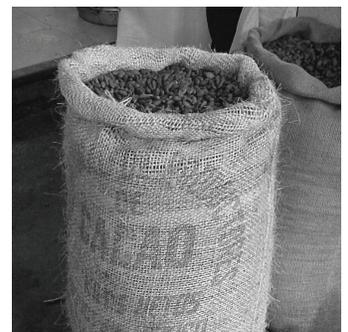
Instructional Activities:

- 1 Give each student a copy of the “Interior Diagram of a Cacao Pod.” Have them label the parts of the pod and color them in. Or, using the “Interior Diagram of a Cacao Pod,” have students create a three dimensional model of a cacao pod to scale. They could sculpt it out of colored clay or cast the pod out of papier-mâché.
- 2 Give each student a copy of the Cacao Map. Ask students to list the major steps involved in harvesting and fermenting chocolate on the back of the paper.
- 3 Have students use this list to “map out” the path that cacao must take before it is shipped off to be processed into chocolate. They may either write or draw the major steps along their map.

Cacao Map

Objectives

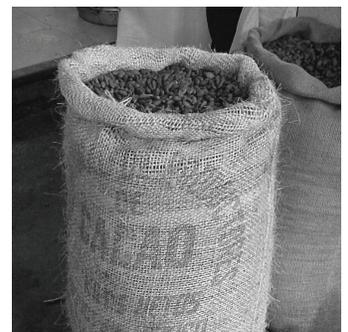
Map out the major steps of harvesting cacao before it is shipped off to be processed into chocolate.



Mapa del Cacao

Objectives

Ordena los pasos más importantes del cultivo y el proceso del cacao antes de ser enviado para ser procesado en chocolate.



Interior Diagram of a Cacao Pod

Activities

Identify the following parts of the cacao pod:

- 1 Outer shell
- 2 Inner shell
- 3 Seeds
- 4 Leaf
- 5 Branch
- 6 Flower
- 7 Pulp



Interior Diagram of a Cacao Pod

Activities

Identify the following parts of the cacao pod:

- 1 Outer shell
- 2 Inner shell
- 3 Seeds
- 4 Leaf
- 5 Branch
- 6 Flower
- 7 Pulp

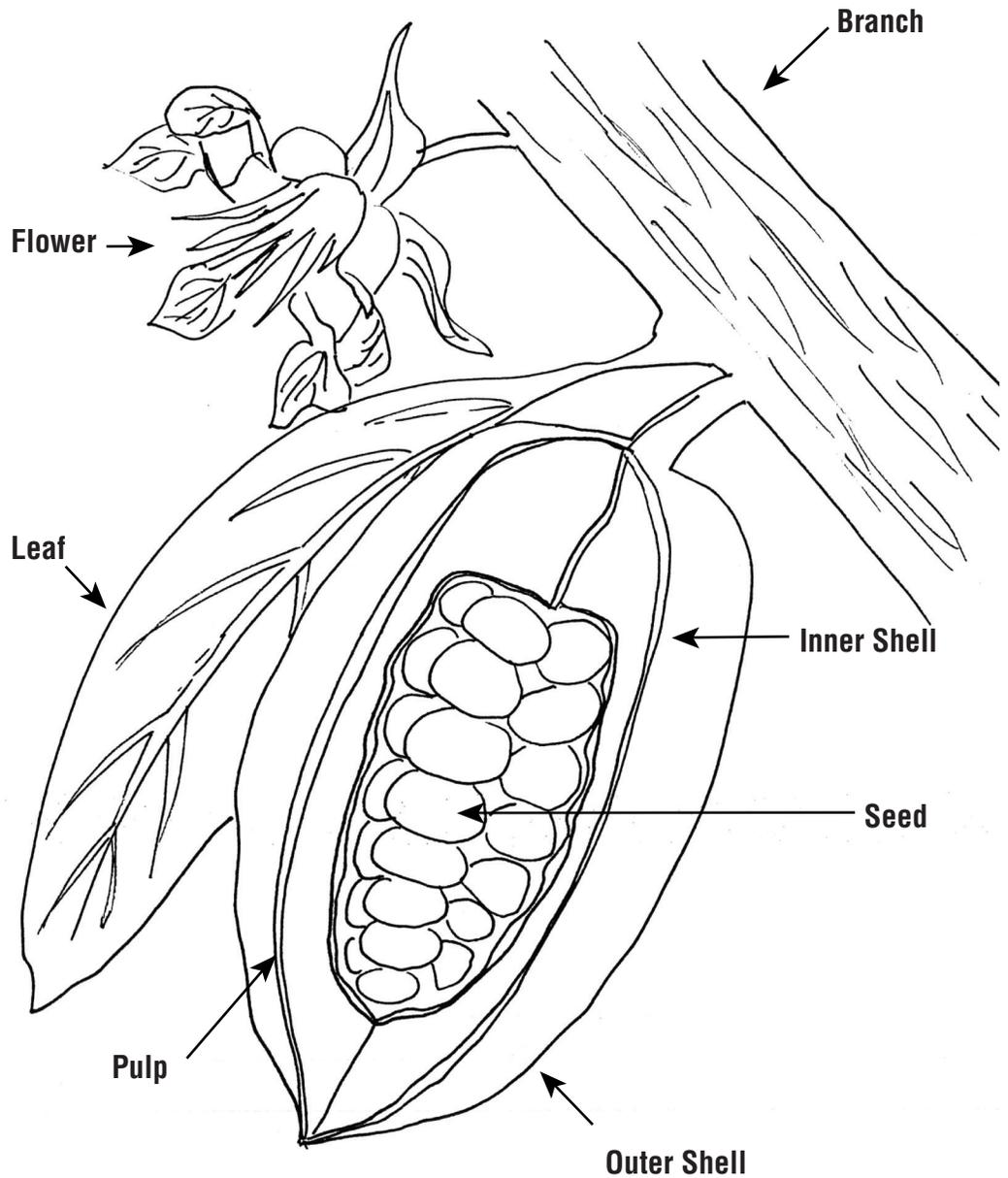


Diagrama Interior de una Mazorca del Cacao

Actividades

Ponle el nombre a las siguientes partes de la mazorca del cacao:

- 1 Corteza exterior
- 2 Corteza interior
- 3 Semillas
- 4 Hoja
- 5 Rama
- 6 Flor
- 7 Pulpa

Planes didácticos



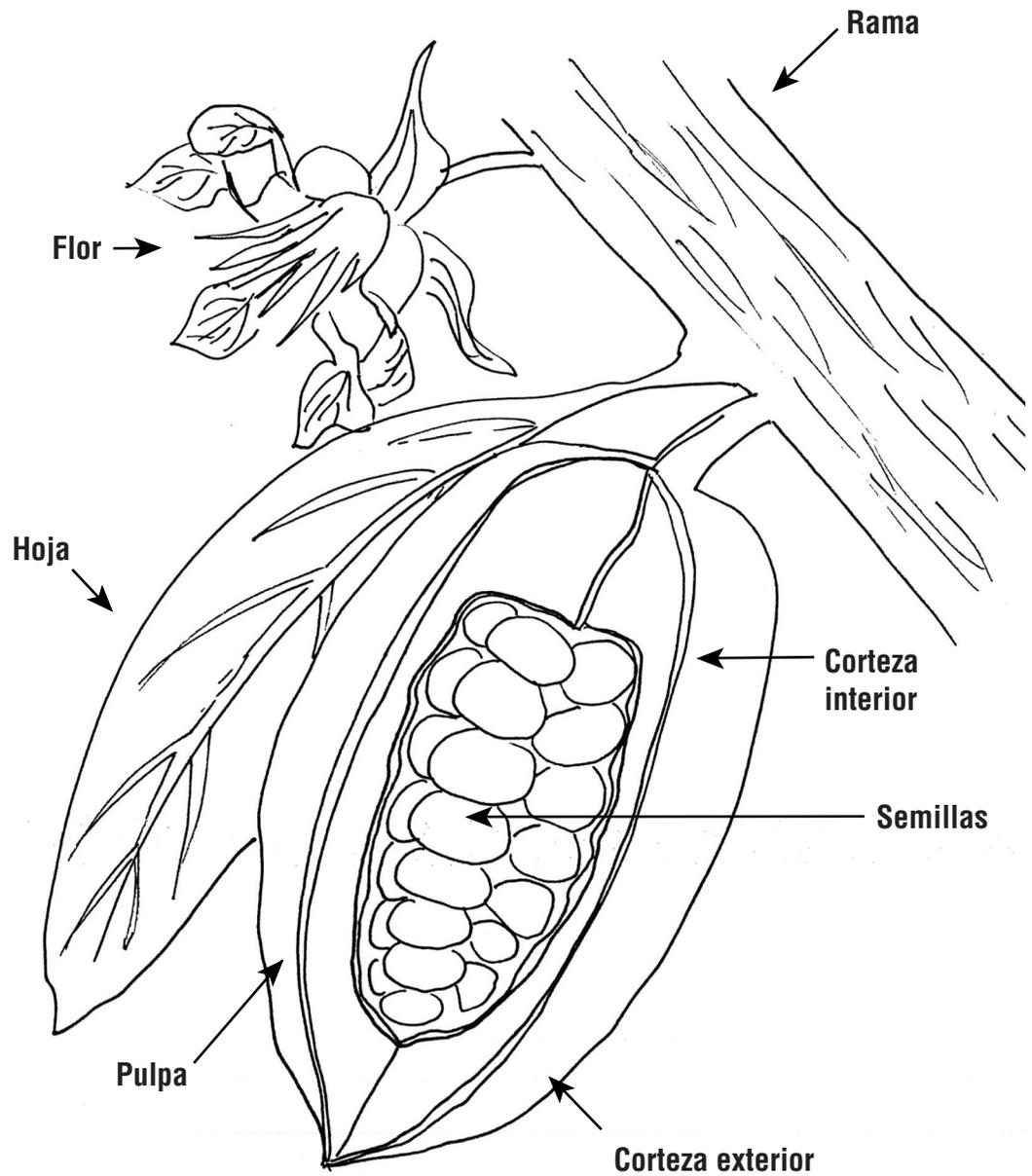
Diagrama Interior de una Mazorca del Cacao

Actividades

Ponle el nombre a las siguientes partes de la mazorca del cacao:

- 1 Corteza exterior
- 2 Corteza interior
- 3 Semillas
- 4 Hoja
- 5 Rama
- 6 Flor
- 7 Pulpa

Planes didácticos



Lesson - How Does Cacao Change Over Time?

Objectives

This project is meant to be a culminating activity after students have been exposed to cacao's ecosystem, cultivation, harvesting, and fermenting.

or

This project can serve as a way for students to research cacao's ecosystem, cultivation, harvesting, and fermenting.

Lesson Plans

Instructional Activities:

- 1 Have students brainstorm to produce a list of what they think are the processes cacao travels through from the minute it sprouts to the moment its seeds are shipped off for processing.
- 2 Students should list each step on an index card and arrange the cards chronologically.
- 3 Working individually, in pairs, or as a group, have students add to their index cards so that they have at least ten major steps. Ask students to research each of those steps.
- 4 Have students use their ten major steps to create a timeline depicting the growth, harvesting, and preparation of cacao for shipment.

Possible Timelines:

- Hang index cards on a length of string that represent the time between the minute the seed sprouts to the moment it is shipped off to be processed. Include an illustration on one side of the card and facts about the process on the other.
- Students can create their own chocolate exhibit. Encourage students to create a display for each of the major processes they've chosen for their timeline. How would they arrange their exhibit? What images or items would they need to display for people to understand the relationship between cacao and its environment?
- Have students create a diorama for each of the processes (example: create a magnified view of a midge pollinating a cacao flower or of a cacao farmer cutting off a cacao pod). Ask students to provide as much detail as they can about what's happening during the process they're depicting and to create a sign explaining what is occurring in their diorama.

National Reading Standards

Environment Lesson Reading Standards

	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6
<p>NL-ENG.K-12.1 Reading for Perspective Students read a wide range of print and nonprint texts to build an understanding of texts, of themselves, and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works.</p>	X	X	X		X	X
<p>NL-ENG.K-12.2 Understanding the Human Experience Students read a wide range of literature from many periods in many genres to build an understanding of the many dimensions (e.g., philosophical, ethical, aesthetic) of human experience.</p>						X
<p>NL-ENG.K-12.3 Evaluation Strategies Students apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies, and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics).</p>	X	X	X		X	X
<p>NL-ENG.K-12.4 Communication Skills Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.</p>	X	X	X	X		X
<p>NL-ENG.K-12.5 Communication Strategies Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.</p>		X	X		X	
<p>NL-ENG.K-12.6 Applying Knowledge Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language, and genre to create, critique, and discuss print and nonprint texts.</p>	X		X			
<p>NL-ENG.K-12.7 Evaluating Data Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.</p>		X	X			X
<p>NL-ENG.K-12.8 Developing Research Skills Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge</p>		X	X			X
<p>NL-ENG.K-12.9 Multicultural Understanding Students develop an understanding of and respect for diversity in language use, patterns, and dialects across cultures, ethnic groups, geographic regions, and social roles.</p>	X		X			X
<p>NL-ENG.K-12.10 Applying Non-English Perspectives Students whose first language is not English make use of their first language to develop competency in the English language arts and to develop understanding of content across the curriculum.</p>	X	X	X	X	X	X
<p>NL-ENG.K-12.11 Participating in Society Students participate as knowledgeable, reflective, creative, and critical members of a variety of literacy communities</p>						
<p>NL-ENG.K-12.12 Applying Language Skills Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).</p>	X	X	X	X	X	X

National Math Standards

Environment Lesson Math Standards

	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6
Numbers and Operations Students should develop an understanding of numbers - ways to represent and manipulate them and the relationship among different numbers and between number systems.						X
Algebra Students should develop an understanding about patterns, relations, and functions. They should learn to analyze mathematical situations using algebraic symbols and use mathematical models to represent quantitative relationships.						
Geometry Students should develop an understanding of the properties of two- and three- dimensional shapes, transformations, and symmetry and develop their use of visual and spatial reasoning to solve problems.						
Measurement Students should develop an understanding of different units to measure, be able to convert among systems, and become proficient in selecting the appropriate type of data of a given situation.		X				X
Data Analysis and Probability Students should develop an understanding about how to collect, organize, display, and interpret data. Students should also be able to apply the basic concepts of probability.	X					
Problem Solving Students should develop an understanding of mathematical concepts by working through problems that allow applications of mathematics to other contexts.		X				
Reasoning and Proof Students should develop an understanding of how to construct and evaluate mathematical arguments using inductive and deductive reasoning.		X				
Communication Students should learn how to organize and consolidate their mathematical thinking and communicate it coherently and clearly to others using the language of mathematics.	X	X				X
Connections Students should develop an understanding of how mathematical ideas interconnect and be able to apply mathematics to contexts outside of mathematics.		X	X	X	X	
Representation Students should learn how to create and use representations to organize, record, and communicate mathematical ideas and solve problems.	X					

California State Content Standards

Science

Grade K–5 Life Science
 Grade 6, 9–12 Ecology

History – Social Science

Grade K Learning and Working Now and Long Ago K.4
 Grade 1 A Child's Place in Time and Space 1.4, 1.6
 Grade 2 People Who Make a Difference 2.4
 Grade 3 Continuity and Change 3.1, 3.2
 Grade 6–12 Historical and Social Science Analysis Skills

Reference Material

Chocolate changes shape

Chocolate is probably best known in solid or bar form, but it wasn't always this way. In fact, for more than 90% of its history, chocolate was consumed only as a beverage.

The first conclusive evidence of chocolate consumption dates from the Classic Period of the Ancient Maya of Mexico and Central America (250-900 CE). The Maya made it into a spicy drink that they used in ceremonies. Among the ancient Maya, chocolate was enjoyed by rich and poor alike. A particular favorite of Maya kings and

priests, chocolate played a special part in royal and religious ceremonies. When ancient Maya aristocrats served chocolate drinks, they used lavishly decorated vessels made by specially trained artists. On storage jars and drinking vessels intended for the elite, artists painted religious and courtly scenes. Some vessels show images of gods and animals, or even kings drinking chocolate. In the palaces of Maya kings, the frothy chocolate drink was a treasured treat. And at sacred altars, Maya priests presented cacao seeds as offerings to the gods. Priests also prepared chocolate as a drink for special religious ceremonies.



Chocolate and Culture

Reference Material

The Maya were part of a trade network that included cacao and extended well beyond the territory they occupied (Maya lands covered parts of southern Mexico, Belize, Guatemala, and western Honduras). Long after the height of their political power, during the later Maya Post Classic Period (AD 900-1519), the ancient Maya supplied cacao to other Middle American people, such as the Aztecs (AD 1428-1521) of central Mexico, where the climate was too cool and dry to grow cacao. Cacao became an important product of the vast trade empire of the Aztec people—not only as a luxury drink, but as money, an offering to the gods, and tribute to rulers. In fact, the seeds were so valuable that dishonest merchants are believed to have made clay counterfeits. Aztec rulers also required ordinary citizens and conquered

peoples to pay a tax or tribute to them. Because cacao was so valuable, conquered peoples who lived in cacao—growing areas often paid tribute with cacao seeds. Why was cacao so valuable to the Aztecs? In part, its value lay in the fact that the Aztecs couldn't grow it themselves and that they had to trade for it over long distances. In Maya lands south of their own, Aztec traders filled woven backpacks with cacao, then hauled this precious cargo on foot to the Aztec capital, Tenochtitlan (ten noch teet LAN), today the site of Mexico city.

Like the Maya, the Aztec also used cacao to create a beverage. But other than the Aztec elite—rulers, priests, decorated warriors, and honored merchants—few had the means to savor the precious drink.

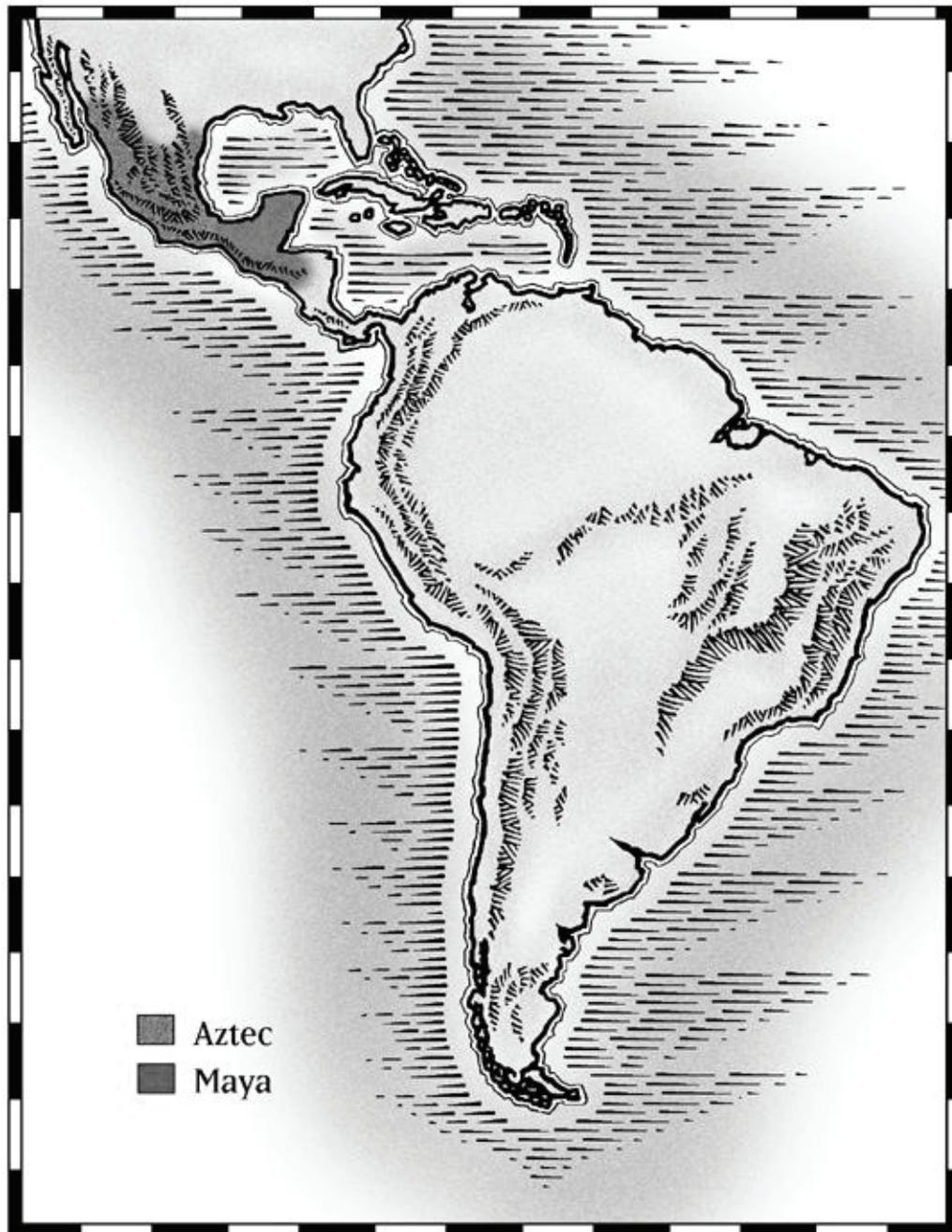


Chocolate and Culture

Reference Material

In 1519, Hernando Cortés led Spanish soldiers to the Aztec capital in search of golden treasures in the Americas. Instead, they found storerooms packed with valuable cacao seeds. In 1521, Spain defeated the Aztec and changed their way of life forever. Contact between the Spaniards and peoples of the Americas affected the rest of the world too. It opened a gateway

for the exchange of ideas and technology, and a new market in Europe for foods like cacao. Chocolate was one of many native American foods the Spanish explorers fancied. Sailing home, they filled their ships not just with cacao, but also with corn, chile peppers, vanilla, and tomatoes. Soon Europeans were cooking with ingredients from all around the globe.



