



The Central American Cacao Project (PCC) at CATIE (Tropical Agricultural Research and Higher Education Center) aims to increase the productivity, diversity and financial and environmental value of the cacao plantations of at least 6,000 Central American families.

Working closely with cacao farming families, the Project creates alliances with other partners in the region in order to enhance the social interactions, competitiveness and business capacity of the producers' organizations and improve the living conditions of their members.

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The Project promotes efforts to increase the knowledge and skills of farming families and students at agricultural schools, technical colleges and agronomy faculties, for the sustainable production of cacao.

The Project also offers equal opportunities as well as economic, social and cultural responsibilities for men and women of all ages and from different ethnic groups in all its spheres of action.



History of Cacao and Chocolate

Lauren Fins
Eduardo Somarriba Chavez
Francisco Quesada Chaverri

COLLECTION

PCC

FIELD
SCHOOLS

7



Technical Series
Extension Materials No.



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The Tropical Agricultural Research and Higher Education Center (CATIE) is a regional center dedicated to research and graduate education in agriculture, and the management, conservation and sustainable use of natural resources. Its members include the Inter-American Institute for Cooperation on Agriculture (IICA), Belize, Bolivia, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Venezuela, Spain and the State of Acre in Brazil.

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This manual is meant to serve as a study book for farmers, local and community facilitators, students and others interested in the natural and cultural history of cacao and chocolate.

This publication was co-produced by CATIE-MAP Noruega Project (Central American Cacao Project), the University of Idaho and The Hershey Company.



University of Idaho





Hi, today
was the last day of
classes. It is so nice to
be on vacation.


How is
everything here at
home?

Hi Maya.
We have been
thinking about the
future of the farm.

Your father and
I were discussing the idea
of starting a small business
to show tourists how we grow
cacao and how we produce
chocolate?

Yes!
That sounds like
a very good idea
to me

We can
also tell the tourists
about our culture and the
origin and history of
chocolate – where it
comes from...



I know where chocolate comes from.

It grows on trees... as any monkey can see.

Sure, they'd love to see how we grow cacao and how we ferment and dry the beans to sell to buyers.

Maya, why don't you use your vacation time to go to CATIE and learn more about cacao?

You could stay at your Aunt Carmen's house and also visit with your cousins. What do you think?

And the tourists can taste and buy the chocolate we make right here on the farm.

That's a great idea, Maya.

Sounds like a great idea!

I'm calling Aunt Carmen right now!

The next day...

Here's some money, fruit and homemade chocolate for the trip.

Hi Maya.

Welcome to CATIE. We've been expecting you. Our library has lots of books on cacao.

Here comes the bus.

'Bye Mom.
'Bye Dad. I'll be back in a week and I'll tell you everything.

Thank you, Carolina. I can see that I am going to be very busy.

I recommend you visit three Internet sites:

the [International Cocoa Organization \(ICCO\)](#),
the [World Cocoa Foundation \(WCF\)](#)
and the [Cocoa Producers Alliance \(COPAL\)](#)

Jot down these addresses in your notebook:
www.icco.org
www.worldcocoafoundation.org
www.copal-cpa.org

There's a lot of interesting information about cacao on these websites.

Look, this book has lots of information on cacao. Here's a list of facts you might find interesting.

The world produces about three and one-half million metric tons of cocoa each year.



The market value of the annual global cocoa harvest is 5.1 billion dollars.



There are about 6 million cacao farmers in the world, and about 50 million people depend on cocoa to support themselves and their families.



Most cacao farms are small, less than 2 hectares. It is estimated that the area planted in cocoa worldwide is around 7 million hectares.



Cacao grows only in the tropics, between 20 degrees north and 20 degrees south latitude.

Amazing! I never would have thought that little farms like ours could produce so much cacao!

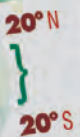
EACH YEAR



about 6 million cacao farmers in the world, and about 50 million people depend on cocoa to support themselves and their families.



the area planted in cocoa



Cacao grows only in the tropics, in Latin America, Africa and Asia, between 20 degrees north and 20 degrees south latitude.

AROUND **80%** IS CONSUMED IN EUROPE AND NORTH AMERICA



80% of the cocoa is consumed in Europe and North America.

70% of the world's cocoa comes from West Africa, 13% from Latin America and 17% from Asia.



The Swiss consumed the most chocolate in the world.

Grafted trees bear fruit at two or three years of age and sometimes in the first year. A cacao tree grown from seed produces its first fruits at three or four years of age.


Around 1200-1300 fermented and dried cacao beans to make one kilo of unsweetened chocolate paste.

It takes 34 to 37 pods to obtain a kilo of dried cocoa beans.



Cocoa yields per hectare are very variable. For example, if we compare the major cocoa growing regions of the world:

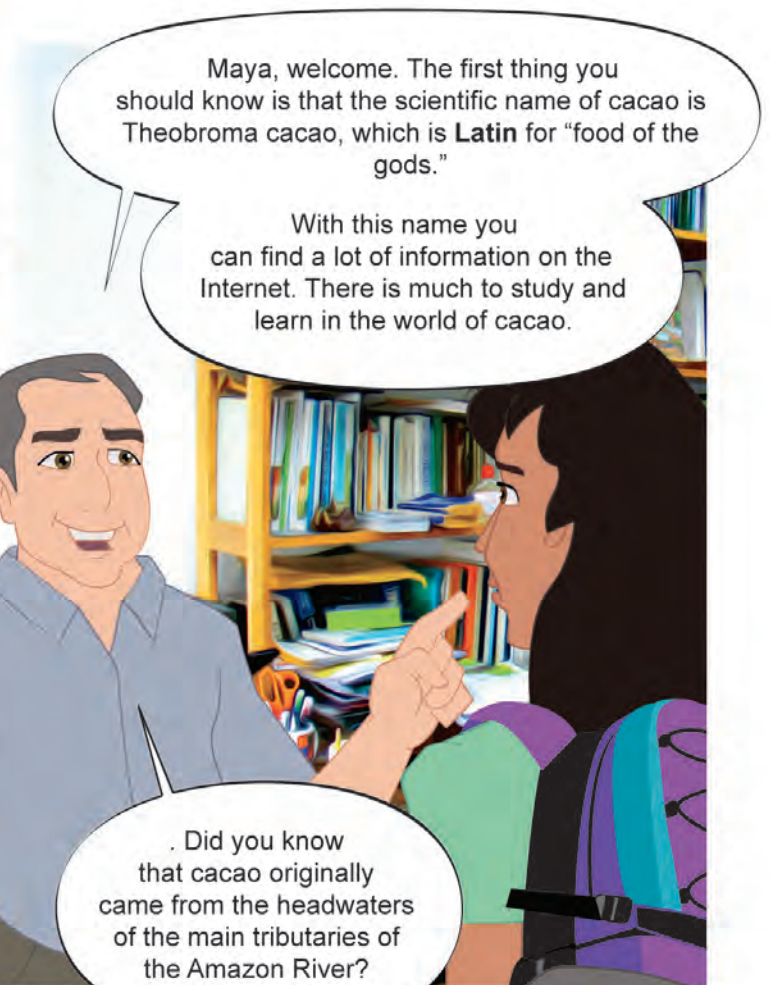




Thank you very much for this information. Now I need to know more about the origin of cacao and how many different types or varieties there are.

I'm going to talk to the experts at CATIE.


Let's visit Harold in his office.



Maya, welcome. The first thing you should know is that the scientific name of cacao is *Theobroma cacao*, which is **Latin** for "food of the gods."

With this name you can find a lot of information on the Internet. There is much to study and learn in the world of cacao.

Did you know that cacao originally came from the headwaters of the main tributaries of the Amazon River?



Do you mean the Amazon forest region at the foot of the Andes Mountains in what is today Peru, Ecuador and Colombia in South America?

Correct.

Cacao grows there in the native forests on the floodplains of the rivers.

It is believed that the indigenous peoples of the Amazon

had cacao trees in their yards, settlements and camps at the edges of the fields where they grew food species. But the native peoples of the Amazon did not know how to produce chocolate.

Yes,

I read that it was the indigenous peoples of Central America and southern Mexico who invented chocolate. How did the Amazon people use cacao if they didn't know about chocolate?

They ate only the white pulp that covers the seeds. It is believed that this pulp was also used to make an alcoholic drink called *chicha*.

Do you think the indigenous people planted cacao trees in their yards, or did they just care for trees that grew naturally?

Good question Maya. We think the indigenous peoples of the Amazon actually

began to domesticate wild cacao. Most likely they collected fruits with large seeds, a lot of sweet pulp and other desirable traits, and seeds from those fruits would have sprouted near their houses.

For many years we thought that there were only three main types of cacao: Criollo, Forastero and Trinitario,

a hybrid between the other two. But recently, scientists have concluded that there are at least 10 **genetic types** of cacao. With more research, this number could increase in the future.

Some of the names of these 10 varieties are the same as the main rivers of the headwaters and tributaries of the Amazon and other regions of America where cacao was domesticated: Marañon, Curaray, Criollo, Iquitos, Nanay, Contamana, Amelonado, Purus, Nacional and Guiana.

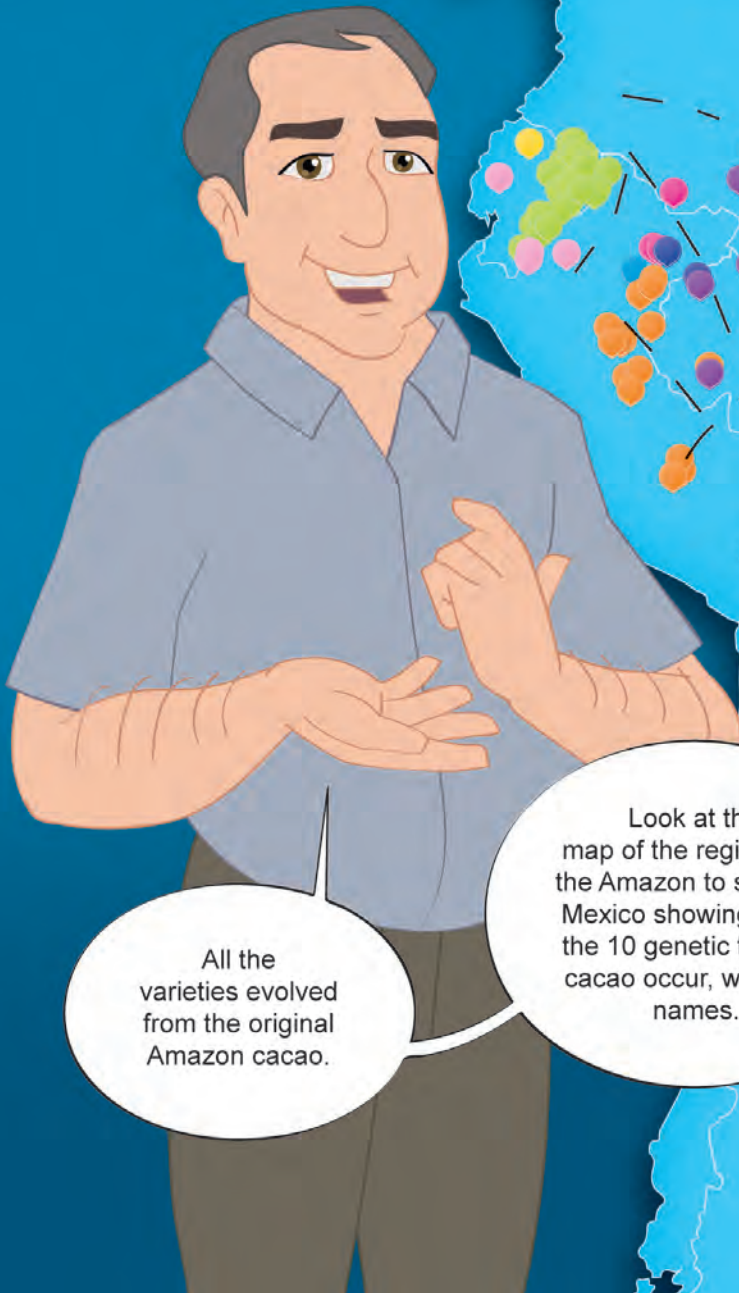
The industry still uses the trade names: Criollo, Trinitario, Nacional Ecuatoriano, Amelonado, Porcelana and others.

Map taken from:
Motamayor 2008

Amelonado
Contamana
Cradle
Curaray
Guiana
Iquitos
Marañon
Nacional
Nanay
Purus

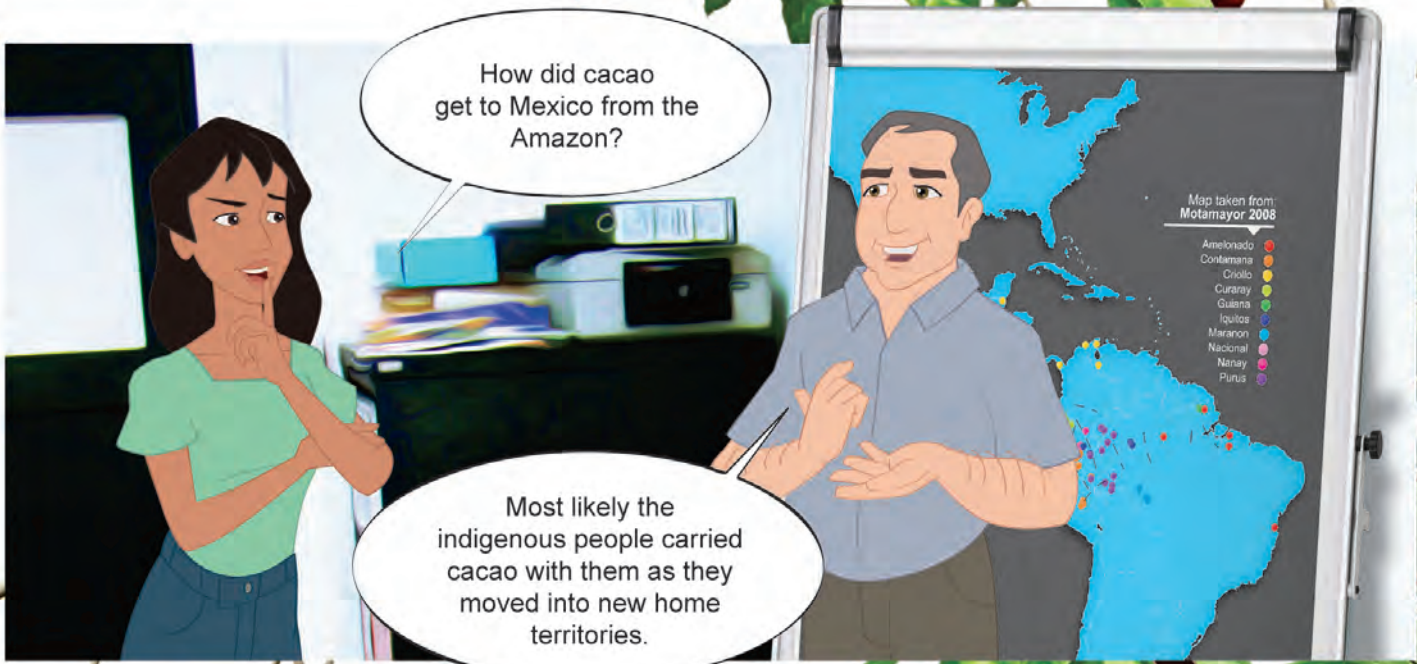
Map taken from:
Motamayor 2008

- Amelonado ●
- Contamana ●
- Criollo ●
- Curaray ●
- Guiana ●
- Iquitos ●
- Maranon ●
- Nacional ●
- Nanay ●
- Purus ●



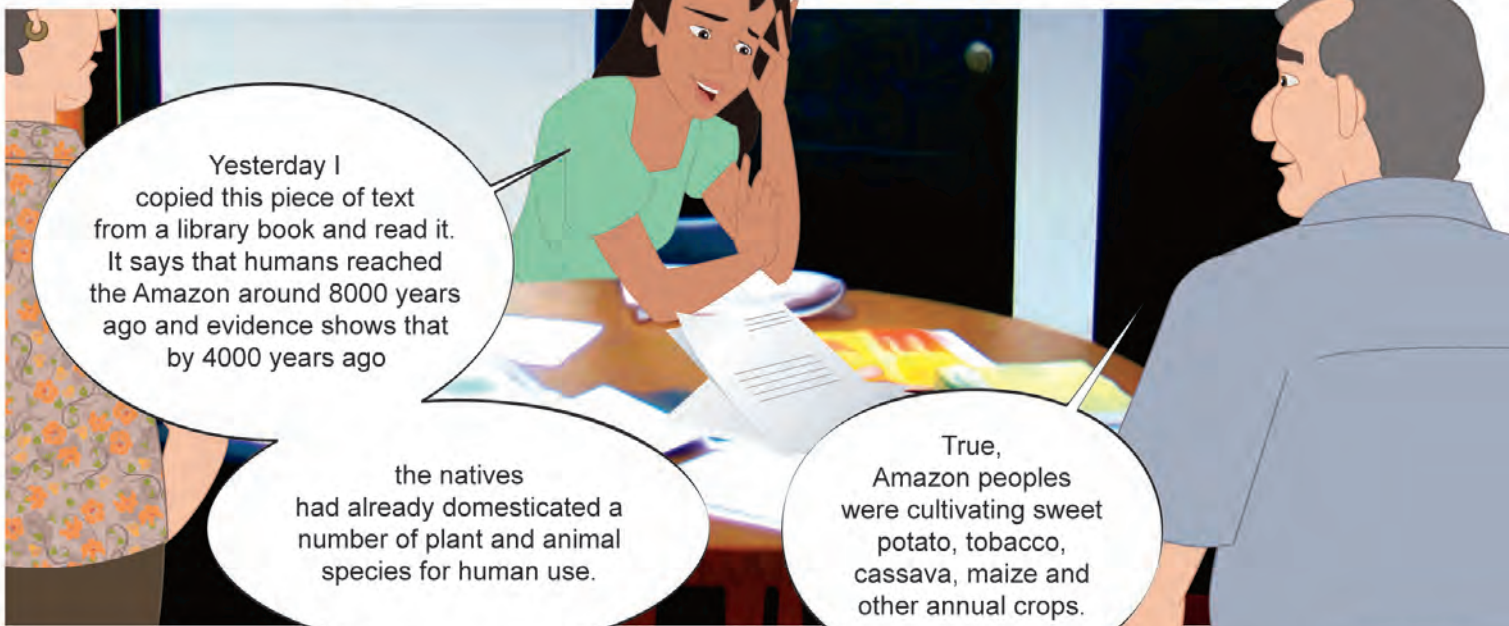
Look at this map of the region from the Amazon to southern Mexico showing where the 10 genetic types of cacao occur, with their names.