Chocolate and Culture

Reference Material

Not long after cacao arrived in Europe, someone added sugar, a sweetener unavailable to the Aztec and Maya. Chocolate from the Americas and sugar, originally from Papua, New Guinea, were treasured imports in Europe. But high import taxes meant that few people could afford to indulge in them. In Spain, people couldn't get enough of this new drink, which had never been tasted before outside the Americas. Travelers visiting Spain from Germany, France, England, Holland, and Italy returned home with tales—and samples—of this new drink. Before a century had passed, many wealthy Europeans had tasted cacao . . . and wanted more. After falling in love with chocolate, the English, Dutch, and French set out to grow cacao in colonized lands near the equator. Soon they were shipping cacao back home to supply Europe with this luxurious treat. For the next 200 years, these political

powers struggled for control of “new” lands brimming with coveted resources like cacao.

By the early 1700s, sweetened chocolate had become a favorite of European upper classes. Like the elaborate ceramic vessels of Maya and Aztec kings, Europeans used special dishes for drinking chocolate. These special dishes, similar to the Maya and Aztec, were symbols of wealth. Chocolate houses of the 1600s and 1700s were gathering places for mostly men to enjoy a hot drink, discuss politics, socialize, and gamble. The first chocolate house opened in London in 1657. Within 50 years, London's chocolate houses numbered nearly 2,000. As the demand for chocolate skyrocketed, so did the demand for sugar to sweeten it. Between the 1700s and 1888, keeping up with the increasing demand for sugar to sweeten chocolate required the labor of millions of people to tend, harvest, and process sugar cane.



Chocolate and Culture

Reference Material

Throughout the 16th century, most cacao continued to be cultivated in the Pacific coastal zones of southern Mexico and Central America. This production depended upon local laborers, until the Native population was drastically reduced by the spread of European diseases. To replace this Native labor force and continue cultivating crops, with sugar being one of the foremost, many colonial landowners relied upon the system of African slavery established by European and Arab merchants. Many of the products of this time were labor-intensive crops. Colonial landowners needed a large workforce to meet European demand for indigo (dye), tobacco, cotton, sugar, and at times even for cacao itself. A combination of wage laborers and enslaved peoples were used to create that workforce—including tens of thousands of men, women, and children.

Although slavery was abolished in all countries by 1888, the need for labor to meet the demand for products like sugar and cacao continued. In some tropical countries harsh labor conditions prevailed long after the end of slavery. However, some activists in the world of chocolate spoke up to change these conditions.

In 1910, Cadbury invited several English and American chocolate companies to join him in refusing to buy cacao from these plantations until working conditions improved. That same year, a United States Congressional hearing resulted in a formal U.S. ban on any cacao shown to be the product of slave labor from these plantations. Even today, the news that some West African cacao farms may use child labor unites international governments, nonprofit organizations, and chocolate companies against such practices.

An international program to study labor practices on 3,000 farms in Ivory Coast and Ghana began in the fall of 2001. It will take time to assess labor conditions and develop an effective solution that supports the millions of farmers depending upon cacao for their livelihood and at the same time stop the criminal exploitation of children. Other suggestions to address the problem of child labor situation include labeling chocolate produced without child labor or boycotting West African cacao. Labeling would be difficult to monitor because there are over 600,000 small cacao farms in Ivory Coast, and a boycott could devastate the economy of West African countries.



Chocolate and Culture

Reference Material

From indulgence to snack food

Cacao seeds grow on trees, but chocolate bars have to be made by hand or by machine. The Industrial Revolution was a turning point for chocolate as a steady stream of technological innovations and creative advertising brought chocolate bars to the masses. While inventions made chocolate easier to produce, advertising opened up new markets by making it something people craved. As chocolate

products became cheaper to make and buy, advertisers introduced marketing campaigns aimed at more people. Today you can buy chocolate in almost every country around the world. Just about anyone you speak to has feelings about chocolate, but it means different things to people in different parts of the world. For some it is a decadent treat, for others an important source of income, and for others still it is a critical component of ritual and celebration.



Lesson - Who Grows Chocolate and How Does it Affect Their Lives?

Objectives

Explore the way cacao and its environment influence people's culture and lifestyle

Materials

- Chocolate: *Riches from the Rainforest* by Robert Burleigh
- Pictures of cacao and its ecosystem (appendix)
- Overhead transparency of the People of the Rainforest scenarios
- A class set of the People of the Rainforest scenarios (P. 48)
- Art supplies for visual representation of rainforest and its people (poster board, markers, construction paper, etc.)

Lesson Plans

Background Activities:

- 1 Ask students to imagine that they are going to live in a nearby park or forest preserve.
 - What basic needs do they have to meet to survive?
 - How will they meet those needs (i.e., What would they use to build a shelter? Where would they get food?)
- 2 As a class, generate a list of the materials students would use to meet their needs.
 - Where they would obtain these materials?
 - Why did they choose them (availability? cost? necessity?)
- 3 Discuss the impact of the environment on people's ability to meet their needs (e.g. availability of materials?)

Instructional Activities:

- 1 Show students the picture card of the cacao tree and its surrounding ecosystem. Ask students to list the natural resources they see and then to think about the following questions:
 - What do the people who live in this environment use to make their houses?
 - Where do they get their food and what kinds of food do they eat?
 - How do they earn their living?
 - How might these people be connected to chocolate?
- 2 Help students become familiar with a group of people who live, harvest and use cacao. We suggest reading the book *Cocoa Ice* by Diana Applebaum or *Chocolate: Riches for the Rainforest* by Robert Burleigh with your students. You can also show them the pictures of the cacao farmers.
- 3 Have students think about the following questions:
 - How are the people of the rainforest utilizing the cacao tree to meet their needs?
 - How has the cacao tree influenced the people who live in the rainforest?
 - How would their lives be affected by the growth or decline of the chocolate industry?
- 4 Have students choose one of the two following fictional scenarios and create a visual representation (poster, diorama, sculpture, etc.) of the effect on the rainforest and on the indigenous people who live there based on the scenario they choose.

Lesson - Who Grows Chocolate and How Does it Affect Their Lives?

Lesson Plans (continued)

Scenario 1

News flash...CHOCOLATE CURES THE COMMON COLD

Researchers have discovered that people who eat at least 6 oz. of chocolate a day have a 95% less chance of contracting the common cold virus. Since this scientific announcement, chocolate bars have been flying off the shelves. Mike Mulligan, CEO of Mall-mart says, "It's amazing! We can't keep up with the demand for chocolate. They're buying absolutely everything—from chocolate bars to chocolate cough drops."

Scenario 2

News flash...CHOCOLATE LINKED TO BAD LUCK

After a year-long study of people who eat chocolate, researchers have found that the amount of chocolate a person consumes is directly related to the amount of negative energy or "bad luck" a person experiences. Scientists believe that the theobromine in chocolate emits negative ions, which cause adverse effects such as flat tires, stepping in large puddles, failing tests, and bad hair days. Scientists advise that people cut chocolate completely out of their diets, and instead, satisfy their sweet tooth with pastries, cotton candy, and other non-chocolate sugar items. Chocolate manufacturers have already begun to convert their chocolate processing plants into licorice factories and pizza parlors. Economists estimate that by the end of the year, 85% of the chocolate industry will be out of business.

People of the Rainforest

Activity

Choose one of the two following invented scenarios. Write a brief description and create a visual representation (poster, diorama, sculpture, etc.) of the effect the described situation would have on the rainforest and the indigenous people who live there based on the scenario you choose.

Scenario 1

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Scenario 2

News flash...CHOCOLATE LINKED TO BAD LUCK

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La Gente del Bosque Tropical

VERSIÓN EN ESPAÑOL Actividad

Escoge uno de los dos panoramas. Crea una representación visual (póster, diorama, escultura, etc...) del efecto que tiene en el bosque tropical y en los indígenas que viven en el área basandose en el panorama que escogiste.

Panorama 1

Boletín informativo... EL CHOCOLATE CURA EL RESFRIADO

Los investigadores han descubierto que la gente que come cuando menos 6 oz. de chocolate al día tiene un 95% menos de probabilidad de contagiarse con el virus del resfriado. Desde que se dio a conocer este descubrimiento las ventas de chocolate subieron hasta las nubes. Mike Mulligan, CEO de Mall-mart declaró, “¡Es sorprendente! No podemos dar abasto a la demanda de chocolate. La gente está comprando de todo, desde barras de chocolate hasta pastillas de chocolate para la tos”.

Panorama 2

Boletín informativo... EL CHOCOLATE TRAE MALA SUERTE

Después de un año de estudiar a gente que come chocolate, los investigadores descubrieron que la cantidad de chocolate que consume una persona está directamente relacionada al nivel de energía negativa o “mala suerte” que tiene este individuo. Los científicos creen que la teobromina del chocolate emite iones negativos, que tienen efectos negativos como llantas desinfladas, caer en charcos, reprobar exámenes y tener mal cabello. Los científicos aconsejan a la gente que deje al chocolate absolutamente fuera de su dieta, y que en su lugar consuma pan, algodón de dulce y otras golosinas que no contengan chocolate. Los fabricantes de chocolate ya han comenzado a convertir sus plantas de chocolate en fábricas de otras golosinas y en pizzerías. Los economistas creen que para fin de año, el 85% de la industria del chocolate habrá desaparecido.

Lesson - How did the Maya and Aztec Use Chocolate?

Objectives

Identify how the Maya and Aztec people used cacao

Compare how chocolate was consumed by the Maya and Aztecs to the way it is consumed today

Materials

- Pictures of Maya hieroglyphs (appendix)
- Map of regions where cacao grows (appendix)
- Map of area inhabited by Maya and Aztec (appendix)
- Drawing paper
- Large Styrofoam cups
- Assorted permanent markers
- Ingredients for Aztec chocolate
- Utensils for making Aztec chocolate

Lesson Plans

Background Activities:

- 1 Provide students with a general background of the Maya (when, where, and how they lived).
- 2 Show students a picture of a hieroglyphs taken from Maya drinking vessels.
 - What do they see depicted?
 - Based on the decoration, how do they think the Maya used the vessel?
- 3 Tell the students that the vessel was used for drinking chocolate.
 - Who do they think got to drink chocolate?
 - On which occasions do they think the Maya drank chocolate?

Instructional Activities:

- 1 Tell students about the Maya's use of chocolate, its consumption, and its value.
- 2 Show students the map of where cacao grows and compare it to the map of where the Maya and Aztecs lived. Discuss the accessibility of cacao to the Maya and the Aztecs. Discuss the following questions:
 - Why was chocolate consumed by many of the Maya people, regardless of their socio-economic status?
 - Why was chocolate consumed by primarily the wealthy and powerful Aztecs?
 - How did cacao influence the relationship between the Maya and Aztecs?
 - Is there a place in the modern world that has a similar relationship to chocolate as the Maya and Aztecs did (haves vs. have nots, environmental limitations, etc.)?
- 3 Have students generate a list of the ways and occasions the Maya and Aztecs used chocolate.
- 4 Have students choose one of the ways the Maya and/or Aztecs used chocolate and illustrate it.
- 5 Have students use permanent markers to transfer their illustrations to a large Styrofoam cup. Encourage students to create their illustrations in the Maya style. (Refer students back to the Maya hieroglyphic for stylistic detail.)
- 6 Using the attached recipe, cook up a pot of your own Aztec chocolate. (You might want to prepare the drink yourself, ask for assistance from a few students, or let the whole class participate in the preparation.) Tell students that this recipe is similar to the one the Aztecs used. When the chocolate drink is done, students may use their decorated drinking vessels (Styrofoam cups) to sample some of the brew.

Lesson - How did the Maya and Aztec Use Chocolate?

Lesson Plans (continued)

7 Ask them to think about how Aztec chocolate is similar to/different from the hot chocolate we commonly drink today.

8 Ask students to list the steps the Maya and Aztecs performed to create their chocolate drink.

Things to Consider:

You might want students to generate a list of the ways we use chocolate today, and compare it to the ways the Maya and Aztecs used it. Then, instead of illustrating Maya and Aztec uses, students could create a “modern” drinking vessel by depicting modern uses of chocolate on their cups.

Recipe for Aztec Chocolate

Activity

Ingredients:

1 ounce unsweetened baking chocolate

1 teaspoon vanilla

2/3 cup boiling water

ground pepper or chilies to taste

Grate the unsweetened chocolate into a bowl and cover it with a little of the boiling water. Mash the mixture into a paste. Add the rest of the water and vanilla and beat with an electric mixer until frothy. You could also use a molinillo or blender (on high speed) to beat the mixture as well. Add the pepper or chilies to give the drink a little kick.

The chocolate does not totally dissolve in the water using this technique. Tiny particles of chocolate will float in the water, and you will be able to taste the grittiness in the drink. For a more authentic drink, allow the chocolate to cool and beat it into a froth just before you drink it.

Use the grid below to illustrate the process of making Aztec chocolate.

Receta para el Chocolate Azteca

SPANISH VERSION

Actividad

Ingredientes:

1 onza de chocolate amargo (sin azúcar)

1 cucharadita de vainilla

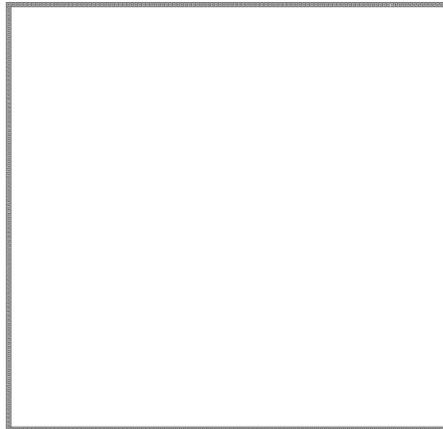
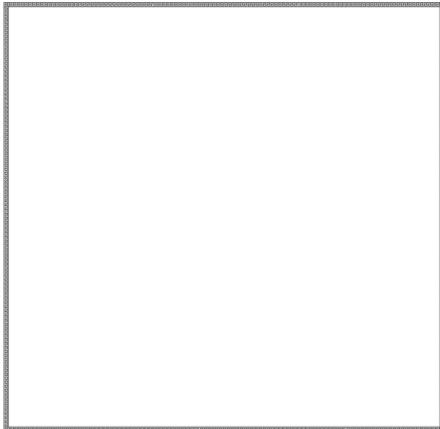
2/3 de taza de agua hirviendo

chile molido al gusto

Ralla el chocolate amargo y viértelo en una vasija. Cúbrela con un poco del agua hirviendo. Machaca la mezcla hasta que tenga la textura de pasta. Agrega el resto del agua y la vainilla y mézclala con una batidora eléctrica hasta que haga espuma. También puedes usar un molinillo o una licuadora (a velocidad alta) para batir la mezcla. Agrega chile entero o en polvo para darle un sabor más fuerte.

Si usas esta técnica, el chocolate no se disolverá totalmente en el agua. Algunas pequeñas partículas de chocolate flotarán en el agua, y podrás saborear la textura áspera de la bebida. Para que la bebida sea más auténtica, deja que el chocolate se enfríe, bátelo hasta que haga espuma y después bébelo.

Usa los cuadros que están enseguida para ilustrar el proceso para hacer el chocolate Azteca.



Lesson - How did the Europeans Use and Influence the Development of Chocolate?

Objectives

Explore the introduction of chocolate to Europe

Identify how the Europeans consumed chocolate

Identify how European consumption of chocolate impacted the chocolate and sugar trade

Materials

- Unsweetened baking chocolate
- Map of cacao trade routes (appendix)
- Picture of 1700s European chocolate houses (appendix)
- Art supplies for chocolate house project (construction paper, markers, glue, etc.)

Lesson Plans

Background Activities:

- 1 Distribute a small piece of baking chocolate to each student, but do not tell them what it is.
- 2 Tell students that you have found a mysterious substance in the back of your desk drawer. Ask them to make observations about the substance (color, texture, size, shape, smell, etc.) to help you guess what it is.
 - Students will probably identify the substance as chocolate. Do not confirm or deny their hypothesis.
- 3 Once students have completed making their observations, compile them into a class list (possibly listing them on a large sheet of paper in the shape of a piece of chocolate).
- 4 Based on their observations, ask students what they think the mystery substance is.
- 5 Allow students to taste the chocolate. Did this change their hypothesis?
- 6 Ask students to guess what is different about the chocolate they have eaten compared to the chocolate they usually eat.

Instructional Activities:

- 1 Tell students that the Maya and Aztec did not sweeten their chocolate with sugar, and it tasted something like the baking chocolate they just consumed. Ask students if they can guess why the Maya and Aztecs didn't use sugar.
- 2 Show students a map of where sugar grows indigenously. Discuss the environmental conditions needed to grow sugar. Compare them to the conditions needed to grow cacao.
 - Could sugar and cacao be grown in the same location?
 - Did they originate in the same regions?
 - What could the Maya and Aztecs have used to sweeten their chocolate, since sugar was not available?
- 3 Help students identify Europe on the map. Ask students how they think the Europeans obtained chocolate and sugar. Identify the trade routes through which the Europeans obtained chocolate and sugar.
- 4 Discuss the introduction of chocolate to Europe and their addition of sugar. We suggest reading *Chocolate: Riches from the Rainforest* by Robert Burleigh.

Lesson - How did the Europeans Use and Influence the Development of Chocolate?

Lesson Plans (continued)

5 Tell students about the chocolate houses of Europe.

- Who do they think frequented these chocolate houses?
- Why was chocolate only for the elite?

6 Ask students to think of a modern business that is similar to one of the European chocolate houses (coffee shop, ice cream parlor, cigar bar, country club, etc.)

7 Have students list the similarities and differences.

8 Ask students to imagine that they are going to open one of these chocolate houses.

- What would they serve?
- What would their shop look like?
- How would they make their shop inviting?

9 Projects (you can assign one, or allow students to choose one):

- Create a menu of what your chocolate house would serve. Research various chocolate beverages and baked goods to obtain just the right chocolate combination. Make sure the items on your menu and its design reflect the spirit and ambiance of your chocolate house.
- Create a poster advertising your chocolate house based on a 1700s design. What will draw customers into your business? Will you have a special promotion or “gimmick”?
- Create a model of your chocolate house (either 2 or 3 dimensional). Include a view of both the interior and exterior. What will you do to make your shop comfortable and inviting?

Things to Consider:

Students can also try adding sugar to baking chocolate until they find a mixture that tastes good. Have them prepare 5 cups of chocolate (without sugar). Then have them add the following amounts of sugar to each cup and decide which one they think tastes the best: 1/4 tsp. , 1/2 tsp., 1 tsp., 2 tsp., 1 tbsp.

Students can also try flavoring baking chocolate with substances other than sugar (honey, jelly, vanilla, and etc..). Have students conduct a “taste test” to see if other students in the class can guess what was used to flavor the chocolate.

Lesson - How did the Technological Advances of the Past Century Affect the Use and Future of Chocolate?

Objectives

Explore the impact of the Industrial Revolution on chocolate

Determine the current status of chocolate manufacturing and consumption

Materials

- Graph paper
- Samples of chocolate from various chocolate manufacturers

Lesson Plans

Background Activities:

- 1 Make sure that each student has a piece of paper and writing utensil.
- 2 Ask students to spend five minutes writing down their personal experiences with chocolate. Encourage them to write continuously for the entire five minutes.
- 3 When five minutes have passed, have students organize their writing into five categories. They may choose the categories, or you can assign them (category examples: brand names, forms of chocolate, negative associations, traditions, celebrations, etc.)
- 4 Have students share their categories and their reasoning for grouping certain items.
- 5 Discuss: What is your earliest memory of chocolate?
 - Why do you think everyone in the class has had several chocolate experiences?
 - Do you think your relationship with chocolate is similar to that of Americans during colonial times? The Civil War? When your parents were young?

Instructional Activities:

- 1 Discuss with students the impact of the Industrial Revolution on chocolate production.
 - How did the Industrial Revolution affect:
 - *the cost of chocolate?*
 - *the way chocolate was manufactured?*
 - *the people who consumed chocolate?*
 - *the candy industry?*
 - *the cacao farmers?*
- 2 Have students read pgs. 55-64 of *Vanilla, Chocolate & Strawberry: The Story of Your Favorite Flavors* by Bonnie Busenburg or chapter 8 of *The True History of Chocolate* by Sophie and Michael Coe.
 - Who were (and still are) the major manufacturers of chocolate in the United States?
 - What impact did the addition of milk to chocolate have on the chocolate industry?
 - What were some of the major manufacturing concerns of early chocolate producers?
 - How did these concerns shape the chocolate manufacturing process (location, distribution, advertisement, etc.)?

Lesson - How did the Technological Advances of the Past Century Affect the Use and Future of Chocolate?

Lesson Plans (continued)

- 3 Have students generate a list of all the chocolate candy products they can think of or have them bring in samples of several different kinds of chocolate candy.
- 4 Ask students to identify the manufacturer of each type of candy they listed or brought.
- 5 Have students divide the candy by manufacturer. See if they can list (or bring) any other types of candy produced by those manufacturers. Based on their lists, have students guess which are the top three manufactures of chocolate in the United States. They will use these manufacturers for the rest of the assignment.
- 6 Have students choose three products made by each of the three manufacturers and then conduct a poll of their classmates, school, or community to determine which of the nine selections of chocolate candy people enjoy the most and the least.
- 7 Using the results of their poll, have students determine which candy people liked the most to the least. Then have students group the candy together by manufacturer and calculate which chocolate manufacturer produces the most popular chocolate products and the least popular.
- 8 Have students graph the results of their poll by both individual candy and manufacturer.
- 9 Encourage students to be creative with their graphs. They might use chocolate wrappers as part of the graph, or decoration. Some students might choose to make an entirely edible graph out of candy.