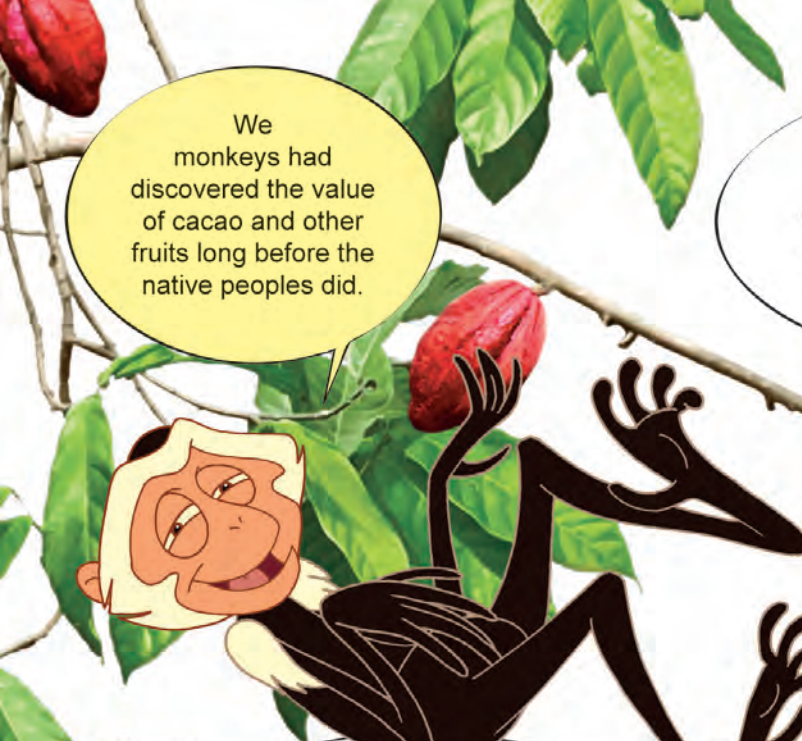
All the varieties evolved from the original Amazon cacao.




People say the apple doesn't fall far from the tree...but the cacao pod travelled a long way from its birthplace... and we animals helped! Listen to this song my grandmother taught me:

*Whenever cacao pods I see,
I pick them up with utmost glee.
The fruits nutritious are most delicious.
So I gulp the pulp and spit the pit.
And that's the way I plant a tree.*






We monkeys had discovered the value of cacao and other fruits long before the native peoples did.



Did you know that Amazon natives were trading with people of the Andes highlands and the Pacific coast, on the other side of the Andes?

I didn't know that.



Hey, don't forget that the Amazon natives were also trading with people living on the Atlantic coast and the Caribbean islands.

And thanks to this trade, Nacional Ecuatoriano cacao was developed on the Pacific coast of Ecuador.

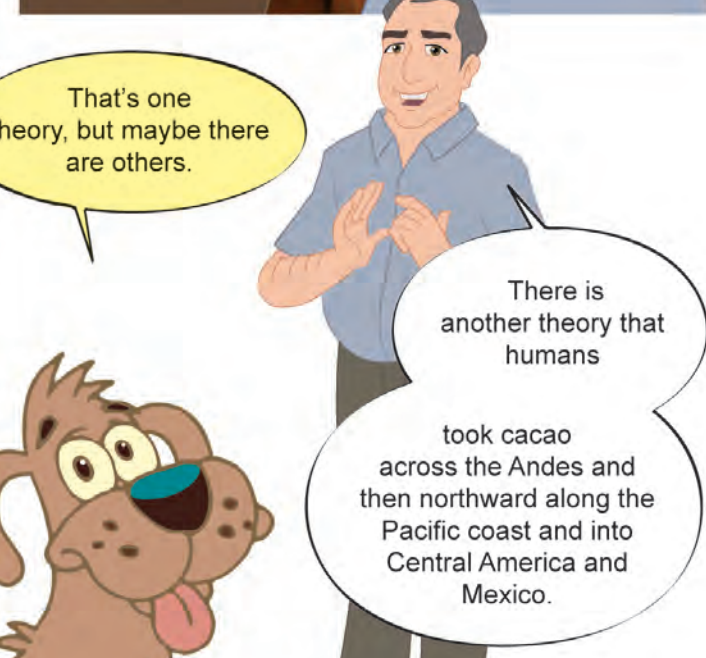
This cacao is highly prized today for its floral aromas.



That's right, Carolina.

One theory is that because of this trade, cacao from the Amazon headwaters reached Venezuela and from there it was taken to Central America and southern Mexico,

where the Criollo variety of cacao was developed. Criollo is the most desired type of cacao because of the quality of its chocolate.



That's one theory, but maybe there are others.

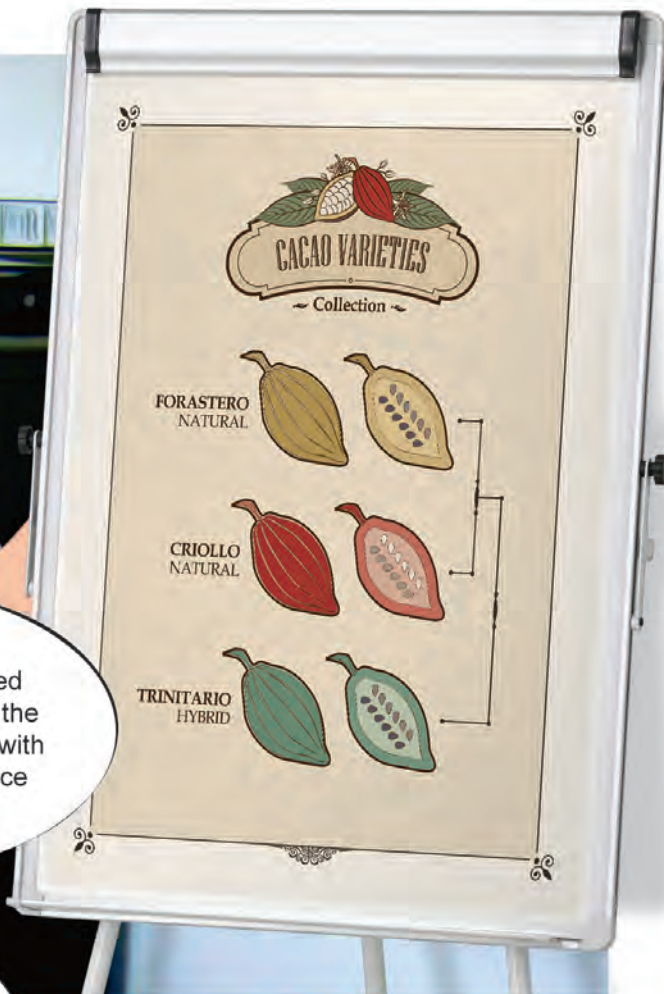
There is another theory that humans

took cacao across the Andes and then northward along the Pacific coast and into Central America and Mexico.

Here's something interesting. On the island of Trinidad, Criollo and Forastero cacaos cross-pollinated naturally, and produced a hybrid cacao that was named Trinitario, to honor the island of Trinidad.

Trinitario cocoa is highly prized because it combines the good flavor of Criollo with the disease resistance of Forastero.

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In Central America and southern Mexico, cacao cultivation and consumption was very important in the life of ancient Mexican indigenous cultures,