Things to consider:

Students can also compare their poll results to national chocolate consumption reports. Reports can be found by accessing the International Cocoa web site at www.icco.org or www.candyusa.org.

Have students talk about the similarities or differences between their results and the national survey.

- *What are some factors that influence chocolate consumption?*
- *What could chocolate producers do to make chocolate more desirable to specific groups of people (i.e., senior citizens, military personnel, athletes, etc.)*
- *What effect would banning chocolate in the United States have on: you? our economy? Europe? Ghana? South America?*

Lesson - How is Chocolate Manufactured?

Objectives

Explore the process through which chocolate is manufactured

Identify the stages of the chocolate manufacturing process

Materials

- 4-5 cacao seeds
- A class set of the Chocolate Manufacturing sheet (P. 59)
- posterboard
- drawing supplies (markers, crayons, etc.)

Lesson Plans

Background Activities:

- 1 Ask students to think about how a cacao seed might turn into a chocolate bar.
 - How does the bean turn from a solid into a liquid so that it can be molded into the bar shape?
 - What has to be added to the chocolate?
- 2 Divide students into groups of 4-5. Give each group a cacao seed. Ask students to examine the seed and come up with a process for turning it into a chocolate bar.
- 3 Have students record their hypotheses and share them with the class.

Instructional Activities:

- 1 Have students take a virtual tour of a chocolate factory. (We recommend The Field Museum's web site at www.fieldmuseum.org or www.hersheys.com.)
- 2 Give each student a copy of the Chocolate Manufacturing sheet.
- 3 As they go through their virtual tour, have students describe each step of the chocolate manufacturing process on their sheet.
- 4 Have students compare their chocolate manufacturing hypothesis to the actual process. Discuss the following questions:
 - How was your hypothesis similar to or different from the actual process?
 - Did anything surprise you about the way chocolate is processed?
 - How is the way large manufacturers process chocolate similar to and/or different from the way individuals process it?
 - Do you think you would like to work in a chocolate manufacturing plant?
- 5 Ask students to imagine that they are the brand new owners of a chocolate factory. They can make any changes or improvements to the factory that they want. Have students create a poster of their utopian chocolate factory and present it to their class.

Things to consider:

*As a class, you might want to read [*Charlie and the Chocolate Factory*](#) by Roald Dahl. Encourage students to compare their utopian factory to an actual chocolate factory and to Willy Wonka's factory.*

Chocolate Manufacturing

Activity

Draw and describe each of the steps of manufacturing chocolate.

Roast

Winnow

Grind

Mill

Conch

Temper

Fabricación del Chocolate

Actividad

Dibuja y describe cada uno de los pasos para la fabricación del chocolate.

Tostar

Batir

Moler

Mezclar

Conchar

Templar

Lesson - How has Chocolate Changed Through the Ages?

Objectives

This project is meant to be a culminating activity after students have been exposed to chocolate production and consumption through the ages.

or

This project can serve as a way for students to research chocolate production and consumption through the ages.

Materials

Will vary depending on which timeline students select

Lesson Plans

Instructional Activities:

- 1 Have students brainstorm to produce a list of major chocolate moments in history (example: the Europeans addition of sugar, the Aztecs' cacao currency, the initial cultivation of the cacao tree, etc.).
- 2 Students should list each event on an index card and arrange the cards chronologically.
- 3 Either working individually, in pairs, or as a group, have students add to their index cards so that they have at least ten major events. Have students research each of those events.
- 4 Using their ten major events, have students create a timeline depicting the development of chocolate.

Possible Timelines:

- Hang index cards on a length of string representing the time between the earliest and most current events. Include an illustration on one side of the card, and facts about the event on the other.
- Create an edible timeline. Encourage students to bring in chocolate recipes from several different time periods and arrange them chronologically. Have students include information about each time period. For fun, encourage students to make several of the chocolate treats and invite other students to "eat" their way through the history of chocolate.
- Chocolate has come in many different shapes. Have students design a chocolate shape for each of the major events they've chosen for their timeline. Shapes should reflect the culture and time period they're depicting. For example, a chocolate shape from the Aztecs might be a temple where chocolate was used in religious ceremonies. A modern day chocolate shape might be a cell phone or computer.
- Students can create their own chocolate exhibit. Encourage students to create a display for each of the major events they've chosen for their timeline. How would they arrange their exhibit? What images or items would they need to display for people to understand the entire story of chocolate?

National Reading Standards

Culture Lesson Reading Standards

	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6
<p>NL-ENG.K-12.1 Reading for Perspective Students read a wide range of print and nonprint texts to build an understanding of texts, of themselves, and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works.</p>	X	X	X	X	X	X
<p>NL-ENG.K-12.2 Understanding the Human Experience Students read a wide range of literature from many periods in many genres to build an understanding of the many dimensions (e.g., philosophical, ethical, aesthetic) of human experience.</p>	X					X
<p>NL-ENG.K-12.3 Evaluation Strategies Students apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies, and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics).</p>	X		X	X	X	X
<p>NL-ENG.K-12.4 Communication Skills Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.</p>	X	X	X	X		X
<p>NL-ENG.K-12.5 Communication Strategies Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.</p>	X		X			X
<p>NL-ENG.K-12.6 Applying Knowledge Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language, and genre to create, critique, and discuss print and nonprint texts.</p>	X		X			X
<p>NL-ENG.K-12.7 Evaluating Data Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.</p>			X	X	X	X
<p>NL-ENG.K-12.8 Developing Research Skills Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge</p>		X	X		X	X
<p>NL-ENG.K-12.9 Multicultural Understanding Students develop an understanding of and respect for diversity in language use, patterns, and dialects across cultures, ethnic groups, geographic regions, and social roles.</p>	X	X	X			X
<p>NL-ENG.K-12.10 Applying Non-English Perspectives Students whose first language is not English make use of their first language to develop competency in the English language arts and to develop understanding of content across the curriculum.</p>	X	X	X	X	X	X
<p>NL-ENG.K-12.11 Participating in Society Students participate as knowledgeable, reflective, creative, and critical members of a variety of literacy communities</p>						
<p>NL-ENG.K-12.12 Applying Language Skills Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).</p>	X	X	X	X	X	X

National Math Standards

Culture Lesson Math Standards

	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6
Numbers and Operations Students should develop an understanding of numbers - ways to represent and manipulate them and the relationship among different numbers and between number systems.	X	X	X	X		X
Algebra Students should develop an understanding about patterns, relations, and functions. They should learn to analyze mathematical situations using algebraic symbols and use mathematical models to represent quantitative relationships.				X		
Geometry Students should develop an understanding of the properties of two- and three- dimensional shapes, transformations, and symmetry and develop their use of visual and spatial reasoning to solve problems.						
Measurement Students should develop an understanding of different units to measure, be able to convert among systems, and become proficient in selecting the appropriate type of data of a given situation.		X	X	X		X
Data Analysis and Probability Students should develop an understanding about how to collect, organize, display, and interpret data. Students should also be able to apply the basic concepts of probability.				X		
Problem Solving Students should develop an understanding of mathematical concepts by working through problems that allow applications of mathematics to other contexts.	X		X	X		
Reasoning and Proof Students should develop an understanding of how to construct and evaluate mathematical arguments using inductive and deductive reasoning.			X	X		
Communication Students should learn how to organize and consolidate their mathematical thinking and communicate it coherently and clearly to others using the language of mathematics.	X			X		X
Connections Students should develop an understanding of how mathematical ideas interconnect and be able to apply mathematics to contexts outside of mathematics.	X		X	X		
Representation Students should learn how to create and use representations to organize, record, and communicate mathematical ideas and solve problems.						

California State Content Standards

Science

Grade K–5 Life Science
 Grade 6, 9–12 Ecology

History – Social Science

Grade K Learning and Working Now and Long Ago K.4
 Grade 1 A Child's Place in Time and Space 1.4, 1.6
 Grade 2 People Who Make a Difference 2.4
 Grade 3 Continuity and Change 3.1, 3.2
 Grade 6–12 Historical and Social Science Analysis Skills



Chocolate

RESOURCE MATERIALS

History Highlights

Born in the ancient world

The first conclusive evidence we have of chocolate consumption dates from the Classic Period of the Ancient Maya of Mexico and Central America (200-900 CE). The Maya made it into a spicy drink that they used in ceremonies, and they traded cacao with people who couldn't grow their own.

The Aztec, between the **13th and 16th centuries**, were among those who had to trade for cacao. To them, chocolate was a luxury, a drink for warriors and nobility, used in rituals and ceremonies. They also used cacao seeds as money; in fact, the seeds were so valuable that dishonest merchants are believed to have made counterfeits.

Some scholars think the Aztec called their chocolate *chocolatl*. But others think that was a Spanish invention, based on the Aztec word *cacahuatl* ("bitter water") or the Mayan *chocol haa* ("hot water").

Chocolate meets European culture

In the **16th century**, the Spanish, searching for gold in the New World, instead found cacao. Finding the drink bitter, they mixed it with sugar and kept their discovery secret from the rest of Europe for nearly a century.

The first English chocolate house opened in **1657**. Before long, because the English, Dutch, and French were so enamored of chocolate, they set out to colonize cacao-growing lands of their own. The chocolate trade was thus built on a system of forced labor and slavery of Meso-American and African people.

By **1700**, there were nearly 2,000 chocolate houses (like today's coffee shops) in London alone. They soon evolved into men's social clubs, hotbeds of gambling and political activity.

In **18th-century** Italy, chocolate was the preferred drink of the Cardinals; they even had it delivered in while they were electing a new Pope. Chocolate also was rumored to have disguised a poison that killed Pope Clement XIV in 1774.

While the Aztec—and the Europeans, at first—used chocolate only as a drink, in the late **17th and 18th centuries** the adventurous Italians pushed it to new culinary heights. They began experimenting with chocolate as a flavoring in everything from soup to polenta; they even dipped liver in chocolate and then fried it.

Mass-produced in the industrial world

The technology of processing cacao scarcely changed from the Maya to the late 18th century. Then new inventions made it possible to produce chocolate for the masses:

1776 A Frenchman named Doret invents a hydraulic machine to grind cacao seeds into a paste. Not long afterwards, it is replaced by the steam engine, making it even easier to produce large amounts of chocolate.

1828 A Dutch chemist, Coenraad Van Houten, invents the cocoa press, which extracts cocoa butter from chocolate, leaving the powder we call cocoa. This makes chocolate both more consistent and cheaper to produce.

1847 Fry and Sons Company of Bristol, England, introduces the first solid eating chocolate. The family—who, like several of the early chocolate dynasties, were Quakers—also boycotted cacao from parts of the world where working conditions resembled slavery.

Resource Materials: History Highlights

History Highlights

1868 Richard Cadbury introduces the first box of chocolates—and later, the first Valentine’s Day candy box.

1870s In Switzerland, Daniel Peter and Henri Nestlé develop the world’s first milk chocolate bar using Nestlé’s creation, powdered milk. That same year, Rodolphe Lindt invents a machine that churns the paste squeezed from cacao seeds into a smooth blend, giving chocolate a new, mellow texture.

1893 Pennsylvania confectioner Milton S. Hershey discovers chocolate processing equipment at the World’s Columbian Exposition in Chicago (where The Field Museum also got its start!) He buys the machinery, builds a chocolate factory and town in the hills of southern Pennsylvania, and soon becomes “the Henry Ford of chocolate makers.”

Refined and carried wherever humankind may travel

1926-27 The New York Coffee, Sugar, and Cocoa Exchange, Inc. is established.

By 1930, there are nearly 40,000 different kinds of chocolate in the U.S.

During World War II, nearly all the chocolate produced in the U.S. is earmarked for the military. After the war, Hershey’s received the Army-Navy E award for civilian contribution to victory. Today, U.S. Army D-rations include three 4-ounce chocolate bars.

1982 Chocolate goes into space on the U.S. space shuttle Columbia.

Fascinating Facts

About the cacao tree

- 1 The seed pods of the cacao tree grow not on the end of its branches, but directly off the branches and the trunk.
- 2 Each pod is about the size of a pineapple and holds thirty to fifty seeds—enough to make about seven milk chocolate or two dark chocolate bars.
- 3 Cacao flowers are pollinated by midges, tiny flies that live in the rotting leaves and other debris that fall to the forest floor at the base of the tree. Those midges have the fastest wingbeats in the world: 1,000 times per second!
- 4 Farmed cacao trees today are endangered by natural threats, such as the witch's broom fungus and other diseases and pests. Along with the rest of the rainforest, their wild counterparts are threatened by lumber companies, which harvest the taller trees that shelter the cacao and help maintain the cacao's fragile ecosystem.
- 5 Cacao seeds are not sweet. They contain the chemicals caffeine and theobromine, which give them a bitter taste.
- 6 The scientific name of the cacao tree, *Theobroma*, means "food of the gods."
- 7 Cacao is not related to the coconut palm or to the coca plant, the source of cocaine.
- 8 Africa is now the source of more than half the world's cacao, while Mexico today provides only 1.5 percent.

Chocolate as food and medicine

- 1 It takes 4 cacao seeds to make 1 ounce of milk chocolate, and 12 seeds to make 1 ounce of dark chocolate.
- 2 Although we tend to think of chocolate as a solid today, for 90% of its history it was consumed in liquid form.
- 3 Some of the earliest European cocoa-makers were apothecaries seeking medicinal uses of the plant.
- 4 Cacao seeds contain significant amounts of naturally occurring flavonoids, substances also found in red wine, green tea, and fruits and vegetables; flavonoids are connected with a reduced risk of cardiovascular disease and some cancers.
- 5 On the other hand, chocolate carries a heavy load of saturated fats and calories; there are much healthier ways to get the same benefits.
- 6 Chocolate contains two stimulants also found in coffee—caffeine and theobromine—but in relatively small amounts. Fifty M&Ms, for example, have about as much caffeine as a cup of decaffeinated coffee.

Who eats chocolate?

- 1 Not many Africans. A great deal of chocolate is grown in Africa, but mostly for export.
- 2 Not a lot of Asians. Although chocolate's popularity is growing in China and Japan, there's still comparatively little chocolate culture in Asia. The Chinese, for example, eat only one bar of chocolate for every 1,000 eaten by the British.
- 3 Mexicans consume chocolate more as a traditional drink and a spice than as a candy. They use it to make one variety of the wonderful sauce called mole and offer chocolate drinks at many social gatherings.

Resource Materials: Fascinating Facts

Fascinating Facts

- 4 Americans for sure...an average of 12 pounds per person per year. In 2001, that came to a total of 3 billion pounds. (Americans spend \$13.1 billion a year on chocolate.)

- 5 Definitely Europeans! As far back as the late 1700s, the people of Madrid, Spain consumed nearly 12 million pounds of chocolate a year. Today, 16 of the 20 leading per-capita chocolate-consuming countries are in Europe, with Switzerland leading the pack. (The U.S., as of 1998, was #9.)

For the love of chocolate...the chocolate of love

Does chocolate stimulate the libido? Chemists can't prove it, but popular culture is reluctant to give up the belief...

- As far back as the 1000 CE, frothy chocolate drinks were exchanged at weddings in Mesoamerica (southern Mexico and parts of Central America).
- Casanova is said to have eaten chocolate to enhance his love-making.
- The Marquis de Sade also was passionate about chocolate, and had his wife send it to him in prison.
- Why else do Americans exchange chocolate on Valentine's Day?

Resource Materials: Chocolate Quotations

Chocolate Quotations

“The divine drink which builds up resistance and fights fatigue. A cup of this precious drink permits man to walk for a whole day without food.”

- *Hernando Cortés, 1519*

“It’s strengthening, restorative, and apt to repair decayed strength and make people strong.”

- *Louis Lemery, 1702*

Oh, divine chocolate!
They grind thee kneeling,
Beat thee with hands praying,
And drink thee with eyes to heaven.

- *Marco Antonio Orellana, 18th century*

“Chocolate is a divine, celestial drink, the sweat of the stars, the vital seed, divine nectar, the drink of the gods, panacea and universal medicine.”

- *Geronimo Piperni, quoted by Antonio Lavedán, surgeon in the Spanish army, 1796*

“What use are cartridges in battle? I always carry chocolate instead.”

- *George Bernard Shaw, 1894*

“Las cosas claras y el chocolate espeso.” (Ideas should be clear and chocolate thick.)

- *Spanish proverb*

‘Twill make old women young and fresh,
Create new motions of the flesh.
And cause them long for you know what,
If they but taste of chocolate.

- *James Wadworth (1768-1844; A History of the Nature and Quality of Chocolate)*

“Mmmmmmmmmmmmmmmmmmm...chocolate...”

- *Homer Simpson*

And one dissenting view:

“Among the many disorders which the intemperance of mankind has introduced to shorten their lives, one of the greatest, in my opinion, is the use of chocolate.”

- *Giovanni Batista Felici, physician to the Tuscan court, 1728*

Resource Materials: Chocolate Recipes

Chocolate Recipes

Chocolate Fudge

8 ounces semisweet chocolate
2/3 cup sweetened condensed milk
1 teaspoon vanilla extract
1/8 teaspoon salt
1/2 cup chopped nuts (optional)

Break the chocolate into small pieces and put into a glass or microwave-safe bowl. Add milk and microwave for one minute. Mix well and microwave again on high for another minute. Stir until chocolate and milk are mixed completely. Stir in vanilla extract, salt and nuts. Pour into a greased loaf pan and refrigerate until hard. Cut into small squares and enjoy!

Chocolate Flying Saucer Cookies

1 package of chocolate cake mix
1 1/2 cups water
2 eggs
1 cup minus 2 Tbsp flour
1/2 cup oil

Filling:

2 Tbsp flour
1/2 cup milk
1/2 cup sugar
1/2 cup shortening
1 tsp vanilla

First mix flour into cake mix in a large bowl. Add remaining ingredients. Beat at medium speed for 3 minutes or until smooth. With a spoon, drop blobs of the mixture onto a greased pan 2 inches apart. Bake for 8-10 minutes at 400 degrees.

While cookies are baking, make filling by adding flour to milk and cooking in double boiler until mixture is thick. Let cool. Add sugar, shortening, and vanilla to filling mixture. Beat at high speed for 5 minutes. Spread filling between 2 cooled cookies.

Chocolate Covered Pretzels

Colored or chocolate sprinkles
1 cup white or milk chocolate chips
20 8-inch pretzel rods

On a piece of waxed paper, arrange a 2 or 3-inch-wide stripe of sprinkles. In a shallow microwave-safe bowl, microwave the white or milk chocolate chips on high for 1 minute. Stir and microwave for 30 seconds more until all chocolate is melted. Stir until smooth (it will be thick). Use a knife to spread the chocolate over half of a pretzel rod. Roll through the sprinkles until chocolate is completely coated with sprinkles. Chill.

Chocolate Caliente

4 squares (4 oz) Baker's chocolate broken into small pieces
2 cups of skim milk
2 or 3 drops of vanilla extract
a pinch of cinnamon
a pinch of ground cloves

Combine the ingredients in a sauce pan and heat gently, stirring all the time. Do not allow it to boil, but when it is hot, whisk the drink (in Mexico the drink is whipped with a wooden hive-like spoon called a molinillo) and then pour it into cups. If you would like, sprinkle a pinch of cinnamon over the top of the drink. Some people like to add sugar to taste when stirring the drink in the pan.

Resource Materials: Glossary

Glossary

Chocolate comes in many forms today. Regardless of the end product, processing begins by extracting, fermenting, drying, and roasting the cacao seeds (also called beans), removing the shell and skin, and leaving the tasty nibs.

Cacao refers to the unprocessed seeds of the cacao tree. Although the British sometimes use the term cocoa to refer to the plant and its seeds, in the U.S. cocoa usually refers only to the processed product.

Chocolate liquor refers to the nibs ground to a smooth, thick liquid or paste. Despite the name, it contains no alcohol—just the fat (cocoa butter) and solids (cocoa) of the cacao seed, in roughly equal proportions.

Cocoa butter is the fat contained in the cacao seed.

Cocoa is the powdery solid that's left after most of the cocoa butter is removed from chocolate liquor.

Baking chocolate is a solid chocolate made from pure chocolate liquor, no sugar added.

Bittersweet and semisweet chocolate are the darkest eating chocolates and have at least 35% chocolate liquor.

Sweet dark chocolate contains 15% to 35% chocolate liquor and less than 12% milk solids. It may also contain ingredients like condensed milk, cocoa butter, sugar, and vanilla.

Milk chocolate is a mixture of chocolate liquor, cocoa butter, milk, sugar, and flavorings. All milk chocolate made in the U.S. contains at least 10% chocolate liquor and 12% whole milk.

“Dutched” or “Dutch” chocolate is made from chocolate liquor or cocoa powder that has been treated with alkaline salts to give it a darker color and a milder flavor. The process—which came to be known as “Dutching”—was invented in Holland by the chemist Coenraad Van Houten.

White chocolate is a blend of cocoa butter, milk, sugar, and flavorings. It contains no cocoa solids, and many people don't consider it chocolate at all!

Loan Materials for Educators

The Museum's Harris Educational Loan Program has developed a new "experience box" for the *Chocolate* exhibition. For more information on the Harris Loan program, please call the registrar at (312) 665-7555 or visit our website at www.fieldmuseum.org.

The History of Chocolate

Chocolate is a food that appeals to the senses. We are captivated by its aroma, tantalized by its taste, and reminded of pleasurable experiences. This experience box adds yet another dimension to our interaction with this delicious food as it demonstrates the ecological, biological, and commercial importance of chocolate. A diorama shows the cacao tree in its natural habitat and its adaptations to the environment and an ancient Maya village. Included are models of the pods as well as actual cacao beans. The box also includes books, a guide for exploration with a brief synopsis of the history, biology, cultivation, harvesting and other uses of the cacao bean, as well as activities for students, a vocabulary list, and sources for further study.