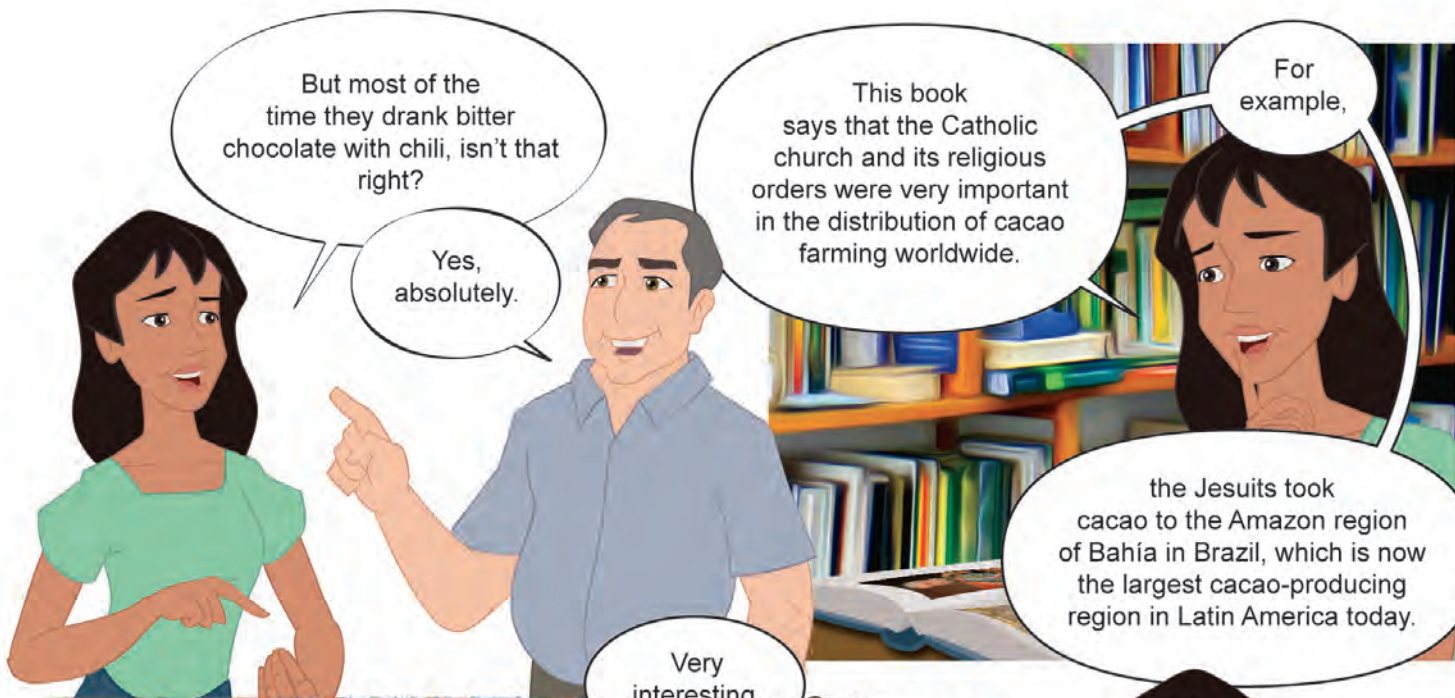
including the Olmec, Maya and Aztec, as I will explain later, Maya.

That's right, Maya.

Thank you, Carolina.

In one of the books I read that when Spanish and Portuguese conquerors reached America, cacao was cultivated from Mexico to Venezuela.

Many indigenous peoples in the Americas consumed cacao, primarily as a drink which they flavored with vanilla, chili peppers, and other seasonings, and sometimes it was sweetened with honey.



But most of the time they drank bitter chocolate with chili, isn't that right?

Yes, absolutely.

This book says that the Catholic church and its religious orders were very important in the distribution of cacao farming worldwide.

For example,

the Jesuits took cacao to the Amazon region of Bahia in Brazil, which is now the largest cacao-producing region in Latin America today.

Very interesting.



I also read that in 1819, King Joao VI of Portugal ordered that cacao be taken from Brazil to the islands of São Tomé and Príncipe, off the west coast of Africa.



Yes, but the colonial powers of Britain and France soon followed and eventually dominated the spread and planting of cacao in West Africa, which now produces more cacao than any other region in the world.

Thanks to you and these books I have learned many things I didn't know.

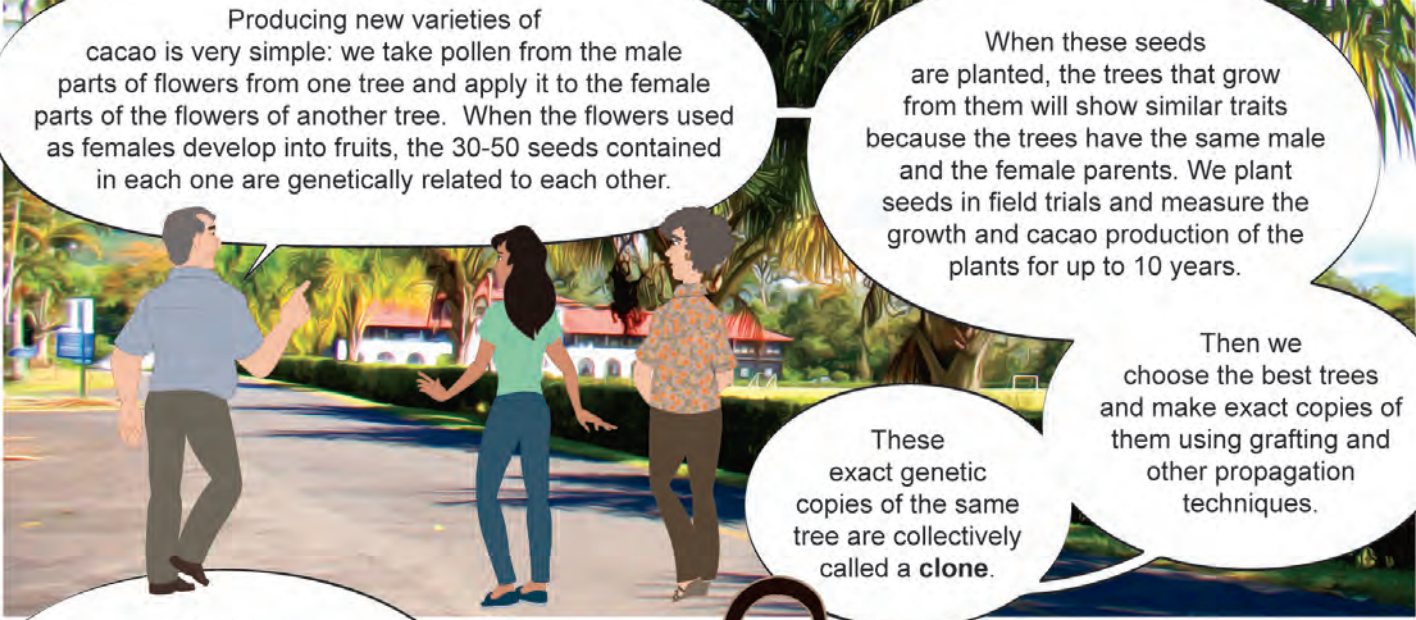
Here at CATIE we have a collection of cacao trees from many populations in the Americas.

With these genetic resources, we can produce new cacao varieties to improve production on farms.

Let's go to the field station where I will show you how we produce these new varieties.



Excellent idea.




Producing new varieties of cacao is very simple: we take pollen from the male parts of flowers from one tree and apply it to the female parts of the flowers of another tree. When the flowers used as females develop into fruits, the 30-50 seeds contained in each one are genetically related to each other.

When these seeds are planted, the trees that grow from them will show similar traits because the trees have the same male and the female parents. We plant seeds in field trials and measure the growth and cacao production of the plants for up to 10 years.

Then we choose the best trees and make exact copies of them using grafting and other propagation techniques.


These exact genetic copies of the same tree are collectively called a **clone**.

I get it. Then you take the best clones to the farmers so they can plant them on their farms and increase their production.




Maya, here you can see some of our best cacao clones. Some have won awards for the excellent flavor of the chocolate they produce. Better flavor,

better value! Like the CATIE R 6 clone.



Yes, of course, that's the idea.



I already tried the award-winning clones and I can assure you that they all have fruit of the highest quality.

There are so many interesting things about the origin of cacao and its varieties. Now I would like to know how indigenous peoples used cacao.

Well Maya,

I think the library is the right place to look for information about that.

Whoa, I never knew there was so much information about ancient peoples who used cacao.

But I'm tired and sleepy from so much reading...

Hi Maya, I was made by the Olmecs, an indigenous people who lived on the southern shore of the Gulf of Mexico 2500-3500 years ago.

Many people believe the Olmecs discovered how to make a chocolate drink from cacao, but, in fact, they learned the technique from an even older indigenous group called the Mocaya,

The scientists analyzed scrapings from the insides of these vessels. The scrapings contained traces of cacao.

How did they reach that conclusion?

Scientists have found ceramic pots almost 4000 years old that the Mocaya used for chocolate.

The Mocaya lived in southern Mexico in what is now Soconusco.

At school we learned that the **Maya** were a people with an advanced civilization, living in the northern part of Central America and southern Mexico.

Did the Maya know about cacao?

Yes, of course. They also made ceramic vessels for serving and drinking chocolate.

Am I not beautiful?

I was made by a Maya craftsman around 500 AD, about 1500 years ago.



Oh, what a beautiful dream I had! A huge stone head and a ceramic pot spoke to me!

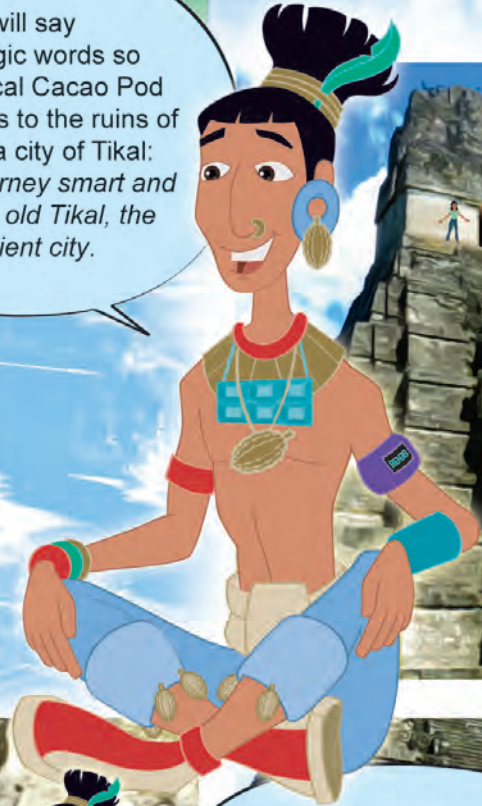
Yes Maya, you were dreaming

Hello. My name is Theo and I have come from the magical world of dreams to help you in your research. Only you can see me.

With my special powers we are going to travel to different places and times. Are you ready?

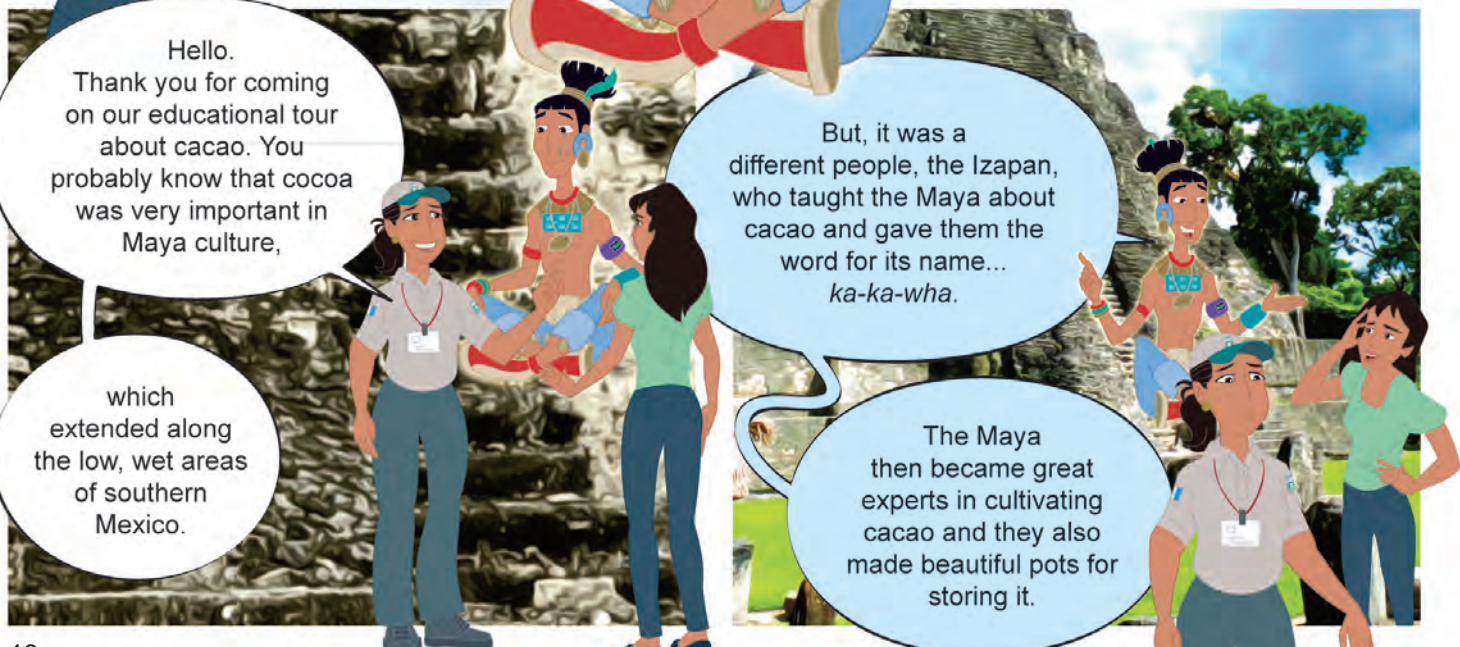
Wahoo! Yes, I'm ready. Thank you, Theo, for helping me to learn more about cacao!

I will say the magic words so the Magical Cacao Pod can take us to the ruins of the Maya city of Tikal: *Take a journey smart and pretty, to old Tikal, the ancient city.*



As you can see, Maya, the Maya built large, complex cities.

They had a sophisticated writing system and even had a symbol for cacao.



Hello. Thank you for coming on our educational tour about cacao. You probably know that cocoa was very important in Maya culture,

which extended along the low, wet areas of southern Mexico.

But, it was a different people, the Izapan, who taught the Maya about cacao and gave them the word for its name... *ka-ka-wha.*

The Maya then became great experts in cultivating cacao and they also made beautiful pots for storing it.



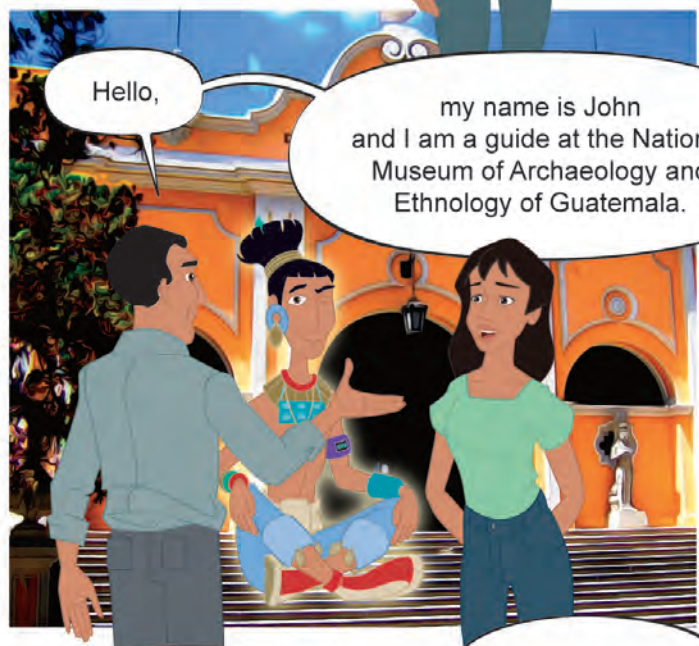
The Maya discovered, amazingly, that they could also grow cacao in old sink-holes, called cenotes, in the very dry areas of the Yucatan. They used cacao in their special celebrations.

I'd like to see more ceramic vessels.

Theo, can we go to a museum where they have a good collection of pots used to prepare and serve cocoa?



Sure: *Magic pod, seize the day. Lift us high and fly away. Our motto now is "carpe diem". Please take us to a good museum.*



Hello,

my name is John and I am a guide at the National Museum of Archaeology and Ethnology of Guatemala.



I will show you our Maya pottery section.



Cacao had special uses and meanings for the Maya and it still does for our indigenous cultures today. According to Maya beliefs, cacao played an important part in the creation of the world.

When the gods created humans,

cacao was one of the foods they provided for human sustenance.

In addition to its importance as a food, people used the cacao seeds as money: 10 for a rabbit, one for a tomato, and so on.





In ceremonies?
How interesting!



Yes Maya,
for example, when wealthy couples wed, each person gave the other five cocoa beans. You know, the Aztecs could not produce cacao themselves because they lived in the highlands of central Mexico where it is too cold for cacao. So they traded for cacao with the Maya and obtained more through taxation.

And perhaps because cacao was so important, it was also used as a special symbol in religious ceremonies, weddings and funerals.



In the Aztec culture in Mexico, only three groups of people were allowed to own cacao: nobles, warriors and *pochtecas*,

the merchants who traveled great distances.

John,
thank you very much, you have answered my questions. So now I feel like having a good cup of chocolate.



Theo, could we return to the CATIE cafeteria?

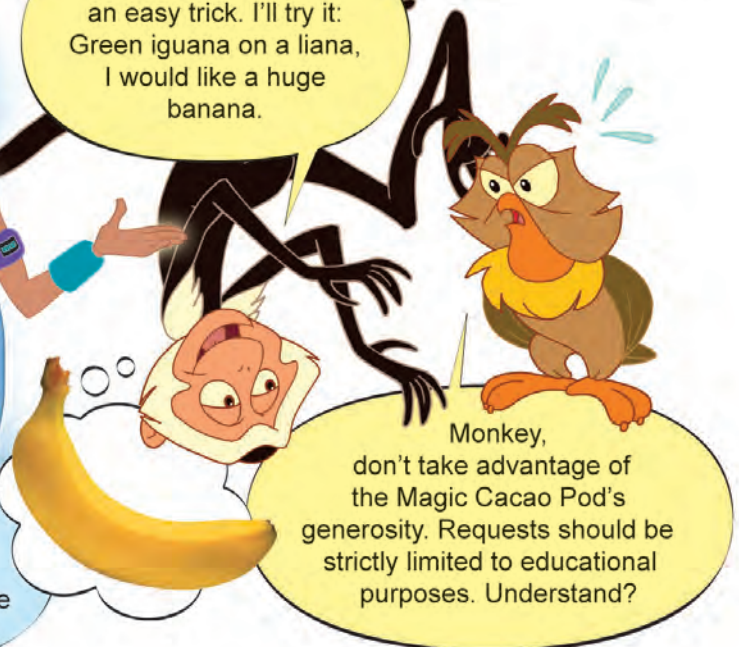


Sure. It's easy, you just have to say a phrase that rhymes with your desire and the Magic Cacao Pod will grant your wish. Watch: Magic Pod – We've done some work;




we're ready to rest, and take the break we like the best. A drink of chocolate in a café. Please take us back to CATIE.