Book List

Exhibition Books

(Published in association with The Field Museum)

Nonfiction Adults

Title: *Chocolate: The Nature of Indulgence*

Author: Ruth Lopez

Publisher/Year: New York: Harry N. Abrams, Inc., 2002

Description: With publication timed to coincide with the opening of the Chocolate exhibition, this book, as noted by the publisher, is the first devoted to a pictorial survey of chocolate's history. The author traces the storyline of the exhibition with additional facts and up-to-date issues in the industry, notably working conditions and child labor in cacao production areas. The book also includes a comprehensive history of the chocolate industry as well as how cacao is grown, harvested, and processed.

Notes: *A great selection of photographs and images includes a magnified view of the cacao-pollinating midge, early chocolate production in France, the Rio Azul vessel found in Guatemala in 1984 (inscribed with the glyph for cacao), and paintings by European artists of elite consumers of drinking chocolate. Literary quotes are interspersed throughout the text. The development of the cacao trade beginning in the 1600s and the use of slave labor are explained. Special sections of the book feature chocolate's medical history and the history of chocolate and war. A section on the future of cacao completes the book.*

Nonfiction Children

Title: *Chocolate: Riches from the Rainforest*

Author: Robert Burleigh

Publisher/Year: New York: Harry N. Abrams, Inc., 2002

Ages/Grades: 9 - 12 years old

Description: This book chronicles chocolate's journey around the world. Full-color photographs and fun facts run throughout. The history of chocolate covers the time of the Maya and Aztecs through chocolate's many forms and adds interesting facts (e.g. why chocolate couldn't be purchased during the summer until after 1915 and that soldiers have used chocolate as a ration since World War I).

Notes: *The book's text is illustrated with numerous color photographs and graphics.*

Top Ten List of Books (in addition to Field Museum books) for Adults and Children (nonfiction with two exceptions)

All About Chocolate by Carole Bloom
Good overall compendium of information.

The Book of Chocolate edited by Nathalie Bailleux
Beautiful images makes this book compelling to browse and read.

The Chocolate Tree: A Natural History of Cacao by Allen M. Young

Great information about the botany of cacao and its cultivation.

The Emperors of Chocolate: Inside the Secret World of Hershey and Mars by Joël Glenn Brenner

Fascinating insight into the development of the chocolate industry in the U.S.

The New Taste of Chocolate: A Cultural and Natural History of Cacao with Recipes by Maricel Presilla

Wonderful photographs and text with focus on Central and South America.

The True History of Chocolate by Sophie D. Coe and Michael Coe

The most recognized in-depth history of chocolate. Exhibition follows same general storyline, making the book a good reference to learn more on the subject.

How Monkeys Make Chocolate by Adrian Forsyth

Includes great section with the same title which is informative and engaging to middle to older child readers. (Additional chapters include information on other rainforest plants.)

Vanilla, Chocolate & Strawberry: The Story of Your Favorite Flavors by Bonnie Busenberg

For middle to older children. Includes good sections on plant-derived flavors as well as the chemistry behind how humans taste food.

Book List

Cocoa Ice by Diana Appelbaum

A story about two girls living in different parts of the world during the era of schooner trade—a good picture book to use for a read-aloud program. Could work well for a range of ages (except very young children).

The Cocoa Commotion: A Carmen Sandiego Mystery by Melissa Peterson

For middle to older children. Much more information about chocolate, cacao, and geography woven into this mystery plot than other similar classics (e.g. *Charlie and the Chocolate Factory*).

Adults Chocolate References/Nonfiction

Title: *All About Chocolate*

Author: Carole Bloom

Publisher/Year: New York: Macmillan, 1998

Description: Great resource book with numerous listings. Begins with a thorough listing of chocolate terms, types of chocolate/cacao, chocolate candies and desserts, and manufacturers; a timeline of chocolate history; botanical and processing information about cacao; and instructions for tasting chocolate. Quotes about the healthful attributes of chocolate are given from a variety of sources. The book's second part details different types of events, festivals and trade shows; chocolate factories/tours worldwide; cooking schools that feature courses about chocolate; select Web sites with good annotation; purveyors of chocolate and baking supplies. Appendix provides information on chocolate in literature, film, and art and includes a bibliography.

Notes: Interesting facts and figures are interspersed throughout the text.

Title: *The Art of Chocolate*

Author: Elaine González

Publisher/Year: San Francisco, California: Chronicle Books, 1998

Description: González focuses on giving clear, simple instructions for how to work with chocolate, from tools used, to tempering techniques, to a range of recipes. Includes a description of different types of chocolate and flavorings used. Interesting techniques include using real leaves to make chocolate leaves, constructing chocolate bows, and working with chocolate clay.

Notes: Chocolate clay can be fun to use for family activities. Ms. González is included in the Speakers' List.

Title: *The Book of Chocolate*

Editor: Nathalie Bailleux

Publisher/Year: New York: Flammarion, 1995

Description: Beautifully illustrated coffee table format book that lusciously covers the history of chocolate. Historic and contemporary photographs, images, artworks and documents are featured. Detailed text covers cacao plantations, the history of chocolate, great names in chocolate, notes about the various ways chocolate is consumed, a few recipes, and an extensive source listing of chocolatiers and shops in the U.S. and Europe, chocolate clubs, and museums.

Notes: Text of the book translated from French.

Title: *Cambridge World History of Food*

Editor: Kenneth Kiple and Kriemhild Conee Ornelas

Publisher/Year: Cambridge, U.K.: Cambridge University Press, 2000

Description: Two-volume set with variety of citations for cacao/chocolate. Entry on cacao written by Murdo MacLeod, Department of History, University of Florida, Gainesville.

Notes: In section on fermentation, it is noted that the fungi that ferment cacao beans after harvesting are *Candida krusei* and *Geotrichum spp.*

Title: *Chilis to Chocolate: Food the Americas Gave the World*

Editors: Nelson Foster and Linda Cordell

Publisher/Year: Tucson, Arizona: The University of Arizona Press, 1992

Description: Based on a symposium that was held at the California Academy of Sciences in 1988, this book covers a number of foods that originated in the Americas. A good chapter is "A Brief History and Botany of Cacao," by John West. Other sections include amaranth, maize, chili peppers, vanilla, and beans.

Notes: Good way to convey that many plants originated in the Americas and are now grown and consumed the world over.

Book List

Title: *Chocolate*
Author: Nick Malgieri
Publisher/Year: New York: HarperCollins Publishers, Inc., 1998

Description: Primarily a book of recipes, Malgieri gives an interesting introduction that tells of his connections to chocolate throughout his career. Includes brief background on chocolate's history, tools and techniques, recipes for a number of types of desserts and confections, showpieces (including chocolate houses), and sources.

Notes: *Malgieri is the director of the baking department at Peter Kump's Cooking School in New York.*

Title: *The Chocolate Bible*
Author: Adrienne Marcus
Publisher/Year: New York: Putnam, 1979

Description: An older work referenced by several other books. Primarily a listing of chocolate companies and shops around the United States and in Europe. Marcus includes history on many of the establishments and plenty of opinions about their products. Some of the companies may be out of business by now but many are still in existence.

Notes: *Interesting vintage photographs from a variety of factories as well as good images of chocolate "styles" and packaging from the 70s. Available as a used book through Amazon.com.*

Title: *The Chocolate Companion: A Connoisseur's Guide to the World's Finest Chocolates*
Author: Chantal Coady
Publisher/Year: New York: Simon and Schuster, 1995

Description: While the majority of this book focuses on profiles and tasting notes about a number of chocolatiers (primarily European), the author includes a good historical overview and description of the steps in harvesting and manufacturing chocolate. The different ingredients in chocolate are covered (including the difference between bean varieties such as criollo and forastero), as are the differences between fine chocolates and those that are mass-produced. Comprehensive explanation of the types of chocolate: bittersweet, amer, varieties of milk chocolate, etc.

Notes: *Guidelines for how to do a chocolate tasting given. The author is the co-founder of the Chocolate Society (formed 1991) and is the proprietor of Rococo in London. Available as a used book through Amazon.com.*

Title: *Chocolate: Fads, Folklore and Fantasies*
Author: Linda K. Fuller, Ph.D.
Publisher/Year: New York: Harrington Park Press, An Imprint of The Haworth Press, Inc., 1994

Description: This book's content is comprised primarily of tidbits of information about chocolate. Sections include information about different types of chocolate candies, cakes, and drinks, festivals around the country, chocolate manufacturers, chocolate in media/film, and biographical notes about people associated with chocolate, such as John Cadbury and Debbie Fields.

Notes: *Good source for factoids and chocolate "sound bites"—examples to add to those that are found in the exhibition. Example: Nestlé introduced the chocolate chip in 1939 and now (as of 1994) makes 250 million/day; there are about 675 in each 12 oz. bag.*

Title: *Chocolate: Food of the Gods*
Author: Alex Szogyi, Editor
Publisher/Year: Westport, Connecticut: Greenwood Press, 1997

Description: Proceedings from a scholarly conference of the same title at Hofstra University. Compilation of scientific papers covering topics including chocolate and psychology, chocolate and literature, chocolate commerce, health, and chocolate lore.

Notes: *Includes paper on chocolate history written by Sophie Coe (*The True History of Chocolate*). Usually available through university and culinary college libraries.*

Title: *Chocolate Moulds: A History and Encyclopedia*
Author: Judene Divone
Publisher/Year: Oakton, Virginia: Oakton Hills Publications, 1987

Description: There are few books on chocolate molds, but this contains a good, brief history of chocolate and its transition from beverage to solid form. Also includes an in-depth background on the development of the United States' chocolate manufacturing industry. A complete listing of chocolate companies in the U.S. also included. The author covers the history of the use of chocolate molds, how they were made, and how their designs paralleled fashion, fads, and social trends of the time. Remainder of book is encyclopedic by shape/type of mold.

Book List

Notes: A number of interesting engravings, photos, and old ads featured (including one exhibition photograph of Robert Strohecker, c. 1890, the “father” of the chocolate Easter bunny, with a 5-foot tall chocolate rabbit made at the Luden’s factory in Reading, PA). Other factoids include how different industries have inspired innovative techniques (e.g. in the 1920s, wrapping machines were developed for soap companies—machines that were quickly adapted by confectioners to wrap chocolate bars). Available through Amazon.com on special order; can take up to 3 months to receive or find through library system.

Title: *The Chocolate Tree: A Natural History of Cacao*

Author: Allen M. Young

Publisher/Year: Washington: Smithsonian Institution Press, 1994

Description: Fascinating information and detail on the natural history of cacao. Dr. Young records how cacao has been cultivated through history and in current agricultural practices. His many years of field study in the tropics (primarily in Costa Rica) led him to important discoveries about the pollination of cacao flowers by midges, dustspeck-sized insects. The botany of cacao trees is explained clearly and detailed accounts of the author’s research bring the world of scientific research to life. Dr. Young also creates a link between his research findings and discovering effective ways to grow cacao by mimicking the conditions found in its natural rainforest habitat.

Notes: Allen Young is curator of zoology at the Milwaukee Public Museum and is included in the *Speakers’ List*. Dr. Young was a key advisor to the development of the exhibition. This book is a good complement to *The True History of Chocolate*—to learn more about the botanical/scientific aspects of cacao as well as chocolate’s connections to human history.

Title: *The Cook’s Encyclopedia of Chocolate*

Author: Christine McFadden and Christine France
Publisher/Year: New York: Barnes & Noble Books, 2000 (previously published as *The Ultimate Encyclopedia of Chocolate*)

Description: Though primarily a recipe book, includes a good introduction covering the history and cultural aspects of chocolate. Sections include the power of chocolate (how chocolate was ascribed with mystique and power), how chocolate traveled the world, chocolate and the church, chocolate as medicine, and the “founding fathers” of chocolate. Provides additional information about how four Quaker families in Britain came to

dominate the chocolate industry and transformed chocolate into a drink of the common people. (In the Quakers’ quest to help others, wholesome chocolate was seen as a much better beverage than other alcoholic drinks—gin and beer—of the time. These families also built model villages and were very conscious of providing good working and living conditions for their employees.)

Notes: Some Mesoamerican rituals are referred to as “strange and sometimes barbaric”—reflecting a bias on the part of the authors. Interesting recipes in the preliminary chapters about chocolate include Spanish Egg Chocolate, Champurrado, and Mole Poblano (with a reference that cacao would not have been used this way by the Aztecs—contrary to what some other food authors have written). Contains rare images, paintings, etchings, and engravings. Obtain through Barnes & Noble (www.barnesandnoble.com).

Title: *Crisis in Candyland: Melting the Chocolate Shell of the Mars Family Empire*

Author: Janice Pottker

Publisher/Year: Bethesda, Maryland: National Press Books, May 1995

Description: Pottker researched and wrote an unauthorized history of Mars, Inc.—a fourth generation family-owned private company noted for its secrecy and controlling nature. More a focus on the individual family members, beginning with founder Frank Mars and continuing through the heirs who are still in charge today. Contains some photos of the Mars family and company headquarters.

Notes: Book is out of print. Can be obtained through libraries or through Amazon.com or other used book purveyors.

Title: *The Emperors of Chocolate: Inside the Secret World of Hershey and Mars*

Author: Joël Glenn Brenner

Publisher/Year: New York: Random House, 1999

Description: In the early 1990s, Brenner was given a rare opportunity to interview Mars family members and was given access to information about their operations as part of a feature story for The Washington Post. She profiles the history and competitiveness between Hershey and Mars in this very engaging historical account. History of cacao, innovations in the manufacturing process, and the development of these two companies included. Also contains information about the role of chocolate in times of war. Text is interspersed with photos, advertisements, and wrappers and includes good chapter notes.

Notes: Brenner is included in the *Speakers’ List*.

Book List

Title: *From Chocolate to Morphine*
Author: Andrew Weil
Publisher/Year: New York: Houghton Mifflin Company, 1993 (revised edition)

Description: Chocolate is included in the chapter on stimulants (covering other natural stimulants such as maté, kola, coffee, and coca as well). Weil writes about the tendency for more women than men to be “chocoholics” but acknowledges that little research has been done on the properties in chocolate that make it addictive. Weil also includes an interesting first person account of a woman’s chocolate addiction.

Title: *La Maison du Chocolat*
Author: Robert Linxe
Publisher/Year: New York: Rizzoli, 2001

Description: Renowned French chocolatier Robert Linxe explains his methods for making exquisite chocolates and pastries. Beautiful photographs accompany recipes. Linxe describes how he combines chocolate with a variety of flavors: ginger, lemon, cinnamon, fennel, and tea. Includes photo of cacao pods with notes about how many pods a tree typically produces per year.

Notes: *La Maison du Chocolat* has two locations in New York: 1018 Madison Avenue and 30 Rockefeller Center. Web site is www.lamaisonduchocolat.com.

Title: *Maya: Divine Kings of the Rain Forest*
Editor: Nikolai Grube
Publisher/Year: Cologne, Germany: Könemann Verlagsgesellschaft mbH, 2001 (English translation)

Description: Oversize, coffee-table style book about the Maya with numerous contributors and chapters. Brief chapter entitled, “Cacao—The Beverage of the Gods” is written by Prof. Grube. Includes two striking photographs of cacao vessels—one from the Early Classic period and one from Guatemala’s Rio Azul (discovered in a burial tomb in 1984). Kakawa hieroglyphs are illustrated and a timeline is included.

Notes: One of the experts on the speakers’ list, Dr. Dorie Reents-Budet contributes an article about the art of classic vase painting with references to images of cacao. Available through Amazon.com, but can take up to three months to receive.

Title: *A Natural History of the Senses*
Author: Diane Ackerman
Publisher/Year: New York: Random House, 1990

Description: Collection of essays relating to all the senses written by naturalist and journalist Ackerman. A four-page essay on chocolate focuses on its psychopharmacology and the research behind why we crave it. Includes a brief history of chocolate consumption and synopsis of the research on PEA (phenylethylamine) in chocolate. Other essays related to food/taste include vanilla, food as an aphrodisiac, and the development of taste in humans, as well as more intense subjects such as cannibalism.

Notes: Ackerman is included in the Speakers’ List.

Title: *The New Taste of Chocolate: A Cultural and Natural History of Cacao with Recipes*
Author: Maricel Presilla
Publisher/Year: Berkeley, California: 10 Speed Press, 2001

Description: The author describes her first association with cacao when, as a young girl in Cuba, her father brought home pods from his mother’s family farm. The book focuses on cacao growing in Latin America and includes great photographs and text on its history and current growing methods. Extensive photographs show how the pods and seeds of different varieties look alongside detailed information about them. The section on how to taste chocolate includes a flavor experiment developed by Parisian pastry chef Philippe Conticini. In the recipe section there are photos on the preparation of classic Mexican hot chocolate, complete with images of foamy cups of chocolate.

Notes: Good appendixes include a glossary, listing of chocolate companies, mail order and retail suppliers, chocolate classes and tours, candy makers, bakeries, and a bibliography.

Book List

Title: *New York Chocolate Lover's Guide*
Author: William Gillen and Patricia MacKenzie
Publisher/Year: New York: City & Company, 1996

Description: Small format book with listings and descriptions of New York chocolatiers, chocolate and candy shops, and bakeries specializing in chocolate items. Also includes more unusual listings such as a dairy in upstate New York that makes its own chocolate butter as well as references for cooking schools and purveyors of chocolate making and baking supplies.

Notes: *Good listing of chocolate spots by city region—SoHo, West Side, etc. Authors also write a monthly newsletter, The New York Food Letter. Book appears to be out of print.*

Title: *Seeds of Change: Five Hundred Years Since Columbus*
Editors: Herman J. Viola and Carolyn Margolis
Publisher/Year: Washington, D.C.: Smithsonian Institution Press, 1991

Description: Based on a Smithsonian exhibition of the same title, various contributors review the impact of the voyages of Columbus and subsequent explorers to the Americas. Chocolate is mentioned only a few times directly—one being the example of transplanting cacao to the Ivory Coast and the ensuing environmental degradation caused by replacing native rainforest with an introduced species. Other chapters include information on the Maya and Aztecs, slavery, and the impact of specific food crops.

Title: *Sweetness and Power: The Place of Sugar in Modern History*
Author: Sidney Mintz
Publisher/Year: New York: Elizabeth Sifton Books Viking (Viking Penguin, Inc.), 1985

Description: Mintz traces the history of sugar in the West—an important staple since the Spanish introduced it to chocolate—and the significant role sugar has played in social classes, politics, and economics. Like cacao, sugar was originally a luxury item reserved for the elite, but industrialization has led to its consumption by the masses. It continues to be a crop that, like cacao, is typically not consumed by those who grow it. In discussing sugarcane production, Mintz includes how it developed as a “slave” crop grown in Europe’s colonies.

Notes: *Numerous references to chocolate in relation to sugar and other sugar-sweetened beverages and foods (e.g. tea and coffee). Comprehensive bibliography and chapter notes.*

Title: *Tastes of Paradise: A Social History of Spices, Stimulants and Intoxicants*
Author: Wolfgang Schivelbusch
Publisher/Year: New York: Pantheon Books, 1992
(English translation from German)

Description: In the chapter on chocolate, the author indicates that as coffee developed into a northern, “Protestant” drink, chocolate developed into the “Catholic” beverage of southern Europe. Chocolate’s nutritive characteristics led to its consumption during fasts, since liquids were not considered off limits. It was also brought to Europe for the Catholic monarch, the King of Spain. Good coverage includes early illustrations and the history of chocolate consumption in Europe.

Notes: *Schivelbusch indicates that in the 17th and 18th centuries chocolate was “dissolved in hot water or milk, often with the addition of wine.”*

Title: *The Science of Chocolate*
Author: Stephen Beckett
Publisher/Year: Cambridge, U.K.: The Royal Society of Chemistry, 2000

Description: Written primarily for schools and universities (particularly for food science students and those entering the confectionery industry), Beckett covers the chemical and physical properties of the cocoa “bean” and the ingredients that make up chocolate: milk products, sugars, and cocoa butter. He then discusses the processing and making of chocolate through the chemical and physical reactions taking place. Several experiments are listed in the final chapter.

Notes: *Good photographs (black & white) of fermentation methods, machines used for chocolate production, and microscopic images of chocolate and its ingredients. Interesting notes describe the particle size of cocoa solids and how they melt in the mouth. He explains that the first manufacturers of solid chocolate ground cocoa with granite rollers, which created a gritty texture because they could not mill the particles fine enough (smaller than 30 microns) to melt in the mouth. Most of the experiments would work in a classroom lab environment and some have processes that require several hours. Two experiments appear easier to replicate in a museum setting. One project shows particle separation and the replication of how cacao seeds are separated from debris as well as how the cacao shell is separated from the nib. Another explores the effects of viscosity on flavor. The book is available from Amazon.com.*

Book List

Title: *The True History of Chocolate*

Author: Sophie D. Coe and Michael Coe

Publisher/Year: New York: Thames and Hudson, Ltd., 1996

Description: A comprehensive history of chocolate in a format that is easily accessible to the lay reader. The historical organization of the exhibition follows the book closely, so the book provides an excellent way to access more in-depth information. Numerous photographs, drawings, and illustrations accompany the text.

Notes: *Michael Coe finished this book for his wife posthumously. Sophie D. Coe was a well-known and respected anthropologist and food historian. She is also the author of America's First Cuisines. Michael Coe, a professor of anthropology at Yale University is an expert in Mesoamerican research; his other books include Breaking the Maya Code, The Maya, and Mexico: From the Olmecs to the Aztecs. He was an advisor to the development of the exhibition.*

Title: *What Flavor is Your Personality?*

Author: Alan Hirsch, M.D.

Publisher/Year: Naperville, Illinois: Sourcebooks, Inc., 2001

Description: Based on studies at Hirsch's Smell & Taste Treatment and Research Foundation in Chicago, connections have been made between food preferences and personality types. Background information about personality and the sense of smell is followed with chapters on particular foods. "Sacred Chocolate" is one chapter that connects chocolate cravings to the compounds found in chocolate as well as notes on personality traits based on certain chocolate preferences.