Umm, that's an easy trick. I'll try it: Green iguana on a liana, I would like a huge banana.

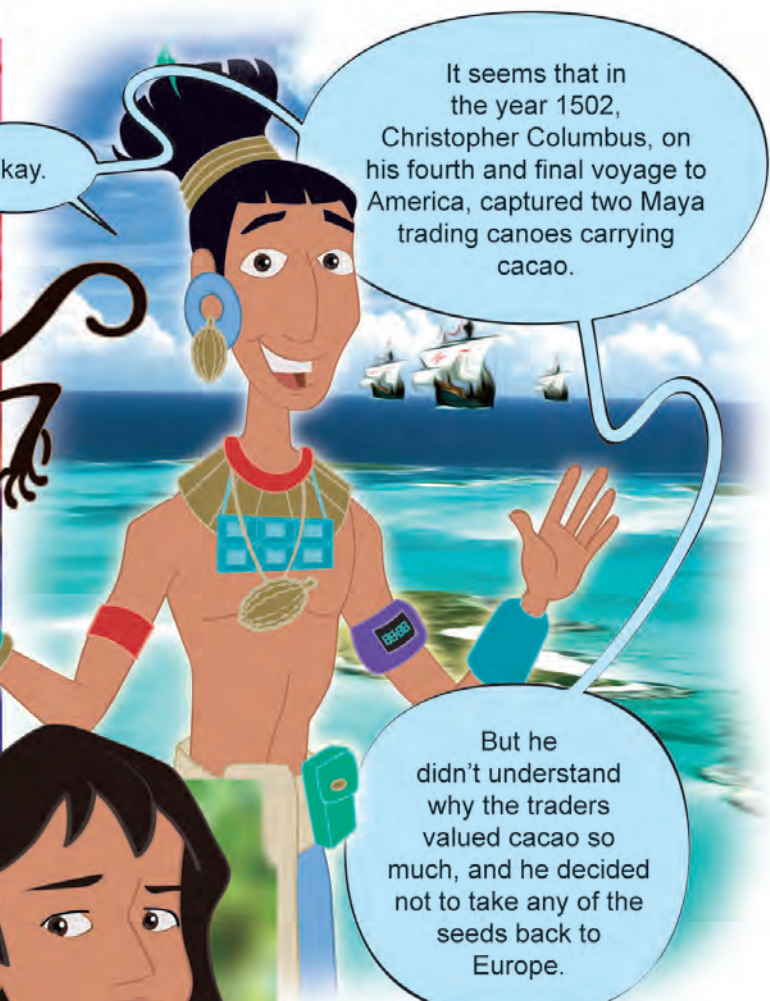


Monkey,
don't take advantage of the Magic Cacao Pod's generosity. Requests should be strictly limited to educational purposes. Understand?




I'm ready now to learn about the history of chocolate.

Okay.

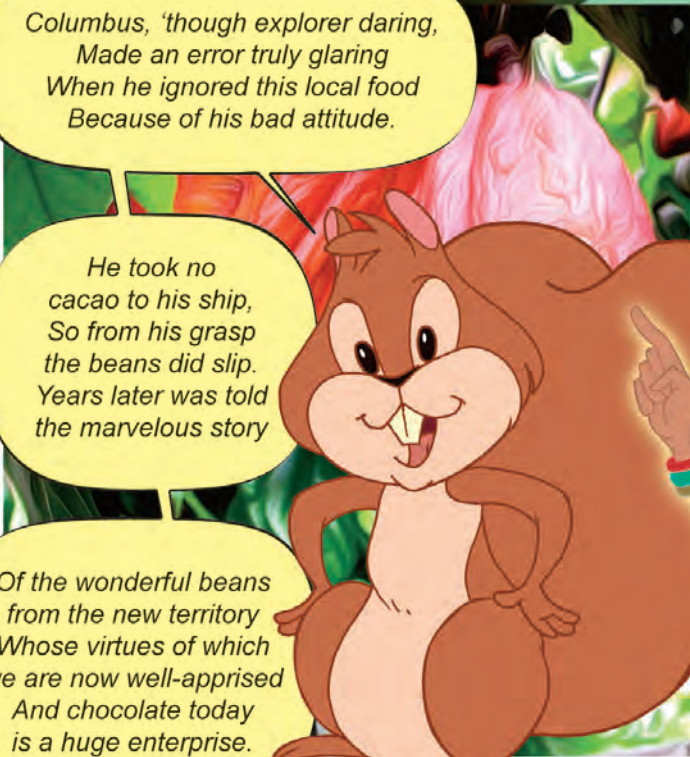


It seems that in the year 1502, Christopher Columbus, on his fourth and final voyage to America, captured two Maya trading canoes carrying cacao.

But he didn't understand why the traders valued cacao so much, and he decided not to take any of the seeds back to Europe.



Columbus died without ever tasting chocolate. Poor man, look what he missed!

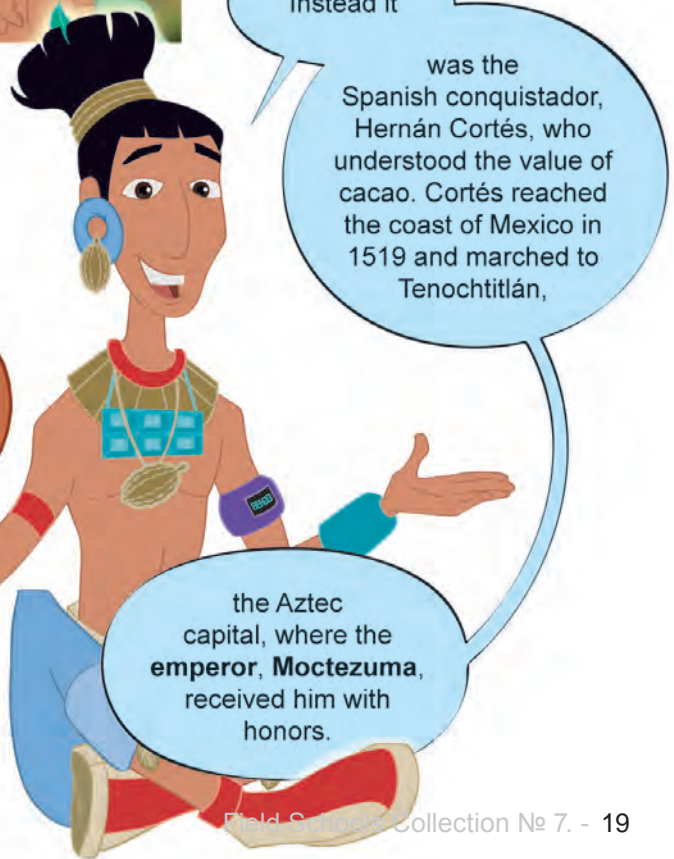


*Columbus, 'though explorer daring,
Made an error truly glaring
When he ignored this local food
Because of his bad attitude.*

*He took no cacao to his ship,
So from his grasp the beans did slip.
Years later was told the marvelous story*

*Of the wonderful beans from the new territory
Whose virtues of which we are now well-apprieved
And chocolate today is a huge enterprise.*

Instead it



was the Spanish conquistador, Hernán Cortés, who understood the value of cacao. Cortés reached the coast of Mexico in 1519 and marched to Tenochtitlán,

the Aztec capital, where the emperor, **Moctezuma**, received him with honors.

How interesting!

Theo, please take me to Mexico to see **Moctezuma's** court.

Alright: *Magic Pod*, We want to travel back in time, When leaders' powers were thought divine.

See spots on a jaguar, but none on a puma, please take us to the court of Moctezuma.

It seems that they used several vessels to prepare the chocolate for Moctezuma.

Theo, look how they pour the chocolate from one vessel to another to make it foamy!

Yes, they drank their chocolate cool and flavored it with chili peppers, flowers and other spices, and sometimes with honey. At first the Spanish did not like the taste of this drink. When Cortés took Moctezuma prisoner and sacked his warehouses,

he found nearly a billion cacao beans. And he wrote about cacao in a letter to the royalty of Spain, referring to cacao as a...

Divine drink which builds up resistance and fights fatigue.

A cup of this precious drink permits a man to walk for a whole day without food...