Notes: *Dr. Hirsch is included in the Speaker's List.*

Chocolate in Literature/Fiction

Title: *1984*

Author: George Orwell

Publisher/Year: New York: Harcourt Brace, originally published 1949, current printing 1983

Description: This futuristic story revolves around Winston Smith, living in the Republic of Oceania—a world that exerts control over all actions including human thoughts and memories. He enters a clandestine extramarital relationship with Julia. In the second section of chapter two, she pulls a piece of chocolate out of her pocket and shares it with Winston. "Even before he had taken it he knew by the smell that it was very unusual chocolate. It was dark and shiny, and was wrapped with silver paper. Chocolate normally was dull-brown crumbly stuff that tasted, as nearly as one could describe it, like the smoke of a rubbish fire. But at some time or another he has tasted chocolate like the piece she had given him. The first whiff of its scent had stirred up some memory which he could not pin down, but which was powerful and troubling. 'Where did you get this stuff' he said. 'Black market' she said indifferently..."

Title: *Arms and the Man (Part of Bernard Shaw: Collected Plays with Their Prefaces, Volume I)*

Author: George Bernard Shaw

Publisher/Year: New York: Dodd, Mead & Company, 1975

Description: One of Shaw's "Plays Pleasant." Set in the home of Major Petkoff in a small Bulgarian town in 1885-86. The story focuses on Petkoff's daughter Raina and how a Swiss man, fighting as a paid soldier for the Serbs, seeks refuge during a retreat and climbs up to the balcony of her bedchamber. She agrees to hide him until he can escape and feeds him chocolate creams to stave off his hunger. In the first act, the soldier (referred to as "The Man") tells Raina that his pistol is not loaded and goes on to say: "I've no ammunition. What use are cartridges in battle? I always carry cakes of chocolate instead; and I finished the last cake of that hours ago." Raina then retorts, "Chocolate! Do you stuff your pockets with sweets—like a schoolboy—even in the field?" To which The Man replies, "Yes: isn't it contemptible? I wish I had some now." He becomes known as the "chocolate cream soldier."

Notes: *The 1941 film The Chocolate Soldier uses part of the story as a backdrop to the movie plot. Viking Press reprinted a paperback version of the play in 1992 (ISBN: 0140450351).*

Book List

Title: *Between Two Fires*

Author: Laura Esquivel

Publisher/Year: New York: Crown Publishers, 2000

Description: Esquivel's most recent work is a collection of essays, speeches, recipes, and short pieces, all focused on food. In "God is Above, the Devil Below" she mentions cacao. "But how could I avoid smelling cacao? How could I return to the cold and damp convent without drinking a cup of frothy hot chocolate? How could I abandon from one day to the next the delicious vice of drinking it?"

Title: *Bittersweet Journey: A Modestly Erotic Novel of Love, Longing, and Chocolate*

Author: Enid Futterman

Publisher/Year: New York: Viking, 1998

Description: Charlotte, a New Yorker, is the main character in this story. Charlotte has strong memories of loving Hershey's milk chocolate as a child and as she becomes an adult and moves out on her own, her life becomes intertwined with the men she meets and the chocolate she consumes. Her travels and longings take her around the world to many of chocolate's "hot spots"—Paris, Vienna, and Zurich. The jacket states, "This sensual novel, complete with recipes, lists of elite chocolatiers around the world, and sinful photographs enables the reader to explore the dark and erotic underside of women's mysterious passion for chocolate."

Title: *Chocolat*

Author: Joanne Harris

Publisher/Year: New York: Viking, 1999

Description: Vianne Rocher and her daughter Anouk are new arrivals in the small French town of Lansquenet. Much to the dismay of the local priest, Vianne opens a chocolate shop at the worst time of year—Lent. As she acquaints herself with the people in town and treats them to her confections, her critics spring into action and try to stop her and her business. Includes wonderful descriptions of how she sets up shop, creates the chocolate, and plans a chocolate festival. Throughout the story tension between perceptions of good and evil manifest themselves; depending on the perspective, townspeople are pitted against the church, against outsiders, and against themselves.

Notes: A film was made of the story; see the Film List. Harris is on the Speakers' List.

Title: *Chocolate*

Author: Alexander Tarasov-Rodionov (Translated from Russian by Charles Malamuth)

Publisher/Year: New York: Doubleday, Doran & Company, Inc., 1932

Description: Set during revolutionary era Russia, Zudin, a high ranking member of the Socialist/Communist Party and chairman of the local "Cheka," takes pity on a young woman, Valts, who has been arrested with others suspected of treason. Valts convinces Zudin of her innocence; he believes her and gives her a job at the Cheka. The woman receives a gift of chocolate by a lover of hers, who is, in reality, a member of the opposition, the White Guards. Chocolate returns throughout the story and seems to symbolize (along with silk stockings and wine) the downfall of men as well as "the cause." At one point Zudin comments to Valts, "In many places there is a great deal of sweets—like chocolate—but that is not for us. We are not accustomed to it. Its softness disables us for our cruel struggle, and that being so, we don't want it." Later as Zudin is condemned for supposed crimes, he says, "What is this cursed chocolate, chocolate, chocolate which persecutes me so irrevocably? Where did it come from?"

Notes: Although out of print, many universities have it in their collection and it can be obtained through interlibrary loan. It is a fascinating novel.

Title: *The Discovery of Chocolate*

Author: James Runcie

Publisher/Year: New York: HarperCollins, 2001

Description: Diego de Godoy is a young Spaniard employed as a notary on the voyage of Hernán Cortés. During his brief time in the court of Montezuma, he is introduced to chocolate and his true love, Igancia. It turns out that the chocolate he drinks contains an elixir that allows both him and his trusted greyhound, Pedro, to live many centuries. Godoy travels through history and meets many people: the Marquis de Sade, Sigmund Freud, Gertrude Stein and Alice Tolka, Joseph Fry, and Milton Hershey.

Notes: Theme of chocolate runs through the book. The story is fictional, but based on actual events and historical figures (Runcie lists his resources in the acknowledgments).

Book List

Title: *The Golden Harvest*

Author: Jorge Amado

Publisher/Year: New York: Avon Books, 1992 English translation (Originally published in 1944)

Description: The work of one of Latin America's most widely read authors. Set in the Brazilian state of Bahia, the story involves a band of exporters trying to ruin the wealthy colonials who have made their riches from cacao farming. Throughout the novel, the reader is introduced to a number of characters: the wealthy landowners, the exporters and their wives, small growers, and the cacao plantation laborers. A cacao boom and a rise in prices creates even more wealth for the few, but the "good times" cannot last. The land eventually changes hands. A well-written and intriguing story of shifts in power. Described as "a dazzling epic novel of greed and deception by Brazil's foremost literary giant."

Notes: *The author was born on a cacao plantation in 1912 in the State of Bahia in Brazil. His more widely known novel, Dona Flor and Her Two Husbands, was made into a film and a Broadway musical. Amado is "a twentieth-century Charles Dickens." (Linda Rabben, The Nation). Available used or through libraries.*

Title: *Like Water for Chocolate: A Novel in Monthly Installments, with Recipes, Romances, and Home Remedies*

Author: Laura Esquivel

Publisher/Year: New York: Doubleday, 1992

Description: The best selling love story about Tita and Pedro, whose instant attraction for each other causes rifts in their family. Tita, being the youngest daughter in an established family is, by tradition, not allowed to marry as she must take care of her controlling mother, Mama Elena. When Pedro, accompanied by his father, visits to ask for Tita's hand, Mama Elena offers instead her older daughter, Rosaura. Pedro decides to accept the offer in order to be close to Tita and live on their family ranch. Tita is the cook (having been brought up in the kitchen) and her emotions and love for Pedro are reflected in the food she prepares—which immediately affects anyone who eats it—a theme which continues to play out throughout the story.

Notes: *Great passages about the preparation of different dishes. The recipes for September's installment are chocolate and Three Kings' Day bread. Esquivel writes about the importance of combining different types of cocoa beans for the best flavor, how to toast the beans to perfection, how to grind the beans using a warm metate, and later in the chapter, how to make the hot chocolate with water or milk ("hot chocolate made with water is more digestible than that made with milk"). Tita also uses cocoa butter as a lip ointment.*

Title: *Such Devoted Sisters*

Author: Eileen Goudge

Publisher/Year: New York: Viking, 1992

Description: This novel tells the story of three sisters, one of whom is a chocolatier named Dolly. The plot takes the characters from Parisian "chocolateries" to cacao plantations in Grenada. Story includes romance, jealousy, and reconciliation.

Notes: *Author acknowledges chocolatiers and experts she used in writing and vetting the book, including Robert Linxe of La Maison du Chocolat and Martha Saucier of Li-Lac Chocolates in New York.*

Title: *A Tale of Two Cities*

Author: Charles Dickens

Publisher/Year: New York: Alfred A. Knopf, 1993

Description: Dickens' classic work about the French Revolution. At the beginning of Chapter 7, there is a passage about how one of the wealthy characters, Monseigneur, takes his chocolate. In a sarcastic way, Dickens relates how Monseigneur had to have four strong men serve him his chocolate: one to carry the chocolate pot, one to mill and froth the chocolate "with a special instrument," one to give the napkin, and the fourth to pour out the chocolate.

Notes: *Good example of the fact that only the wealthy could afford to drink chocolate and many did so with a flourish.*

Book List

Children's Chocolate References/Nonfiction Preschool/Young Readers

Title: *Chocolate* (part of the *What's for Lunch?* series)
Author: Claire Llewellyn
Publisher/Year: Danbury, Connecticut: Children's Press (A Division of Grolier Publishing), 1998
Ages/Grades: 4 - 8 year olds

Description: Easy-to-read informative book about the origins of chocolate. Numerous words are highlighted and listed in a glossary in the back. Good photographs illustrate how cacao grows on the tree and is harvested and processed. Photographs of children enjoying chocolate are also included.

Notes: *The book indicates only that cacao is grown on plantations, neglecting the harvesting of cacao in the rainforest. Also, farmers caring for their crops are only described as using insecticide to protect their trees from pests and diseases. The photographs show people of color growing and harvesting the cacao and Caucasians working in the factories. An Asian boy and Caucasian girl are shown eating chocolate. Other books in the series include peanuts, honey, rice, corn, and bananas.*

Title: *The Hershey™'s Kisses™ Addition Book*
Author: Jerry Pallotta
Publisher/Year: New York: Cartwheel Books, Scholastic, Inc., 2001
Ages/Grades: Grades 1 and 2

Description: Basic principles of addition are given using kisses to illustrate the numbers. Includes story of how kisses got their name and how many kisses are made each day.

Title: *In the Rain Forest* (part of *The Magic School Bus* series)
Author: Joanna Cole
Publisher/Year: New York: Scholastic, Inc., 1998
Ages/Grades: Grades 1–6

Description: This animated book is a companion to the popular children's PBS series, *The Magic School Bus*. The teacher, Ms. Frizzle, has her own cacao tree in the rain forest but only gets one "bean" from the year's harvest. Ms. Frizzle and the students hop aboard the *Magic School Bus* to see what is affecting the production of the crop. The

students discover that the flowers are not being pollinated and work to remedy the situation. Along the way, they learn other facts about the rain forest and the other plants and animals that live there.

Notes: *This is one of the only books to talk about the importance of pollination and the role of the midge as the pollinator. There is also an accompanying video. Allen Young, Ph.D., of the Milwaukee Public Museum (see *Speaker's List for more*) served on the advisory board for the production of this episode. Both the book and video are available from Amazon.com.*

Title: *Let's Visit a Chocolate Factory*
Author: Catherine O'Neill
Publisher/Year: Mahwah, New Jersey: Troll Associates, 1988
Ages/Grades: 4–8 year olds

Description: The focus is on the making of chocolate chips and details the manufacturing steps with good photographs and terminology of the machinery used. (The book mentions that chocolate comes from the cacao tree.) The difference between how cocoa powder is made versus chocolate is clearly described. Nice photographs showing how a chocolate bunny is made from a mold. Includes a recipe for chocolate chip cookies.

Notes: *Book is out of print. Available through libraries or used book dealers such as Amazon.com*

Title: *The M & M's® Counting Book*
Author: Barbara Barbieri McGrath
Publisher/Year: Watertown, Massachusetts: Charlesbridge Publishing, 1994
Ages/Grades: Grades 1 and 2

Description: Developed to teach numbers 1–12, six different colors, and three shapes (circle, square, and triangle). M&M's serve as a reward for learning simple subtraction.

Book List

Middle/Older Readers

Title: *Aztec Times*

Author: Antony Mason

Publisher/Year: New York: Simon & Schuster Books for Young Readers, an Imprint of Simon & Schuster Children's Publishing Division, 1997

Ages/Grades: 8–12 years old

Description: A colorfully illustrated book for young people, part of the If You Were There series. Chapters include information on Aztec origins, daily life, their gods, the arts, trade, warfare, and the conquest.

Notes: Includes a board game entitled, "The Final Conquest," and a timeline that compares events in Aztec history with what was taking place in the rest of the world.

Title: *Exploration of Africa*

Author: Colin Hynson

Publisher/Year: Hauppauge, New York: Barron's, 1998

Ages/Grades: 9–12 years old

Description: Traces the history of explorers in Africa. Section on religion and economics covers the introduction of crops, including cacao, which European farmers found to be more profitable than native plants.

Title: *How Monkeys Make Chocolate*

Author: Adrian Forsyth

Publisher/Year: Toronto, Canada: Owl Books

Ages/Grades: 9–12 years old

Description: This book focuses on several rainforest plants including a section on cacao. The chapter tells how fruit-eating monkeys break open the pods and eat the tasty pulp surrounding the bitter seeds. The author further describes how "perfectly the fruit works" in its ecosystem—a strong pod that protects the seeds, a bright color when ripe that attracts monkeys, fruit that is easy for a monkey to reach and pluck from the tree, and bitter seeds that the monkey will spit out. A history of how people have consumed cacao and chocolate is included and clearly explained. This is the only children's book to mention the midge as pollinator of cacao flowers. Other plants with similar characteristics—with a fleshy seed covering that animals like to eat—are mentioned, including kola nuts and coffee.

Notes: This is one of the most fascinating books on the list and one of the only ones for young people that discusses the botany of cacao and the evolution of its structure. It is well written and easily understandable. Excellent photographs accompany the text and bring it to life. The author spent many years studying biology in the rainforest and speaks from his personal experience, a feature that makes the reading all the more engaging.

Title: *A Taste of Mexico*

Author: Linda Illsey

Publisher/Year: New York: Thompson Learning, 1995

Ages/Grades: 8–10 years old

Description: This book details the history of food in Mexico and includes a brief listing about chocolate. It describes how it was originally consumed by the Aztecs, and was made with water and left unsweetened. It also mentions how chocolate was mixed with different substances to create different colors.

Notes: Book can be found through libraries.

Title: *Vanilla, Chocolate & Strawberry: The Story of Your Favorite Flavors*

Author: Bonnie Busenberg

Publisher/Year: Minneapolis: Lerner Publications Company, 1994

Ages/Grades: 9–12 years old

Description: One of the better books for young people on the origins of three loved flavors. Excellent introduction explains what flavor is and how we taste foods. As vanilla is used in so many chocolate products, this book gives beneficial background information on it. The section on chocolate contains great photographs and a clear map showing where cacao is grown worldwide. As in some other books, the author claims that molinillos were first used by the Aztecs (rather than having been introduced by the Spaniards, contradicting the exhibition text). The author also gives a good explanation of plants that sound similar but are different: the cacao tree, the coconut palm, and the coca plant. Good explanation of how chocolate is processed and a history of some of the historical names in chocolate and their contributions to what we eat today: Cadbury, Hershey, van Houten, etc.

Notes: As with Adrian Forsyth's book, this book is a good quick "adult read" as well. The information is easily accessible, well written, and fun to read.

Book List

Fiction Preschool/Young Readers

Title: *April Bubbles Chocolate: An ABC of Poetry*
Author: Selected by Lee Bennett Hopkins
Publisher/Year: New York: Simon & Schuster Books
for Young Readers, 1994
Ages/Grades: N–K

Description: A collection of poems by noted poets including Langston Hughes, Carl Sandburg, and Ogden Nash. Two of the poems relate to chocolate, entitled “Chocolate,” by Arnold Adoff and “Xerox Candy Bar,” by Richard Brautigan.

Notes: Lots of seasonal poems as well: Halloween, Valentine’s Day, Back to School, and wintertime. Nicely illustrated.

Title: *Chocolate Dreams*
Author: Arnold Adoff
Publisher/Year: New York: Lothrop, Lee & Shepard
Books, 1989
Ages/Grades: 6 years old and up

Description: This is a book of poems all about chocolate, some simply written for younger children, but most written for older kids. The poems are also appealing and fun for adults.

Notes: The book is well illustrated by artist Turi MacCombie.

Title: *Cocoa Ice*
Author: Diana Appelbaum
Publisher/Year: New York: Orchard Books, 1997
Ages/Grades: 4–8 years old

Description: A charming and informative book set in the late 19th century that follows two stories: one about the ice trade in Maine, and the other about growing cacao in the Caribbean’s Santo Domingo. A young girl is the feature of both stories, and the book explores how the two girls are connected through the schooners that take ice from Maine to trade for goods—including cocoa—in Santo Domingo. By telling both parts of the story, the book helps children learn the steps in producing both products and much about how trade routes worked. Great cut-paper illustrations accompany the story. Additional information on growing cacao and a map showing the trade route are included in the back.

Notes: This is one of the best books that combined factual information with an engaging story. It is a longer book with well-done illustrations, and could be a nice “read aloud” book for a program.

Title: *Curious George Goes to a Chocolate Factory*
Author: Margret & H.A.Rey
Publisher/Year: New York: Houghton Mifflin
Company, 1998
Ages/Grades: N–K

Description: When Curious George visits a chocolate factory, the mischief begins. Initially his curiosity gets him into trouble, but he finds a solution to save the day and the chocolate candies.

Notes: Of the picture books geared towards preschoolers, this is the only one that includes the larger connection to chocolate’s origins and manufacturing process. Includes an illustration of chocolates and how you can figure out what’s inside by the swirl on top.

Title: *The Doorbell Rang*
Author: Pat Hutchins
Publisher/Year: New York: Greenwillow Books, 1986
Ages/Grades: N–K

Description: Victoria and Sam’s mother makes a dozen cookies for their afternoon snack. They are looking forward to sharing six each and comment on how the cookies look and smell like Grandma’s. After their mother tells them that no one makes cookies quite like Grandma, the doorbell rings and some friends arrive. This continues to happen until the dozen cookies must be shared with more and more children. When the doorbell rings again they are pleased to find that Grandma has arrived with another big tray of cookies.

Notes: Chocolate chip cookies aren’t mentioned per se but the illustrations depict them.

Title: *Hot Fudge*
Author: James Howe
Publisher/Year: New York: Mulberry Books, An
Imprint of William Morrow, 1990
Ages/Grades: Grades K–2

Description: This story centers on the adventures of a group of family pets, Harold, Chester, and Howie, who are left to guard a plate of fudge made by the family father, Mr. Monroe.

Notes: Although in the story the animal characters eat chocolate, there is a note at the back of the book that explains to children the dangers of feeding chocolate to real dogs. Includes the recipe for Mr. Monroe’s Famous Fudge. Out of print; limited availability or may be found used.

Book List

Title: *The Last Chocolate Cookie*

Author: Jamie Rix

Publisher/Year: Cambridge, Massachusetts:
Candlewick Press, 1997

Ages/Grades: Grades K–2

Description: This story is about Maurice and the last chocolate cookie on the plate. His mother asks him to be polite and make sure that no one else wants the cookie first. Maurice proceeds to carry it around with him for six weeks asking everyone he sees—he even travels to space and asks a space monster. The monster doesn't want the cookie—he wants Maurice. With the tables turned, the monster's mother says that he must offer the human being to others first. After some narrow escapes, Maurice makes it back home where his mother finally allows him to eat the cookie. He takes a bite only to find it doesn't quite taste the same anymore.

Notes: *Funny and whimsical, filled with some nonsensical words and colorful cartoon-like illustrations.*

Title: *Wellington's Chocolatey Day*

Author: Mick Inkpen

Publisher/Year: WhistleStop, an imprint and registered trademark of Troll Communications L.L.C.

Ages/Grades: N–1

Description: Picture book for very young children about Wellington the pig, who gets a chocolate bar from his Aunt, eats some, and sets off on his bike. Armed with his last two squares of chocolate, he shares some with a girl in exchange for some bread to feed the ducks. By mistake, he tosses his last piece of chocolate into the pond, making him very sad. A duck saves the day by rescuing the square and giving it to Wellington who heads home thinking, "What a happy thing chocolate is...delicious."

Middle/Older Readers

Title: *Charlie and the Chocolate Factory*

Author: Roald Dahl

Publisher/Year: New York: Alfred A. Knopf, 1964

Ages/Grades: 9–12 years old

Description: The classic story about a poor boy, Charlie Bucket, who wins one of five tickets to Wonka's chocolate factory. The story is a morality tale about what happens to children who are spoiled, gluttonous, watch too much television, and don't listen to their elders (e.g. Mr. Wonka). The imaginative setting of the mysterious chocolate factory is engaging and the book includes additional references to chocolate that don't appear in the film. Wonka explains how the waterfall churns and mixes the chocolate and tells of how the oompa loompas love "cacao...the thing from which all chocolate is made."

Notes: *The book is also available in Spanish and Braille. There is a play version of the book and the well-known film starring Gene Wilder. This book is also interesting and fun to read as an adult.*

Title: *Chocolate Fever*

Author: Robert Kimmel Smith

Publisher/Year: New York: Bantam Doubleday Dell Books for Young Readers, 1972

Ages/Grades: Grades 2–4

Description: Henry Green is another character who loves chocolate. But when he eats too much of it, he gets strange brown spots, is taken to the hospital, and is diagnosed with the first ever case of Chocolate Fever. Henry doesn't like being in the hospital and runs away, befriending a truck driver, Mac, and Mac's boss, Alfred "Sugar" Cane. Sugar Cane runs a large candy company and states at the end of the book that as a child he had decided to spend his life bringing joy and happiness to others. The way he did it was to bring chocolate to the world.

Notes: *The book is also available as an animated children's video.*

Book List

Title: *The Chocolate Touch*
Author: Patrick Skene Catling
Publisher/Year: New York: Morrow Junior Books, 1952 and 1979
Ages/Grades: 9–10 years old

Description: A story similar to *Chocolate Fever* about the dangers of eating too much chocolate. Young John Midas eats so much candy and chocolate that he doesn't eat much of anything else. After finding a strange coin engraved with his initials, he eats a chocolate from an unusual candy shop he encounters. He wakes up and begins turning everything that his mouth touches to chocolate. John initially thinks this is great, but his new ability turns out to be problematic as his day continues. When he kisses his upset mother's cheek and turns her into chocolate, he knows he needs to get help. In the end the candy shop reappears, and he receives a lesson about greed and selfishness.

Notes: *Morality story about the perils of greed, similar to *Charlie and the Chocolate Factory*.*

Title: *The Chocolate War*
Author: Robert Cormier
Publisher/Year: New York: Laurel Leaf Library, Dell Publishing Co., Inc., 1974
Ages/Grades: 12–16 years old

Description: Jerry Renault is the new freshman at Trinity, a New England Prep School For Boys. Jerry's mother has recently died and his father's own grief is making him more and more distant. Trinity is also in trouble financially and Brother Leon has vowed to make the annual chocolate sale bigger than ever and demonstrates this vow by ordering twice as many boxes as the previous year. Each boy must then sell twice the amount as they have in the past. Archie is the leader of the school's secret society, the Vigils, whose members traditionally give "assignments" to the freshmen. Jerry's assignment is to refuse to participate in the chocolate sale for 10 days, after which he decides to continue his refusal to sell chocolates. Power struggles ensue between Archie, Brother Leon, and Jerry.

Notes: *This is a classic young adult novel. It was made into a film; see film list section—note R rating.*

Title: *The Cocoa Commotion: A Carmen Sandiego Mystery*
Author: Melissa Peterson
Publisher/Year: New York: HarperTrophy, A division of HarperCollins Publishers, 1997
Ages/Grades: 9–12 years old

Description: The notorious masterminding thief, Carmen Sandiego, is up to her tricks again. This time she has one of her associates stealing cacao seeds from all the important points in history. If she isn't stopped, chocolate as we know it will never have existed and history will be forever changed. Two young detectives from the ACME Crimestopping Organization, Ben and Maya, are given the assignment to solve the mystery before it's too late. They head off in their time machine and end up visiting the Maya, seeing a parade in Spain for returning conqueror Hernán Cortés, meeting Daniel Peter (inventor of milk chocolate) in Switzerland, and a speaking to a worker at the Hershey chocolate factory in Pennsylvania.

Notes: *Young readers will get a good amount of historical background in a readable, mystery format. Good emphasis on historical accuracy and broader geographic information. Some interesting consideration is given to whether the world would have been better if history was "rewritten" and slavery had not existed or the Europeans had not colonized and plundered conquered lands.*

Periodical/Journal List

Article: *The 16 Most-Frequently-Asked Questions About Chocolate*

Periodical: *Chocolatier*

Month and Year: February/March 2000

Notes: *The magazine went through 16 years of its history to find the most often asked questions regarding chocolate. Most questions have to do with terminology (e.g. What is Dutch processed cocoa? What is ganache?) or cooking with chocolate (How can I prevent chocolate from seizing?). Good resource for answers to questions the public might also be asking. See below for information on Chocolatier magazine.*

Article: *The Chocolate Factor (Chocolate Could Bring the Forest Back)*

Periodical: *World Watch*

Month and Year: November/December 2001
(Vol. 14, No. 6)

Notes: *Written by Chris Bright, this article proposes that the reformation of cacao farming is necessary to restore the fragmented rainforests of Brazil's Bahia state.*

Article: *Chocolate Food of the Gods*

Periodical: *National Geographic*

Month and Year: November 1984

Notes: *A lengthy article with good photographs.*

Article: *Chocolate Molds*

Periodical: *Country Living*

Month and Year: April, 2000

Notes: *The article discusses the history of molds and gives information about collecting them.*

Article: *Cocoa Craving*

Periodical: *Wine Spectator*

Month and Year: February 29, 2000

Notes: *The article focuses on premier lines of chocolate.*

Article: *Like Water for Chocolate: Feasting and Political Ritual Among the Late Classic Maya at Xunantunich, Belize*

Author: Lisa LeCount

Journal: *American Anthropologist*

Volume: 103 (4): 935-953

Article: *A New Genus and Species of Furnariid from the Cocoa-Growing Region of Southeastern Bahia, Brazil*

Journal: *The Wilson Bulletin*

Month and Year: September 1996 (Vol. 108, No. 3)

Notes: *This scientific article is about the Pink-legged Graveteiro, a new genus and species in the family of birds, Furnariidae, which was recently found in the cacao plantations of Brazil. This bird and its discovery are included in the Chocolate exhibition.*

Article: *Uto-Aztec Perspective on Cacao and Chocolate*

Journal: *Ancient Mesoamerica*
(Cambridge University Press)

Date: Spring 2000 (Vol. II, No. 1)

Notes: *Authors propose that 'cacao' and 'chocolate' are Uto-Aztec terms.*

Articles: Various

Periodical: *Chocolate Magazine*

Month and Year: April, 1999 (Vol. 1, No. 1)

Notes: *This issue of the English publication contains numerous articles of interest including, "Making Chocolate," "Chocolate History" (about the history of chocolate houses), "The Cocoa Bean," and "Chocolate Books." See their Web site: www.chocolate-magazine.co.uk for ordering information. Their magazine may also be available from specialty newsstands or bookstores.*

Periodical/Journal List/Website List

Periodical/Journal List/Website List

Articles: *Various*

Periodical: *Chocolatier magazine*

Published: six times per year.

Notes: *Primarily recipes for chocolate and pastries; information on new products, chocolatiers and confectioners. Subscription information at: www.bakingshop.com/magazine/chocolatier*

Articles: *Various*

Periodical: *Faces: People, Places and Cultures*

Published: monthly.

Notes: *Geared towards ages 9–14. Past issues that have dealt with chocolate or cacao include: Mexico (December 2000) and El Salvador (November 1998). See their Web site for back issues: www.cobblestonepub.com.*

Articles: *Various*

Periodical: *The New Internationalist (Issue: The Cocoa Chain)*

Month and Year: August 1998 (No. 304)

Notes: *This issue includes a number of articles about cacao production in Ghana and focuses on the experiences of one Ghanaian cacao farmer. The articles are available online at www.newint.org. An article, “Facts-Chocolate” accompanies informational graphs depicting where chocolate is grown versus where it is consumed, as well as the “production chain” of chocolate. Perspective of magazine is to promote policies and company practices that help small producers of cacao. The magazine is published in England.*

Web Site List

Top Ten Web Sites

www.fieldmuseum.org

www.barry-callebaut.com

Contains interesting facts and information not found on other Web sites reviewed.

www.candyusa.org

Good listing of statistics related to chocolate and candy consumption.

www.chocolateandcocoa.org

Comprehensive information on a number of topics related to cacao production.

www.chocolate-elrey.com

Nice visuals and explanations of different varieties of cacao.

www.exploratorium.com/chocolate/index.html or www.exploratorium.com/chocolate/live.html

Web cast and newsletter about chocolate.

www.hersheys.com

“Kid-friendly” virtual factory tour.

www.howstuffworks.com/chocolate

Simple format with good information.

www.icco.org

Incredible amount of information and links.

www.scharffen-berger.com

Great virtual tour of factory with detailed descriptions of steps.

www.sciencefriday.com

Audio cast of episode with guests Allen Young and Russ Greenberg.

Website List

General/Chocolate Today

Address: www.candyusa.org

Description: Web site for both the Chocolate Manufacturers of America (CMA) and the National Confectioners Association. Contains much information about candy in general, current statistics on worldwide chocolate consumption (figures from 1994 and 1998), as well as factoids/statistics relating to holiday consumption. Press Release section includes numerous articles and information on the CMA's initiative regarding child labor issues in West Africa.

Address: www.chocolateandcocoa.org

Description: A new Web site that has dubbed itself "the official site for the U.S. chocolate industry." Comprehensive information covers supply and outlook, cocoa research, cacao farming, buying and selling cocoa, producing chocolate, regulatory issues, health and nutrition, and current events. Cacao farming section includes information on their sustainable agriculture programs. Explanations are given (many with photographs) for the difference between cacao production and chocolate manufacturing, for the pests and diseases that affect cacao, and for farming practices (images include cacao seedlings in the beginning stages and cacao trees growing in the shade of banana and coffee trees until they are mature). Tidbits of interesting information abound, such as the name for cacao pod pickers, which is tumbadores.

Notes: *Includes links to partner sites?: Chocolate Manufacturers Association (CMA), American Cocoa Research Institute (ACRI), World Cocoa Foundation, and the Cocoa Merchants' Association of America.*

Address: www.chocolate4u.com

Description: The relatively new International Chocolate Company's site features single-bean™ chocolate bars (bars that are made with one type of bean from one country). Site includes a fun trivia quiz.

Address: www.chocolatevalley.com

Description: A self-described Web portal, this site provides e-community and e-commerce in addition to other components. Interviews with chocolatiers, tips from the pros, a glossary of chocolate terms, and a comparison of chocolate and carob can be found. The science of chocolate section discusses chocolate toxicity and pets.

Address: www.chocolate-elrey.com

Description: Web site posts striking botanical and historical images. Chocolate El Rey is based in Venezuela and only uses Venezuelan-grown cacao in their products. Many feel that this chocolate, the criollo variety, is one of the finest in the world. Clear descriptions and images depict the three varieties of cacao and explain how the different colors of the cotyledons (embryonic leaves inside bean) impact flavor.

Notes: *Products for sale include a kit for making your own chocolate from scratch, a popular product for children. Chocolate disks and nibs are also available on-line. A 15-minute video can be ordered. The film focuses on production in Venezuela with footage of growing, harvesting and producing chocolate as well as a brief history of chocolate. While it has a promotional slant it is a good, brief film.*

Address:

www.exploratorium.com/chocolate/index.html or www.exploratorium.com/chocolate/live.html

Description: San Francisco's Exploratorium museum hosted a two-hour web cast on chocolate on Valentine's Day in 1999. Moderated by local NPR personality Sedge Thompson, the web cast featured traditional Aztec chocolate-making as well as interviews with Robert Steinberg of Scharffen Berger Chocolate, confectioner Joseph Schmidt (including a tour of his plant), and scientists Andrew McGee and Andrew Waterhouse.

Notes: *Web cast can be viewed with Real Video. There is also an online newsletter, The Sweet Lure of Chocolate, that includes interesting video (cutting a cacao pod and eating the white pulp; a tour of the Scharffen Berger factory) and audio clips (scientists explaining different processes and current research). Newsletter contains links to other Web sites.*

Address: www.Ghirardelli.com

Description: Site includes in-depth information about the history of cacao, company history, and the steps Ghirardelli uses to make their chocolate. Link included to the Web site of their Swiss parent company, Lindt, which has a "Chocomania" section with interesting chocolate history and timeline with rare details on European history. Timeline also describes Mayan use of cacao beans for units of calculation.

Website List

Notes: Student information packs are available by writing: Ghirardelli Chocolate Company, 1111 139th Ave., San Leandro, CA 94578-2631, Attn: Consumer Affairs.

Address: www.howstuffworks.com/chocolate

Description: This edition of How Stuff Works by Marshall Brain includes simple, easy-to-read text and brilliant close-up images of cacao. After an introduction to “How Chocolate Works,” sections include the cacao bean, raw chocolate, making chocolate, and additional information. Great images include a cacao seedling, pods on the tree, and harvested pods. Interesting links discuss “How do they make hollow chocolate Easter rabbits?,” “Is chocolate poisonous to dogs?,” and “How caffeine works.” An additional link, “The misadventures of home cocoa bean roasting,” demonstrates the technological process that roasting has become.

Address: www.hwvi.com

Description: Site for Hawaiian Vintage Chocolate company—the only company that grows cacao in the United States. Includes information about the history of cacao and its manufacturing. Lists Hawaiian as a type of cacao in addition to criollo, trinitario, and forastero. Mentions some interesting facts about the relative number of flowers that bloom per year (10,000), the number pollinated (1,000), and the number of pods that develop (100). Out of these hundred, many drop due to a natural thinning process. Importance of fermentation to development of taste included.

Notes: Can order unroasted cacao beans and cocoa nibs (edible roasted inside of bean) from company. See supply resources for prices.

Address: www.education-world.com/a_lesson/lesson142.shtml

Description: Contains a dozen candy-related classroom activities with links to the Exploratorium web cast (mentioned above), Ghirardelli, and Hershey’s. Mentions the book, *The Big Block of Chocolate* by Janet Slater.

Notes: The world site also contains numerous other classroom activities on a number of subjects. Lesson 024 covers plant photosynthesis and how plant leaves work.

Address: www.sciencefriday.com

Description: NPR’s Ira Flatow hosts this edition of Science Friday, “The Science of Chocolate,” with guests including Allen Young, author of *The Chocolate Tree*, and Russ Greenberg of the Smithsonian’s Migratory Bird Center. The show can be heard with Real Audio.

Notes: Get to this episode from the home page by going to Archives, February, 1998: *The Science of Chocolate*.

Address: www.sci.mus.mn.us/sln/tf/c/cacao/cacao

Description: Part of the Science Learning Network Thinking Fountain from the Science Museum of Minnesota. Introductory questions lead to further exploration, and cultural connections are made with the Maya. Includes image of a ruler with a pod and bean to show relative size. Activity suggestion: make a cross section of a candy bar and see how many ingredients can be identified. What would cross sections of other foods look like?

Rainforest/Growers

Address: www.acri-cocoa.org

Description: Site for the American Cocoa Research Institute (research arm of the Chocolate Manufacturers Association). Includes additional information about their sustainable agriculture initiatives.

Address: www.amnh.org

Description: Allen Young’s research with midges and sustainable cacao production in Costa Rica is featured on this Web site for the American Museum of Natural History. One of the Museum’s BioBulletins by Young is entitled, “No More Chocolate? How the Rain Forest and a Tiny Fly Make Chocolate Happen.” Included is a video clip featuring Dr. Young in Costa Rica. In it, he points out that while the tree’s trunk may be covered with flowers, only 1–2% produce pods. Dr. Young is the scientist who discovered that midges pollinated cacao flowers.

Notes: Find the page by going to the “On Exhibit” section of the Web site. Click on the following: *Science Bulletins*, *Hall of Biodiversity*, and *Bulletin Archives*; then scroll down to Fall 1998. See additional notes about Dr. Young in the Book List (*The Chocolate Tree: A Natural History of Cacao*) and the Speaker’s List.

Website List

Address: www.eduweb.com/amazon.html

Description: Interactive Web site based on the Ecuadorian Amazon region. Gives information on the physical and human geography of the area as well as the risks and benefits of ecotourism. Includes an interactive game based on developing coffee production or ecotourism. The introduction to the farmer interactive indicates that many farmers have turned to cacao harvesting to support their families, and that one hectare produces about 300 lbs. of cacao beans, worth about \$120 in the market. Site compares rainfall in this region to regions of the United States (you can enter your home region).

Notes: Part of the Eduweb adventures.

Address: www.rain-tree.com

Description: Company-based Web site for their line of rainforest plant-based herbal medicines and supplements. Contains information about rainforests and their environmental importance.

Notes: Good resources for teachers, including images of rainforest scenes, plants and animals, and background information. Contains new section for school reports and numerous links to other Web sites for current events and maps.

Address: www.natzoo.si.edu/smbc

Description: This site for the Smithsonian Migratory Bird Center features a number of scientific papers on shade-grown cacao from a 1998 workshop in Panama (in Research section). Includes fact sheet on migrant birds and coffee production that also refers to cacao.

Maya/Aztec

Address: www.nativeweb.org/pages/pyramids/overview.html

Description: Contains background information on the Maya and Aztecs.

Address: www.educapes.com/42explore/aztec.html

Description: Lists activities and Web site links for exploring the Aztecs.

Notes: Good for teachers/students.

Address: www.yale.edu/ynhti/curriculum/units/1992/2/92.02.05.x.html

Description: Part of the Yale New Haven Teachers Institute includes teacher-written curriculum, "Rediscovering the Aztec Indians."

Notes: Comprehensive curriculum (designed for grades 3 & 4) and information; mentions cacao consumption. Classroom activities provided.

Address: www.northcoast.com/~spdtom/aztec.html

Description: Student/teacher resource center for Mexican history with listings of books, music, and videos.

Address: www.campus.northpark.edu/history/WebChron/Americas/AztecEmp.html

Description: Brief background information about Aztec Culture, 1400–1519.

Notes: Link to page about the conquest of the Aztecs. Site based at North Park University.

Europe/Slavery

Address: www.barry-callebaut.com

Description: The merger between a French and a Belgian chocolate company produced Barry Callebaut, which in turn created a Web site featuring a wealth of information. "Chocolate World" includes a section discussing the processes from cocoa to chocolate, the Aztec Quetzalcoatl myth, and the spread of chocolate use through Europe. Other notable facts are found in the section on how cocoa is grown; the production section features good images of the steps involved. Rare information about the characteristics of cocoa butter (in FAQs) can be found, as well as the difference between open and captive market companies producing cacao. The site also contains information about work practices in West Africa. Good map shows cacao production, noting current and future trends.

Website List

Website List

Address: www.cadbury.co.uk

Description: The British manufacturer Cadbury maintains an extensive Web site. In the “Chocolate Encyclopedia,” the Story of Chocolate includes Making Chocolate, Chocolate History and Cocoa, and Packaging and Design. Various entries in each section allow the browser to learn more about the manufacturing of drinking chocolate, chocolate across Europe, the colonization of cacao-producing countries, chocolate houses in London, and the origin of the Easter egg.

See www.Ghirardelli.com notes in General/Chocolate Today section above for link to parent company, Lindt.

Manufacturing/World Trade

Address: www.csce.com

Description: Coffee, Sugar, and Cocoa Exchange Web site; part of the New York Board of Trade site. Seminar section displays quarterly statistics on cacao products, market information, and prices.

Address: www.hersheys.com

Description: Includes a more “child-friendly” tour of a chocolate factory. Browsers can take a video tour of the various steps from rainforest to chocolate bar. Each of the six segments lasts about a minute. Pictorial and text tour are also available (though video version gives more information). In the Kidztown section there are games, recipes and information on different chocolate making techniques. Consumer information section includes links to chocolate’s history and the story of founder Milton Hershey.

Notes: There are many links to Hershey products with their own Web sites, including the Hershey Kissmobile.

Address: www.icco.org

Description: The site of the International Cocoa Organization, based in London, has extensive information and a “question and answer” section that includes production costs, major ports importing and exporting beans, and links to manufacturing company Web sites worldwide.

Address: www.scharffen-berger.com

Description: This site features a great virtual tour of Scharffen Berger Chocolate Maker’s factory in Berkeley, California. By selecting one of the eight stages of chocolate production, you are provided with good detailed information on each step. Multiple, clear images of the machinery used accompany the text. The tempering section includes a clear diagram of how cocoa butter crystallizes when chocolate is tempered. A link to an even more in-depth article gives great background on the basics of chemistry and tempering.

Notes: Their products, including cocoa nibs, can be purchased on-line; recipe section gives instructions for tempering.

Documentary Films for Adults

Title: *Extra Bitter: The Legacy of the Chocolate Islands*
 Produced by: Nutaaq Media, Inc., for the Multimedia Group of Canada
 Length: 52 minutes, Color

Description: Two small islands off the coast of West Africa, São Tomé and Príncipe, are the focus of this documentary. These islands, formerly known as “Chocolate Islands,” were once Portuguese colonies, where coffee and cacao created wealth for the plantation owners and simultaneously horrible conditions for slave labor. William Cadbury, the Quaker founder of Cadbury Chocolate, traveled to the islands and pressured Portugal (from whom he purchased cacao) to let any Africans return home. Archival film and interviews tell this little-known history.

Contact: Filmmakers Library, 124 East 40th Street, Suite 901, New York, NY, 10016
 212.808.4980
 info@filmmakers.com
 www.filmmakers.com

Notes: *Filmmakers Library has several other related films that may be of interest: Coffee: A Sack Full of Power, Coffee Break, and Brazil: An Inconvenient History (part of the BBC Timewatch Series about slavery in Brazil).*

Title: *Knorosov: The Decipherment of the Mayan Script*
 Produced by: Tiahoga Ruge and Eduardo Herrera Fernandez
 Length: 57 minutes, Color

Description: *Knorosov: The Decipherment of the Mayan Script* is about the Russian scholar who broke the Maya glyph code. The film covers the history of the ancient Maya codices as well as the many unsuccessful theories and attempts to decipher the glyphs.