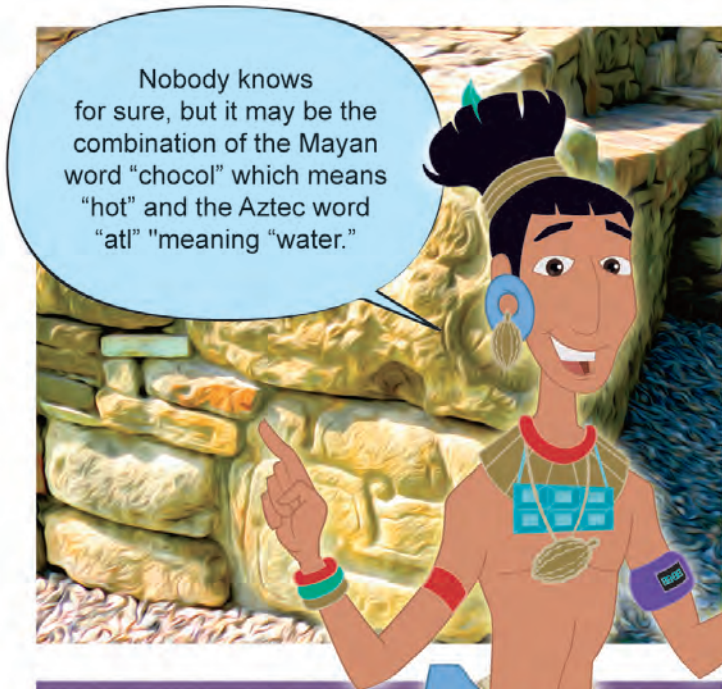
Hernan Cortes

I suppose that, after a while, the Spaniards began to sweeten cocoa with sugar, and then they and other Europeans liked it too.

A smash hit.

Later they added milk and what can I say ... **Chocolate pastries** were born and now we can't live without them.

Where did the word "chocolate" come from?



Nobody knows for sure, but it may be the combination of the Mayan word "chocol" which means "hot" and the Aztec word "atl" meaning "water."



I would like to return to CATIE. Would you let me try the magic words?



Sure, give it a try. You'll see how easy it is.



Take a look at this book. It says the Church was involved in bringing cacao to Spain for the first time... that in 1544 Dominican friars took a delegation of Maya nobles to visit Prince Philip in Spain, and one of their gifts to him was cacao. I'll leave the book here for you to see.

Good morning Maya.

Magic Pod, The Aztec court was rich and fine, with colors bright and high design, But now like a ship that is docked in the bay, let us return to CATIE.



Thanks Carolina. Let's see: the first officially recorded shipment of cocoa from America to Spain occurred in 1585.

Drinking chocolate became a ritual in Spain as it had been in the Maya culture.



Drinking chocolate became a ritual in Spain as it had been in the Maya culture

At first, only the **nobles** had access to chocolate.

In England, however, anyone who could pay the price could drink chocolate.

In Spain, cacao was first used as a medicine and it was thought to be an **aphrodisiac**. But people soon discovered its incredible flavor and began to drink it for its taste. In England, however, anyone who could pay the price could drink chocolate.

El primer lugar donde se elaboró el chocolate fue en el Monasterio de Piedra de Zaragoza, en el pueblo de Nuévalos, España. Los monjes adaptaron el "chocolatl" al paladar Europeo, sustituyendo las especias utilizadas en América, por miel, azúcar y leche. La corte de la bebida durante un siglo, sólo los monjes conocían su preparación y lo utilizaban sobre todo en cuaresma ya que la iglesia consideraba que no rompía el ayuno.

que se daba la fórmula para un medicamento hecho principalmente con chocolate.

En 1644 la Corte de Madrid ordenó que no se vendiera chocolate en ninguna parte como bebida, para evitar que fuese tomado en cualquier sitio o en cualquier momento por la gente, ya que se había convertido en una bebida muy popular; obligando de esta manera a ser vendido como pastillas.

El primer libro donde se habla del chocolate, data del 1631 y fue escrito por un médico cirujano de Écija provincia de Sevilla, en el

A pesar del hermetismo, el chocolate llegó a otros países. A Francia, gracias a la boda entre María Teresa de España y Luis XIV.

In Spain, cacao was first used as a medicine and it was thought to be an **aphrodisiac**. But people soon discovered its incredible flavor and began to drink it for its taste.

Theo, I read that the European **colonists** used slave labor to produce cacao.

See you later, Maya

Slaves were not free people; they were owned by the colonists. I'll ask Carolina for more information.

See you later Theo.

During the 16th and 17th centuries, people in Europe and America wanted more and more cacao but the native Americans who grew it were dying from disease and mistreatment.

The colonists established plantations in Africa, South America and the Caribbean. Black people from Africa were enslaved and taken to work the plantations.

Many people got rich from using this terrible institution.



Maya, come read this on my computer.

Today the chocolate industry is trying to ensure that child labor is not used in cacao farming, that working conditions are suitable and nature is protected.

But it is very difficult to monitor these situations.

There are 218 million child labourers in the world today.

Children do not belong in fields and factories... they belong in school.

We can all do a lot more to end child labour!



Yes, and in many of our families it is customary for children to help with farm tasks,

after they've done their homework.

All of us

can help by buying only chocolate certified to have been made from cacao grown by farmers who do not exploit child labor, do not treat the workers like slaves and who protect nature.

Thanks Carolina. I think I'll go back to my table. I'm going to rest a bit.


There are still some things I would like to know. I wonder how cacao is produced in harmony with nature.

Maybe Theo can help me.

Here I am Maya, I know just where to go. Let's visit some cacao-farming regions in West Africa. *Magical Cacao Pod: Cacao is grown around the globe, in tropical places so I'm told. So I tap my feet and clap my hands. Please take us to West African lands.*




Look, we are in Ghana. Those two farmers are chatting about producing cacao under shade. Let's listen...




Planting cacao under shade protects the soil and allows the cacao trees to live longer.



Yes,




when we plant fruit trees to shade the cacao, they also produce fruits for the family to eat and for food for domestic and wild animals.




We can also plant timber trees,

so that when a special occasion or needs arise, we can cut some trees to use or sell the wood and resolve the situation.

And there is usually enough to sell in the market too!

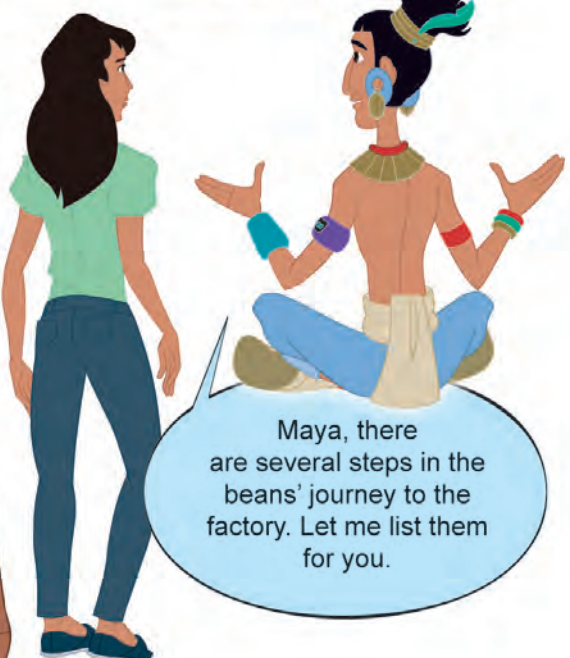


That's good planning!



Theo, I know that once the cacao pods are harvested, the seeds are extracted and fermented and then dried well to prevent mold from forming.

But then how does the cacao get from the farm to the chocolate factory?



Maya, there are several steps in the beans' journey to the factory. Let me list them for you.

THE COCOA BEAN TRAIL FROM THE FARM TO THE CHOCOLATE FACTORY



1

The beans are sold to the exporter

Most individual farmers sell their beans to a middleman, who then sells them to an export company. But farmers with small holdings sometimes organize into cooperatives. They combine the cacao from all their farms so they can get a better price for it.

2

Inspection and repackaging

The exporting company inspects beans, sorts them according to their quality, repackages them and sends them to a warehouse or directly to port.



4

Inspection and importation procedures

When they reach their destination port, the beans are unloaded and taken to a warehouse where they are sampled, inspected by the importer and declared to the customs office.

3

Shipping

The beans are shipped by boat to the countries where they will be processed.



5

Transformation of beans into chocolate

The beans are transported to processing facilities where the next series of steps depend on the type of end product to be manufactured.

Ahh, I am imagining the processing plant ... I can even imagine the smell of the chocolate. Can we visit a chocolate factory?

Very cute, Mr. Dog. *Magic Pod*... Now that we've seen where cacao is grown, We want to go where the process is known.

Of course. We can visit a factory in Switzerland.

Toss me a sausage and give me a kiss... Let's all go to the land of the Swiss...

Of how to make chocolate – it's not with a kiss, Please take us now to the land of the Swiss.

Good morning. Welcome and thank you for visiting us. My name is Hans.

Hello Hans.

I have come to learn how cocoa beans are processed to make chocolate and other cocoa products.

Of course, I'll be happy to explain this as we tour the factory. This way, please...