Contact: First Run Icarus Films, 32 Court Street, 21st Floor, Brooklyn, NY, 11201
 718.488.8900
 info@frif.com
 www.frif.com

Notes: *First Run Icarus has other interesting films in related subjects. Another seven-part series, The Commodities, produced by Sue Clayton and Jonathon Curling, profiles Third World commodities and their producers' relationships to sellers and traders. Though cacao is not profiled, there are segments on sugar, coffee, and tea.*

Title: *Mystery of the Senses: Taste*
 Produced by: WGBH, NOVA Series
 Length: 60 minutes
 Year: 1995 (originally broadcast on Feb. 21)

Description: Based on Diane Ackerman's book, *A Natural History of the Senses*, the episode on taste covers the biology and rituals of eating and taste around the world. “In France, a master chef divulges his secrets; in Mexico, a family prepares a meal for the Day of the Dead; in a Japanese restaurant, Ackerman looks into why some people consider potentially poisonous fish to be a delicacy; and in Connecticut, a scientist maps our taste buds.”

Contact: Not available through NOVA Web site; try through a library.

Title: *A Passion for Chocolate: The History of Our 2000-Year Obsession (working title)*
 Produced by: Meredith Dreiss
 Length: 60 minutes
 Year: 2002

Description: With an emphasis on the history of chocolate production and use in Mesoamerica and connecting the past to the present, filmmaker Meredith Dreiss and her brother, award-winning filmmaker Grant Mitchell, traveled the world to make this new documentary. Mesoamerican sculpture, ceramics, paintings, and monuments with cacao-related motifs will be featured (including a few from unpublished private collections). Interviews with experts include an archaeologist in Belize who specializes in ancient agricultural customs and archaeologists who have found artifacts in Guatemala's Rio Azul. Features will include a look into a Mayan cave where in ancient times cacao was brought as an offering to the lords of the underworld. Current day rituals in Mexico will be included, as well as the cacao growers' festival in Tabasco and the Day of the Dead in Oaxaca. Also integrated is footage of a chocolate festival in Italian Perugia and an interview in France with chocolate makers in the Basque Country known for their ancient dark chocolate recipes.

Contact: ArchaeoProductions,
 3805 Stevenson Avenue,
 Austin, TX, 78703
 512.478.7757 or mldreiss@aol.coms

Notes: *Dreiss is included in the Speaker's List. Her film work is included in the Grower's section of the exhibition.*

Feature Films for Adults

Notes: Most of the films (except where noted) can be rented from Swank Motion Pictures, Inc., 800.876.5577 or www.swank.com. (for non-theater public screenings). Film format varies (VHS, DVD and/or 16mm), so check when inquiring. Call to speak to a representative for your area.

Title: *Chocolat*
Directed by: Lasse Hallström
Starring: Juliette Binoche, Judi Dench, Alfred Molina, and Johnny Depp
Rated: PG-13
Length: 122 minutes, Color
Year: 2000

Description: Based on the novel of the same title by Joanne Harris, *Chocolat* tells the story of Vianne Rocher (Binoche) and her daughter, Anouk, who move to a small French village and wreak havoc on the villagers by opening a chocolate shop during Lent. The screenplay varies from the novel in several ways, including the exchange of the priest for the mayor in the primary antagonist's role. The cinematography is visually rich, from the chocolate creations and décor of the shop to the color that Vianne and Anouk bring to the somber tones of the village and people. Film also focuses on the transformative power chocolate has on the townspeople. This film follows the strongest storyline relating to chocolate.

Distributed by: Miramax (Available through Swank)

Title: *The Chocolate Soldier*
Directed by: Roy Del Ruth
Starring: Nelson Eddy and Risë Stevens
Rated: Not Rated
Length: 102 minutes, Black and White
Year: 1941

Description: A musical comedy based on Ferenc Molnar's play *The Guardsman*, Eddy and Stevens play married singers Karl and Maria Lang. On stage they perform well together, but off stage their marriage is poked by Karl's jealousy, which culminates in him testing his wife's fidelity by posing as a Russian nobleman. Eventually their love is strengthened and, at the end of the movie, Karl and Maria perform their final number as part of the musical. Karl says, "I'm a chocolate soldier man." as Maria feeds him chocolate. There are similarities also to *Shaw's Arms and the Man*.

Distributed by: MGM (Available through Swank)

Title: *The Chocolate War*
Directed by: Keith Gordon
Starring: John Glover, Ian Mitchell-Smith and Wally Ward
Rated: R
Length: 103 minutes
Year: 1989

Description: The movie is based on Robert Cormier's classic book of the same title. Brother Leon is counting on the boys at his Trinity Prep School to save the school from financial trouble with their annual chocolate sale. Brother Leon enlists the help of a local student group, the Vigils, to ensure the sale's success, but the Vigils strong arm other students and give out "special assignments" to freshmen. Freshman Jerry Renault's assignment is to refuse to participate in the chocolate sale for 10 days, after which time Jerry surprises his classmates by continuing to refuse to sell the chocolates. Interesting struggles for power and control ensue.

Distributed by: Management Company Entertainment Group, Inc. (Available through Swank)

Title: *Consuming Passions*
Directed by: Giles Foster
Starring: Vanessa Redgrave and Jonathon Pryce
Rated: R
Length: 95 minutes, Color
Year: 1988

Description: A dark British comedy written by Monty Python's Michael Palin and Terry Jones. Set at the Butterworth Chocolate Factory, where main character Mr. Farris accidentally lets some workers fall into a vat, and a certain type of chocolate with a special ingredient becomes popular. Farris finally has to meet the demand for this new chocolate by means of murder. Film described as "gross" in many parts and funny in others by VideoHound's Golden Movie Retriever.

Distributed by: MGM/UA (Available through Swank)

Feature Films for Adults

Title: *Days of Wine and Roses*
Directed by: Blake Edwards
Starring: Jack Lemmon and Lee Remick
Rated: Not Rated
Length: 138 minutes, Black and White
Year: 1962

Description: Remick is addicted to chocolate when she meets her husband, who is an alcoholic, and eventually leads her to an alcohol addiction.

Distributed by: Warner (Available through Swank)

Title: *Despair*
Directed by: Rainer Werner Fassbinder
Starring: Dirk Bogarde and Andrea Ferreol
Rated: Not Rated (Adult subject matter)
Length: 120 minutes, Color
Year: 1978

Description: Set in Nazi Germany in the 1930s, a Russian chocolate factory owner descends into madness. Dubbed in English.

Distributed by: German Language Video Center
(317.547.1257 or www.germanvideo.com)

Title: *Ever After: A Cinderella Story*
Directed by: Andy Tennant
Starring: Drew Barrymore, Dougray Scott and Anjelica Huston
Rated: PG
Length: 100 minutes, Color
Year: 1998

Description: This rendition of the “Cinderella” story is set in the 16th century where the arranged marriage of the Prince of France to the royal family of Spain is about to take place. The Prince struggles against this arrangement, preferring to marry for love. In an argument with his father, he accepts the challenge of finding a woman of his own choice to marry in the following few days, or else he must proceed with the arranged marriage. The competition begins amongst the single women of the court and region to become his betrothed. An evil stepsister of Barrymore’s, also vying for his attention, is with the Prince at the town market when he is handed a dish

of chocolate. The Prince offers her a taste saying, “You have never tasted anything so delicious.” The stepsister says that it is “positively sinful” and asks what it is. The Prince replies, “the Spanish monks have been sending bricks of it.”

Distributed by: Criterion, 800.890.9494

Title: *Forrest Gump*
Directed by: Robert Zemeckis
Starring: Tom Hanks, Robin Wright, Gary Sinise and Sally Field
Rated: PG-13
Length: 142 minutes, Color
Year: 1994

Description: Contains the well-known and oft-repeated line, “Life is like a box of chocolates. You never know what you’re going to get.” Hanks plays Forrest Gump who, despite his slow intellect, has a profound impact on world events and the lives of those around him.

Distributed by: Paramount (Available through Swank)

Title: *I Don’t Buy Kisses Anymore*
Directed by: Robert Marcarelli
Starring: Jason Alexander and Nia Peeples
Rated: PG
Length: 112 minutes, Color
Year: 1992

Description: Alexander plays overweight Bernie Fishbine who stops by a neighborhood store every day to buy chocolate kisses. He meets Theresa (Peeples), a psychology student who decides to use Bernie as a case study for her term paper without telling him. Over time they both realize they are falling for each other.

Distributed by: Paramount (Available through Swank)

Feature Films for Adults

Title: *Life is Sweet*

Directed by: Mike Leigh

Starring: Alison Steadman and Jim Broadbent

Rated: R

Length: 103 minutes

Year: 1992

Description: Life in a quirky family in England centers on Nicola, a young adult-aged twin, whose sister and she both still live at home. Nicola tries everyone's nerves, including her twin, and especially her mother. Food is a theme in the family members' futile dreams—the father, for example, buys a ramshackle snack wagon and makes endless plans for a successful business. Chocolate appears throughout the movie as part of Nicola's eating disorder and sexual interests (which are not overly graphic, but involves eating chocolate). Humorous in an offbeat way.

Distributed by: Republic Pictures (Available through Swank)

Title: *Like Water for Chocolate*

Directed by: Alfonso Arau

Starring: Marco Leonardi and Lumi Cavazos

Rated: R

Length: 105 minutes

Year: 1993

Description: Based on the novel by Laura Esquivel. Esquivel also wrote the screenplay that tells the love story of Tita and Pedro (see description in Book List). While book details the preparation of hot chocolate, the film only mentions the serving of chocolate with the special Three Kings' Day bread. One of Tita's sisters, Gertrudis, who has been away for some time mentions that she has looked forward to enjoying Tita's chocolate. Rich cinematography depicts the preparation of many food dishes. In Spanish with English subtitles.

Distributed by: Buena Vista (Available through Swank)

Title: *My Fair Lady*

Directed by: George Cukor

Starring: Audrey Hepburn and Rex Harrison

Rated: G

Length: 170 minutes, Color

Year: 1964

Description: Based on the musical Pygmalion, Harrison plays Professor Henry Higgins trying to turn a cockney girl (Hepburn) into a lady. During lessons to improve her speaking skills, Higgins uses chocolates as a reward.

Distributed by: CBS/Fox Video (Available through Swank)

Title: *The Naked Jungle*

Directed by: Byron Haskin

Starring: Eleanor Parker and Charlton Heston

Rated: Not Rated (some violence)

Length: 95 minutes, Color

Year: 1954

Description: Parker plays a mail-order bride who joins Heston on his cacao plantation in South America in the early 1900s. Good depictions of cacao growing and beans drying in sheds. Heston plays the rough plantation owner who has worked 15 years to carve his empire out of the jungle ("civilizing" the native people in the process). The movie involves stereotypic and racist views of the native inhabitants of the area, as Heston is portrayed as the "hero" who has saved them from their previous life. He also saves the natives and his new wife from a band of killer ants that threatens to consume them all.

Distributed by: Paramount (Available through Swank)

Feature Films for Adults

Title: *The Secret Agent*
Directed by: Alfred Hitchcock
Starring: John Gielgud and Peter Lorre
Rated: Not Rated (some subtle sexual innuendo; mild depiction of violence)
Length: 86 minutes
Year: 1936

Description: Classic black and white Hitchcock thriller in which Gielgud plays British novelist-turned-spy Edgar Brodie. As his assumed identity, Richard Ashenden, Brodie is sent on assignment to Switzerland to find a German spy who must be stopped from leaving the country. Peter Lorre, the “General,” plays the assassin who accompanies him. Early in the film a secret message is shown being passed in the wrapper of a chocolate bar. Later, the two are given a tip that a Swiss chocolate factory is being used by the Germans as a “post office” for their spy work. Brodie and the General go to Mochard Chocolat under the auspices of wanting a tour of the facility. The police are notified that there are British spies present and a climactic chase follows.

Distributed by: No distributor found; obtain through video store or library.

Title: *Strawberry and Chocolate (Fresa y Chocolate)*
Directed by: Tomas Guitierrez Alea and Juan Carlos Tabio
Starring: Jorge Perugorria and Vladimir Cruz
Rated: R
Length: 110 minutes, Color
Year: 1993

Description: Story of two men who meet at a café (one eating chocolate ice cream and the other strawberry). They build an unlikely friendship, since one is gay and the other strongly heterosexual, and have differing political views. Set in Havana in the late 70s. Spanish with English subtitles.

Distributed by: Buena Vista (Available through Swank)

Title: *Vatel*
Directed by: Roland Joffé
Starring: Gérard Depardieu, Uma Thurman, and Tim Roth
Rated: PG-13
Length: 103 minutes, Color
Year: 2000

Description: Set in France in the 16th century, this true story revolves around a steward—for the bankrupt Prince de Condé—who is in charge of three days of extravagant dining and spectacles for the visit of King Louis XIV. The Prince thinks that by hosting the King and his court, he will receive the funds needed to rescue him and his province from bankruptcy. Depardieu plays the steward who orchestrates the meals and events, and the preparations are beautifully filmed with focus on the food and drink served. Depardieu, the King, and the Marquis are all smitten with a young woman of the court (Thurman). The King requests to “have chocolate with her at midnight in her bedchamber” to which Thurman must agree. This request, which comes again later from the Marquis, refers to sleeping with the woman. An early scene in the movie shows the steward ladling chocolate into a chocolatière (silver server) at one of the banquets.

Distributed by: Miramax (Available through Swank)

Title: *Who is Killing the Great Chefs of Europe?*
Directed by: Ted Kotcheff
Starring: George Segal, Jacqueline Bisset, and Robert Morley
Rated: PG
Length: 112 minutes, Color
Year: 1978

Description: Dark comedy mystery about a number of European chefs who are murdered according to their cooking specialty. Bisset character has a connection with chocolate.

Distributed by: Warner (Available through Swank)

Documentary & Feature Films for Families/Children

Title: *Milton Hershey: The Chocolate King*
(An A&E Biography)

Directed by: Bill Harris

Rated: Not Rated

Length: 50 minutes

Year: 1995

Description: Film that documents the life and work of Milton S. Hershey, founder of the Hershey Chocolate Company. Film traces his early interest in confections and his many attempts and failures in a number of businesses. His Lancaster Caramel Company becomes the key to his initial success, but he is inspired by German chocolate making equipment exhibited at the Columbian Exposition in Chicago. Hershey knew that “caramels were a fad but chocolate was permanent.” Vintage photographs and film show the creation of Hershey, Pennsylvania, as well as early mechanization. Film also discusses his family history and his philanthropic work.

Distributed by: New Video Group, 126 Fifth Avenue, NY, NY 10011, info@newvideo.com

Title: *The Cadbury Family: The Sweet Smell of Success* (An A&E Biography)

Rated: Not Rated

Length: 50 minutes

Year: 2001

Description: Though Cadbury has been making chocolate for 175 years, it is still run by family members, a rare occurrence in the chocolate industry. From the company’s beginning, their work has been shaped by their Quaker beliefs; interviews with current and past employees tell their history.

Distributed by: New Video Group, 126 Fifth Avenue, NY, NY 10011, info@newvideo.com

Title: *I Love Lucy Volume 2: Job Switching*

Starring: Lucille Ball, Desi Arnaz, Vivian Vance, and William Frawley

Rated: not rated

Length: 25 minutes

Year: Originally aired September 15, 1952

Description: Famous episode where Lucy and Ethel place a bet with Fred and Ricky about trading jobs. Lucy and Ethel agree to find an outside job for a week while Fred and Ricky declare that the “girls” have it “easy” and can easily take care of the household work for a week. The girls head to the ACME Employment Agency and get a job in a candy factory-Kramer’s Candy Kitchen. Ethel is taken to the packing area while Lucy is assigned to the dipping station. Lucy ends up in a “chocolate fight” with her co-worker after a fly lands on the woman, and Ethel keeps pinching the chocolates she is trying to package. The two are reunited at the wrapping station, in the scene with which most are familiar, where a speedy conveyor belt forces the two to start stuffing chocolates in their mouths and blouses to keep up (as they’ve been told that they will be fired if one piece gets by them). At the end of the day both are let go and return home to find the house a disaster from Ricky’s attempts at domestic work. They both groan as their husbands present them each with a big box of candy to call off the wager.

Distributed by: CBS Fox Video (Available through Swank)

Title: *Willy Wonka and the Chocolate Factory*

Directed by: Mel Stuart

Starring: Gene Wilder, Jack Albertson, and Peter Ostrum as Charlie

Rated: G

Length: 115 minutes

Year: 1971

Description: Popular film version of Roald Dahl’s classic book, *Charlie and the Chocolate Factory*. Whimsical and fun, the musical follows five lucky children and their adult companions who win tickets to tour the Wonka Chocolate Factory—a place known for its mystique. (See Book List for more about the story.) The film depicts the chocolate waterfall and river, where one of the children, Augustus Gloop, falls in after greedily drinking the chocolate. The book includes more detail (albeit not much) about about the oompa loompas and their love for cacao.

Distributed by: Warner (Available through Swank)

Music/Dance List

Title: *The Nutcracker*

Composer: Tchaikovsky

Description: Based on a German story, Tchaikovsky and choreographer Marius Petipa created the ballet in the late 1800s. The little girl, Clara, falls asleep by the tree on Christmas Eve. She awakens to find her wooden nutcracker has come to life and takes her to the Kingdom of Sweets, where there is a series of “Divertissements.” The first divertissement is “Chocolate”—a Spanish Dance reflecting the influence of the Spanish in introducing chocolate to the wider world. Coffee and Tea are among the other divertissements.



Chocolate

APPENDIX

I. Interchange Plant Hint Cards: Plants of North and South America

Tomato—Peru, South America

Lycopersicon esculentum

Product hints

- 1 My plant originally grew in Peru but most people think I'm from Italy.
- 2 The Spanish took me to Europe where some people thought I was poisonous. Other people called me a love apple. I was even used in medicine.
- 3 Americans like me in salads as well as in catsup and in sauces for pizza and pasta

Location hints:

- I am located at 10 S, 76 W.
- I border Bolivia, Brazil, Chile, Colombia, and Ecuador.
- My capital is Lima.
- I begin with "P" and rhyme with Shamou.

More About Tomatoes

Tomatoes come in different sizes, shapes, and colors. They are important sources of vitamins A and C. Tomatoes are actually a fruit. They are known as vegetables because of the ways that we eat them. Tomatoes are very popular not only because they make food more interesting but also enhance the flavor of many other foods.

Chile—Bolivia, South America

Capsicum species

Product hints

- 1 I am a very spicy vegetable that originally grew in Bolivia. Birds carried my seeds throughout Central and South America.
- 2 Columbus took me to Europe; within a century, people all over the world were adding my fiery pods to their food.
- 3 My plant is in the same family as potatoes and tomatoes. Columbus thought that I was a pepper and I am still known as a hot pepper in the U.S.

Location hints:

- I am located at 17 S, 65 W.
- I share Lake Titicaca with Peru.
- My capital is La Paz.
- I begin with "B" and rhyme with Olivia.

More About Chiles

Chiles were part of the Incan Creation legend and were also revered by Mayan and Aztec societies. Chiles are hot because they contain a substance called capsaicin. Capsaicin is so strong that it can be used as a substitute for mace or to drive away grizzly bears.

I. Interchange Plant Hint Cards: Plants of North and South America

Cassava or Manioc - Brazil, South America

Manihot esculenta

Product hints

- 1 I'm a tropical plant from the Americas. I have been grown for my root for about 3000 years.
- 2 Products made from my root are flour, starch, juice or soup, and preservatives.
- 3 I am used in many traditional dishes in Middle and South America, but you may know me as tapioca.

Location hints

- I am located at 10 S, 55 W.
- I am the largest country in South America. I border every other South American country except Chile and Ecuador.
- My capital is Brasilia.
- I rhyme with hand drill.

More About Cassava or Manioc

This plant is an important part of the diet for people who live in the tropics, but it has not replaced other sources of flour elsewhere. Manioc's major use in many countries has been as a starch to thicken foods such as desserts.

Peanut- Bolivia, South America

Arahis hypogaea

Product hints

- 1 I first grew in South America. Now I'm an important source of food and vegetable oil in most parts of the world.
- 2 I'm known as a nut, but I'm really the bean of a low growing plant. I'm different because my flower stems bend down and my beans develop and ripen beneath the ground.
- 3 You probably think of me as a good snack or a spread to put on bread with jelly.

Location hints:

- I am located at 17 S, 65 W.
- I share Lake Titicaca with Peru.
- My capital is La Paz.
- I begin with "B" and rhyme with olivia.

More About Peanuts

Peanuts are an excellent source of protein and cooking oil. After the oil is expelled, the remainder of the bean can be used as good quality animal feed. Peanuts are used in many different ways throughout the world—as snacks, cooked with meats or other vegetables, as peanut butter, or in sauces with seasonings such as chilies.

I. Interchange Plant Hint Cards: Plants of North and South America

Potato - Peru, South America *Solanum tuberosum*

Product hints

- 1 I am part of the root of a plant which has been cultivated by Peruvian Indians for many centuries.
- 2 I wasn't much larger than a golf ball until I came to Ireland, where climate and selective breeding tripled my size. Now I'm often called Irish or Idaho.
- 3 I'm prepared many ways: boiled, baked, or made into flour or starch. But you probably like me best when I'm made into a chip or French fried.

Location hints:

- I am located at 10 S, 76 W.
- I border Bolivia, Brazil, Chile, Columbia, and Ecuador.
- My capital is Lima.
- I rhyme with Shamu.

More About Potatoes

The Spanish were impressed with the Incas' system for planting, preserving, and storing potatoes; their mountain climate enabled them to develop a freeze-drying process. Europeans began to raise potatoes because they were easy to grow and produced a high yield even in difficult soils. In 1845, a disease killed potato plants in Ireland and Northern Europe, resulting in famines and causing a large immigration to the U.S.

Vanilla - Mexico, North America *Vanilla planifolia*

Product hints

- 1 I'm the seed pod of a rainforest plant which has been used by Mexican peoples for flavoring for more than 8000 years.
- 2 The complex fermentation process developed by ancient peoples is still the best way to cultivate my flavor.
- 3 I am one of the most expensive flavoring ingredients, especially popular in ice cream.

Location hints:

- I am located at 23 N, 102 W.
- I am strategically located on the southern border of the U. S.
- My capital is Mexico City.
- I rhyme with Texaco.

More About Vanilla

The vanilla plant is a member of the orchid family. The Spanish named this plant "vainilla" which means "little sheath" referring to the bean-like shape of the fruit. It may take up to six months to develop the vanilla bean's flavor. The fermentation process the Indians developed is still the best. The fruits are exposed to the warm sun and then wrapped in cloth for the remainder of the day. After fermenting, the beans are dried and placed in a liquid—such as alcohol—to extract the flavor.

I. Interchange Plant Hint Cards: Plants of North and South America

Chocolate - Mexico, North America

Theobroma cacao

Product hints

- 1 The tree I grow on is a native of Middle and South America.
- 2 In Mexico, people have been drinking a beverage made with my seeds for 3000 years.
- 3 My seeds were used for money.
- 4 People all over the world love candies, desserts, and drinks flavored with my dark brown roasted seeds.

Location hints:

- I am located at 23 N, 102 W
- I am strategically located on the southern border of the U. S.
- My capital is Mexico City.
- I rhyme with Texaco.

More About Chocolate

Chocolate is an English word derived from chocolatl, its Nahuatl (Mexican) name. Aztec emperors thought chocolate to be a love potion sent from the gods. Today its scientific name means food of the gods, and we often give chocolate candies on Valentine's Day to people we love. The Spanish took chocolate to Africa and it now grows in many tropical regions. Ivory Coast is now the largest producer of chocolate. Dutch and Swiss candy makers developed ways to improve the flavor and texture so that today we enjoy chocolate as candy, as a flavoring, and as a beverage.

Corn or Maize - Mexico, North America

Zea mays

Product hints

- 1 I'm probably a native of Mexico. Indian traders carried my seeds throughout the Americas. Later, Spanish explorers introduced me to Europe. Now I'm one of the most important crops in the world.
- 2 Flour ground from my dried seeds was an important food for Indians. I'm still harvested for flour, eaten as a vegetable, used as a cooking oil, fed to animals, and also have many industrial uses.
- 3 You may like me best as flakes for breakfast, cooked on the cob, or popped.

Location hints:

- I am located at 23 N, 102 W.
- I am strategically located on the southern border of the U. S.
- My capital is Mexico City.
- I rhyme with Texaco.

More About Corn

Anthropologists think that Indians went from nomadic hunting and gathering societies to farming after they developed corn. Its productivity enabled them to build trade centers of up to 200,000 people. Corn was developed with careful breeding, beginning with a tiny cob found on a type of grass. Corn enabled European farmers to increase the number of animals they could raise for milk, meat, and eggs. These new food sources led to expansion of the human population and major increases in the size of cities. There are now many specialized varieties of corn—for eating, popping, producing corn oil, and feeding to animals.

II. Mud Management Materials List

UNDERGROUND ADVENTURE - Mud Management Interpretive Station Inventory

ITEM	DESCRIPTION	PURPOSE/USE	QUANTITY/#
What is soil? (Harris Loan display case)	Soil Community Diorama (black box with glass front)	Illustrates what lives in soil Take out chart	One (1)
Compound Microscope	Includes "Life in the Soil" booklet and Micro-Slide Viewer	Allows visitors to view slides of: Algae, Bacteria, Tardigrades, Nematode, Nematodes on Tomato Root, Predaceous Fungi, Springtail, Mite	Microscope - one (1) Micro-Slide Viewer - one (1) "Life in the Soil" Booklet - one(1)

SOIL SCIENCE TOOLS - Mud Management Interpretive Station Inventory

The majority of these items can be obtained by contacting your local USDA office. You may also wish to contact a forestry supply company or check your local hardware store.

ITEM	DESCRIPTION	PURPOSE/USE	QUANTITY/#
Aerial Photos	Binder of pairs of photos	Illustrates one method scientists use to get data about soil	one (1)
Stereoscope	Always stored in brown cardboard box	To use with aerial photos to show 3D effect	one(1)
Basic Photo Interpretation Book		Basically a text/reference book used to teach soil scientists	one (1)
USDA Soil Survey Book		Soil scientists put all their aerial photos into this resource publication to be used by anyone to learn more about the soil	one (1)
"From the Surface Down"	Booklet	Shows picture of soil horizons and includes great explanations of what soil is	one (1)
Core sampler	Long metal tube with handle - T shape	Takes sample of soil to show different horizons. Variety of sizes, some are so large they necessitate a truck	two (2)
Penotrometer	Silver, metal pen-like object in a storage wallet	Measures compaction of soil	one (1)

Appendix

II. Mud Management Materials List

SOIL SCIENCE TOOLS (continued) - Mud Management Interpretive Station Inventory

ITEM	DESCRIPTION	PURPOSE/USE	QUANTITY/#
Soil Thermometer	Looks like a meat thermometer	Measures temperature of soil	one (1)
Earth Colors Book - Scientists often call it a "Munsell Book" - the most famous brand.	Pocket sized blue binder with color sample pages	Soil scientists uses to compare soil samples—universal color coding system	one(1)
Soil sorting sieve	Clear cylinder with gray frame	Used to sort soil by particle size, largest particles to smallest, top to bottom	one (1)
Tape Measure	garden shovel	A variety of trowels, shovels, and large digging equipment, such as back hoes are used in the field	one (1)
Soil Sedimentators (Mud shakes)	Sealed, clear plastic tubes with water and soil	Used to sort soil by particle size, largest particles to smallest, top to bottom	one (1)
Soil Test Kit	Package containing four rectangular test tubes and indicators	Shows how soils can be mixed with water and indicators to show chemical composition	one (1)
Trowel	Retractable	Used in the field, plots depths and horizon thickness	one (1)

III. Credit Line

Chocolate Curriculum Images

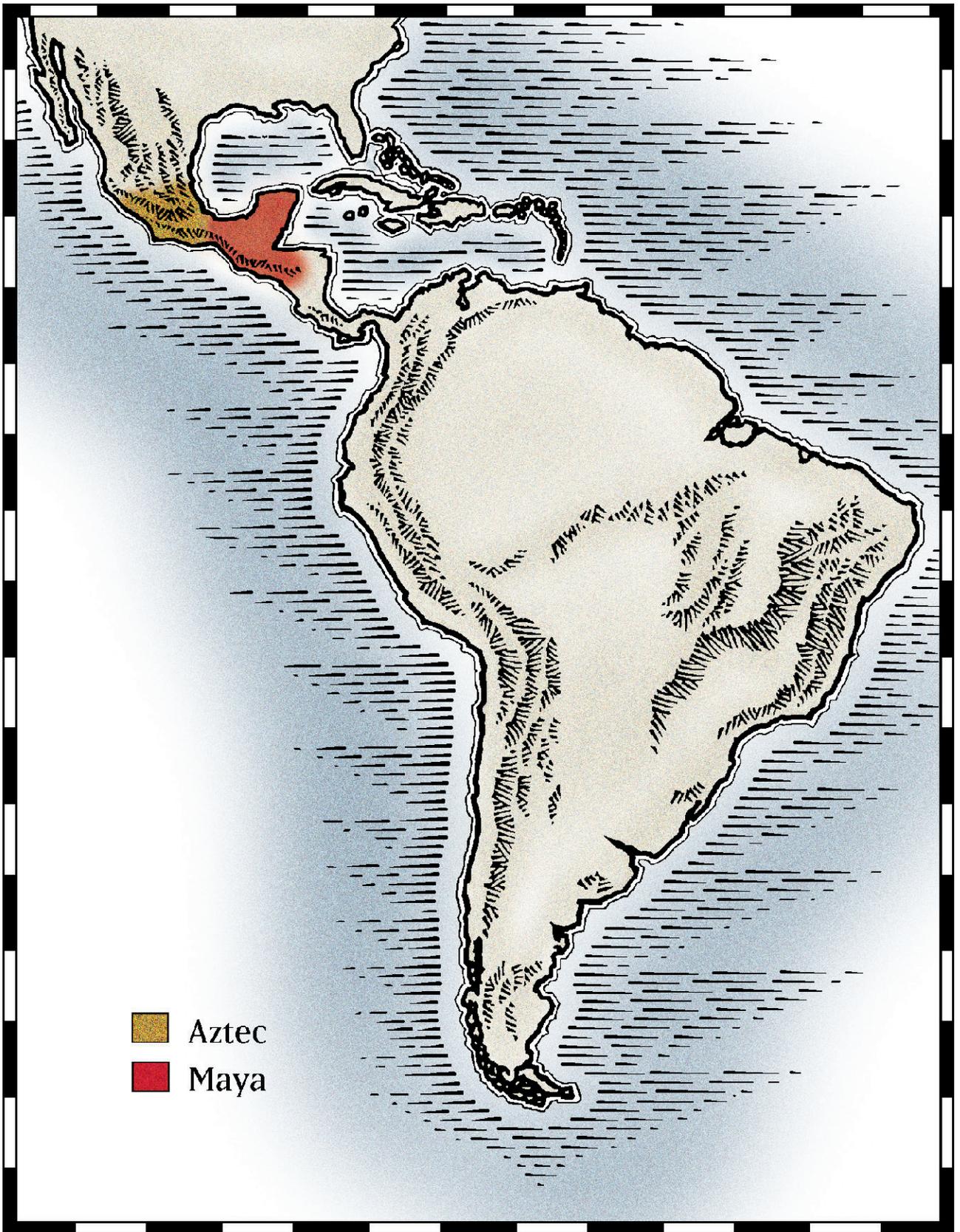
Man holding pod: Anamari Golf
Pods on cacao tree: Anamari Golf
Green pods: Anamari Golf
Candy factory: Teresa Murray
Chocolates on board: Anamari Golf
Hand holding cup of foam: Teresa Murray
Incense burner: John Weinstein
Women with sugar cane: Anamari Golf
Woman making cacao drink: Teresa Murray
Bag of cacao beans: Teresa Murray
Man in chocolate factory: Anamari Golf

Appendix Images

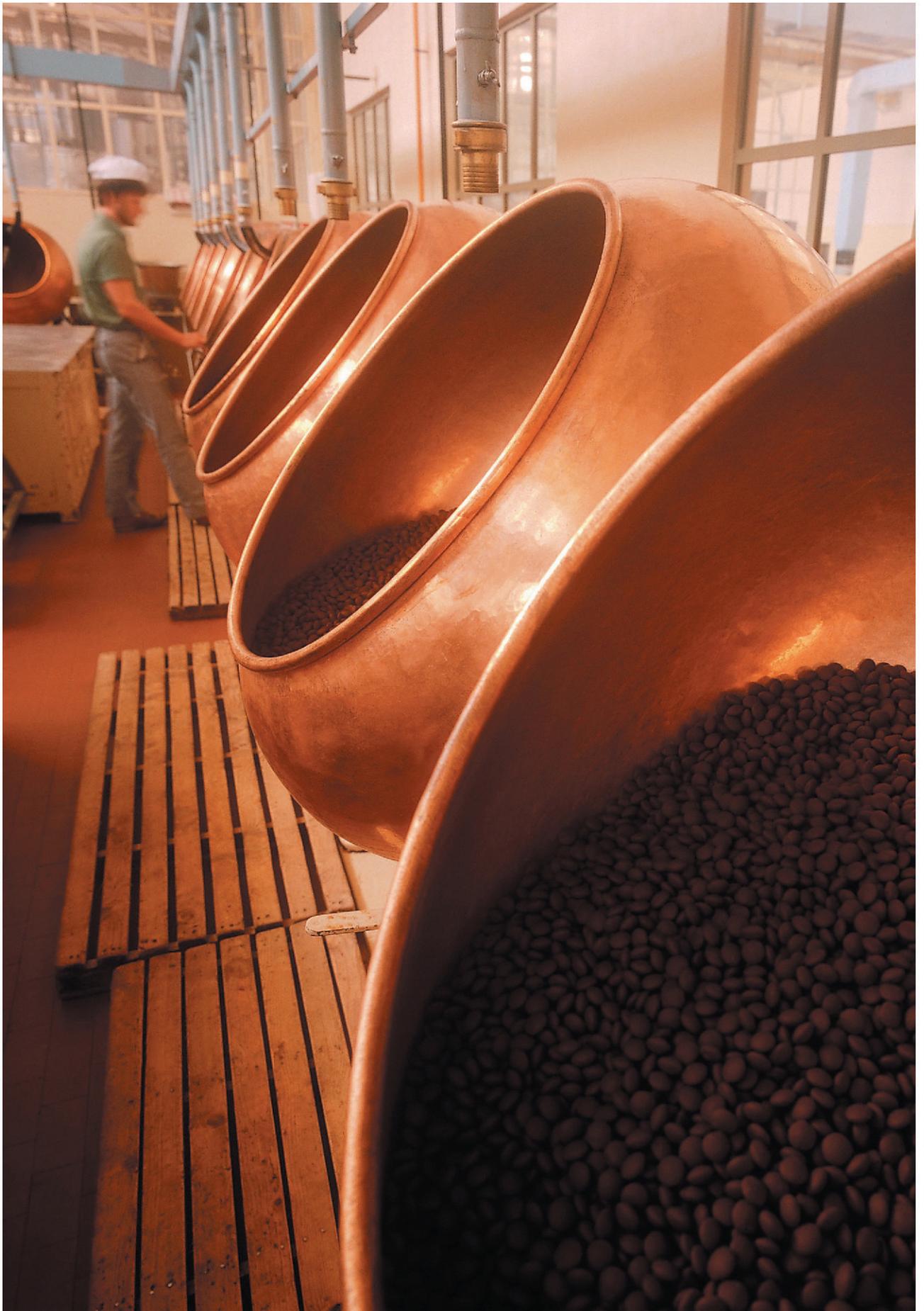
Green pods: Anamari Golf
Molinillos: Teresa Murray
Aztec and Maya map: Lori Walsh
Copper pots: Photodisc
Fermenting beans: Anamari Golf
Bag of cacao beans: Teresa Murray
Pods on cacao tree: Anamari Golf
Roll out of Maya vessel: Justin Kerr
Maya vessel: Justin Kerr
Rainforest map: Lori Walsh
Painting of public chocolate house:
The British Museum, London
World of Chocolate map:
The Newberry Library, Chicago



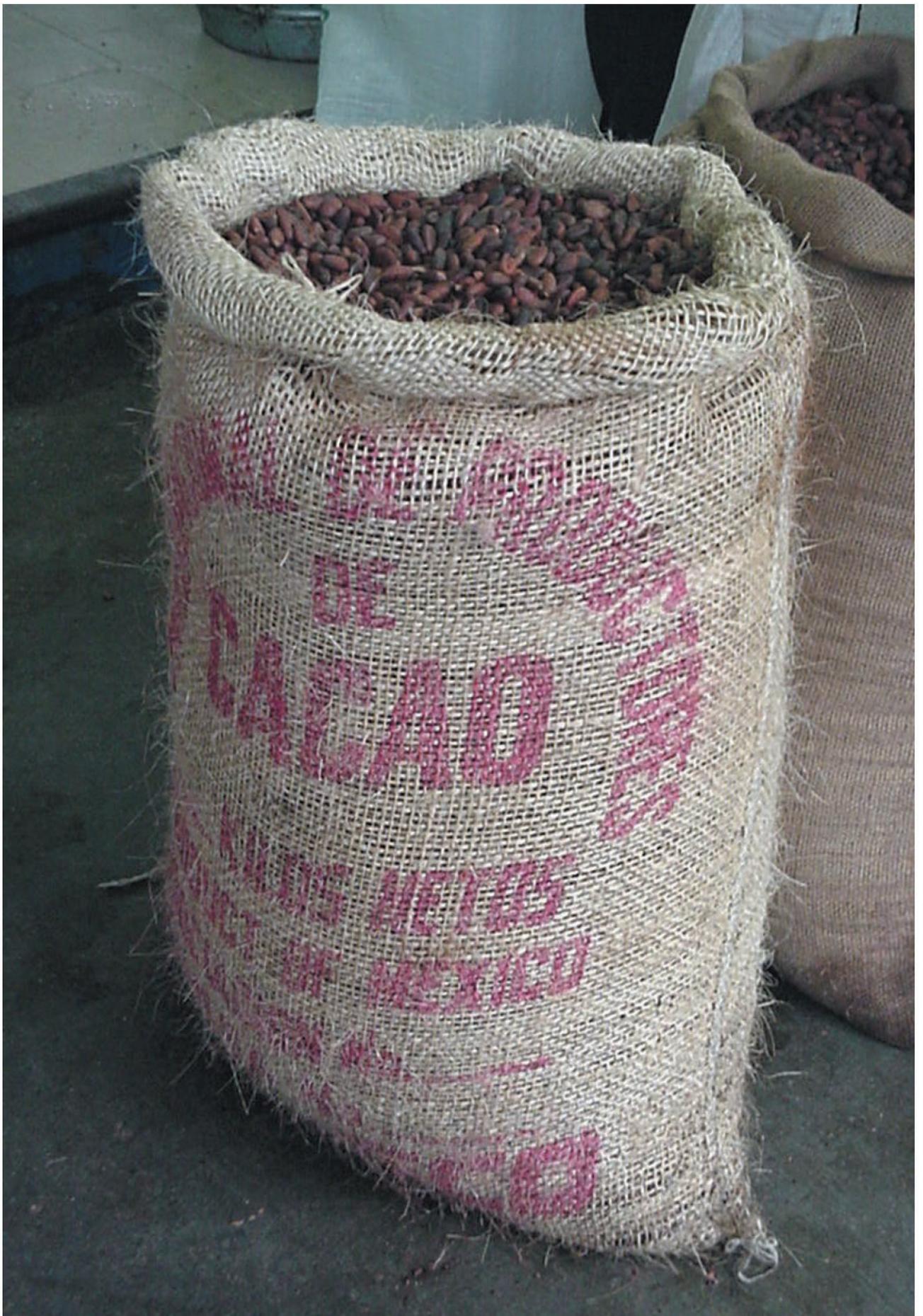




 Aztec
 Maya



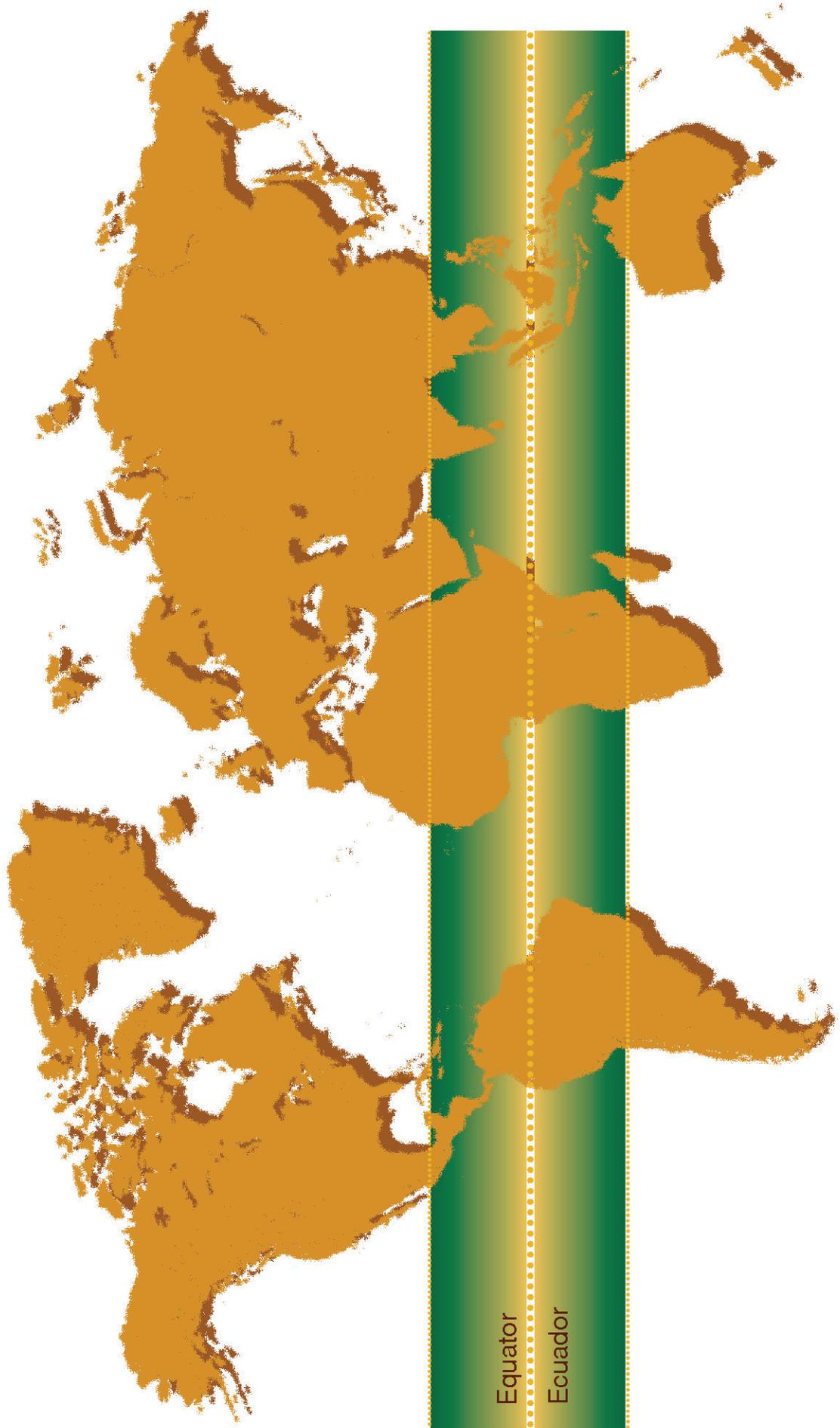












Equator

Ecuador



A.8 1663.



The World of Chocolate ~ 1606 ~ el Mundo del Chocolate