Processing chocolate

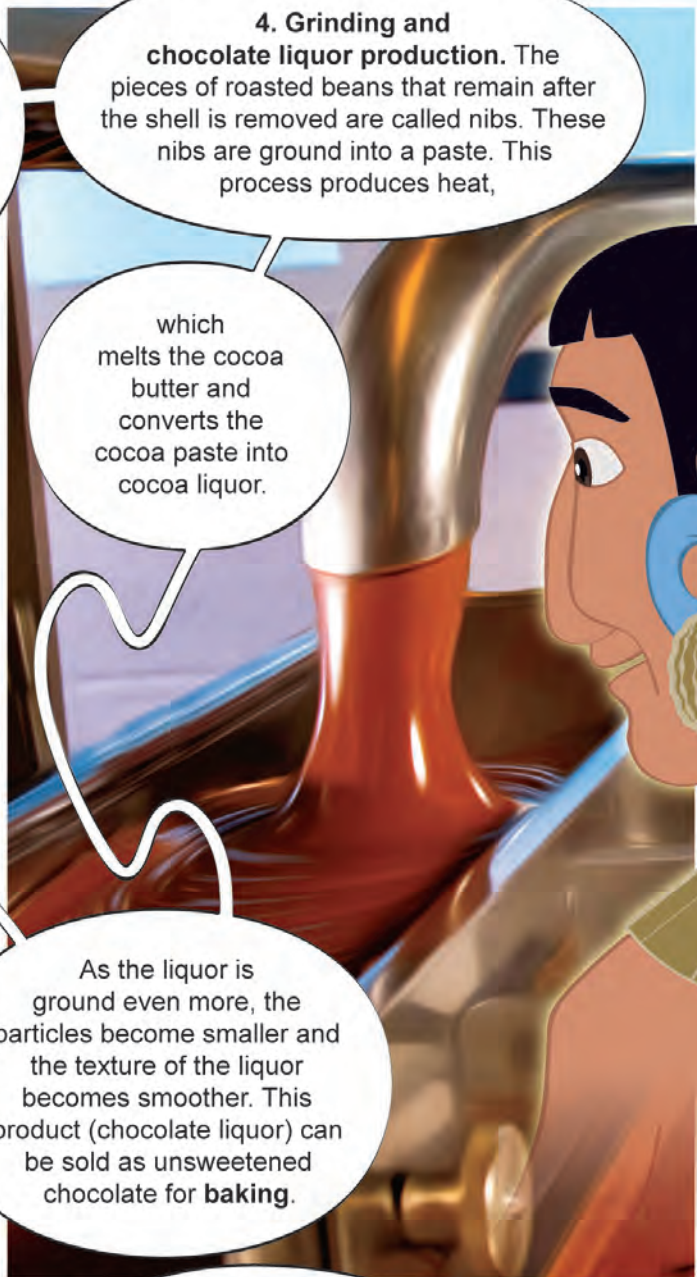
1. Inspection and cleaning.
The first thing we do is to carefully inspect and thoroughly clean the beans,

removing debris, such as sticks, stones and broken beans.

2. Shelling.
Once the beans are cleaned, we can either roast them and then remove their shells, or, we can remove the shells first and then roast. We use different machines for each operation.



3. Roasting.
Cocoa beans can be roasted in different ways, using intense heat for a short time for a more intense flavor, or low heat for a longer time, to enhance more delicate aromas and flavors.



4. Grinding and chocolate liquor production. The pieces of roasted beans that remain after the shell is removed are called nibs. These nibs are ground into a paste. This process produces heat,

which melts the cocoa butter and converts the cocoa paste into cocoa liquor.

As the liquor is ground even more, the particles become smaller and the texture of the liquor becomes smoother. This product (chocolate liquor) can be sold as unsweetened chocolate for **baking**.



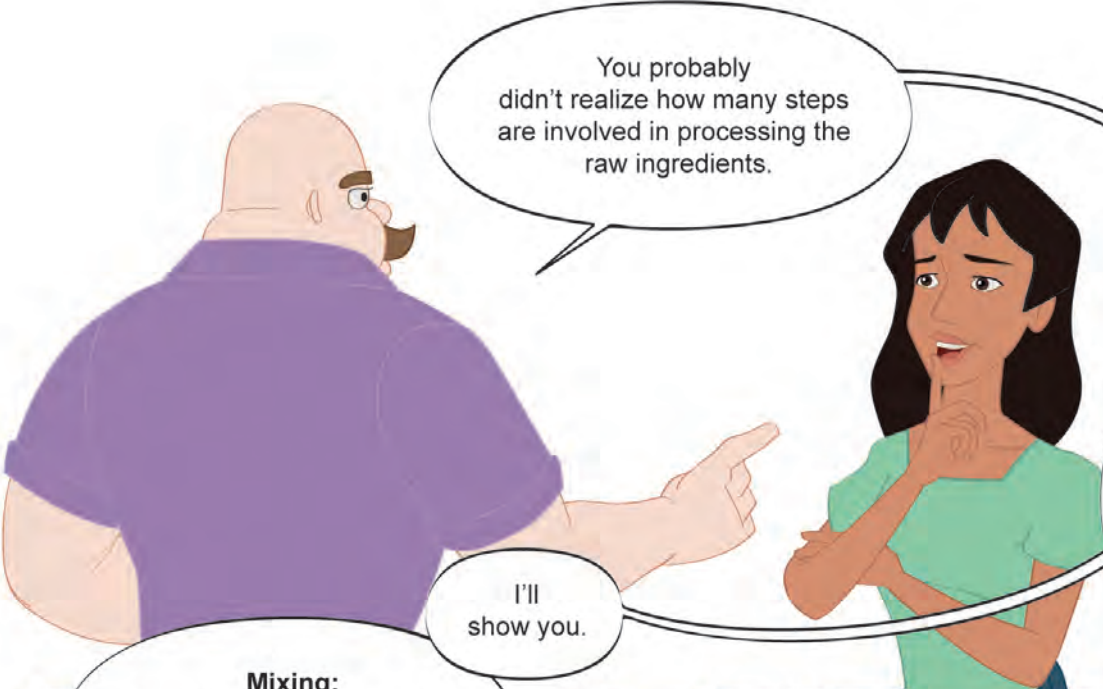
5. Blends.
Manufacturers often use mixtures of cocoa from different sources in their final products. This way they make their own chocolate recipes.




The solid material remaining after the cocoa butter has been removed can be separated into smaller batches

6. Pressing and extraction of cocoa butter. About half the weight of the roasted and shelled bean is a special a very valuable fat called cocoa butter. **Hydraulic presses** are used to extract the cocoa butter from the chocolate liquor.

and ground into a fine powder, which is called cocoa. This is the main ingredient of chocolate.



You probably didn't realize how many steps are involved in processing the raw ingredients.



And, to make chocolate, even more steps are required. The processes that are used depend on what we want the final product to be.

I'll show you.

Mixing:
To make bitter chocolate we combine chocolate liquor, cocoa butter and sugar until they are well mixed.

A: Refining
To make a smoother chocolate, the mixture is refined by pressing it with heavy rollers until a smooth paste is formed. This process reduces the size of the chocolate particles.

B: Conching
The chocolate flavor and texture are improved by the continuing kneading and churning of the mixture to polish the chocolate particles.

At this point flavors such as vanilla and emulsifiers, such as lecithin, can be added.

This process is called conching. The kneading time can last from a few hours up to seven days.

Emulsifiers help keep the ingredients from separating. To make milk chocolate, we add condensed or powdered milk. The proportions depend on the type of chocolate we want to produce.

The longer the conching process, the smoother the chocolate.

C: Tempering

After conching, the mixture is alternately heated and cooled to the appropriate temperature, so that it forms some very specific kinds of crystals.

This is a delicate process that eventually produces the shiny and beautiful chocolate that breaks into pieces with a little snap and melts in your mouth with the luxurious texture that people love.

D: Molding and extraction

The last steps consist of carefully pouring this viscous, Molding and extraction: The last steps consist of carefully pouring this viscous, perfectly textured liquid into molds, and cooling

them to form chocolate bars. Or the chocolate can be used for fillings or coatings.

E: Packaging

Of course, each company has its own style of packaging and marketing for the product, which helps us recognize the brand.



Wow, I didn't realize how much had to be done in making chocolate or the care that must be taken with every step!

That's right, Maya.

Producing excellent quality chocolate is as much an art as a technical process.

Of course, we know that there are many varieties of chocolate, which can also be distinguished by the amount of cocoa they contain.



Hans, Mmmm...

Can you become addicted to chocolate, or is that a myth? Is chocolate an aphrodisiac or does it cause people to fall in love?

Does chocolate have any medicinal effects or not?

Here I have a poster that will help answer those interesting questions, Maya.

Let's first look at addiction.



SOME PEOPLE SAY THEY ARE ADDICTED TO CHOCOLATE AND THEY JOKINGLY CALL THEMSELVES 'CHOCOHOOLICS'. BUT, THAT'S NOT REALLY TRUE. RESEARCH HAS SHOWN THAT ALTHOUGH THERE ARE PEOPLE WHO EAT A LOT OF CHOCOLATE AND ENJOY IT IN A BIG WAY, THEY ARE NOT ADDICTED TO IT.



Sexual stimulant? Some people think so. Chocolate has become a symbol for love on Valentine's Day. But there is no evidence that chocolate increases sexual desire.

Cacao contains natural substances that improve mood in people, so it is possible that its relaxing effects have been misinterpreted.

Is chocolate a medicine? In the beginning, Europeans used it as a medicine to help gain weight, fight fatigue and to treat digestive problems and constipation.

We now know that cacao contains more than 500 natural chemicals and it is believed that eating moderate amounts of dark chocolate is good for health.



And cocoa butter is good for the skin. I sometimes buy a stick of cocoa butter to rub on my lips and make them soft.



I have also heard stories that chocolate is not good for health.



For example, there are doctors who advise teenagers not to eat chocolate because it causes **acne** and weight gain. But I know young people who eat chocolate and have clean skin and slender figures. What's the truth here?



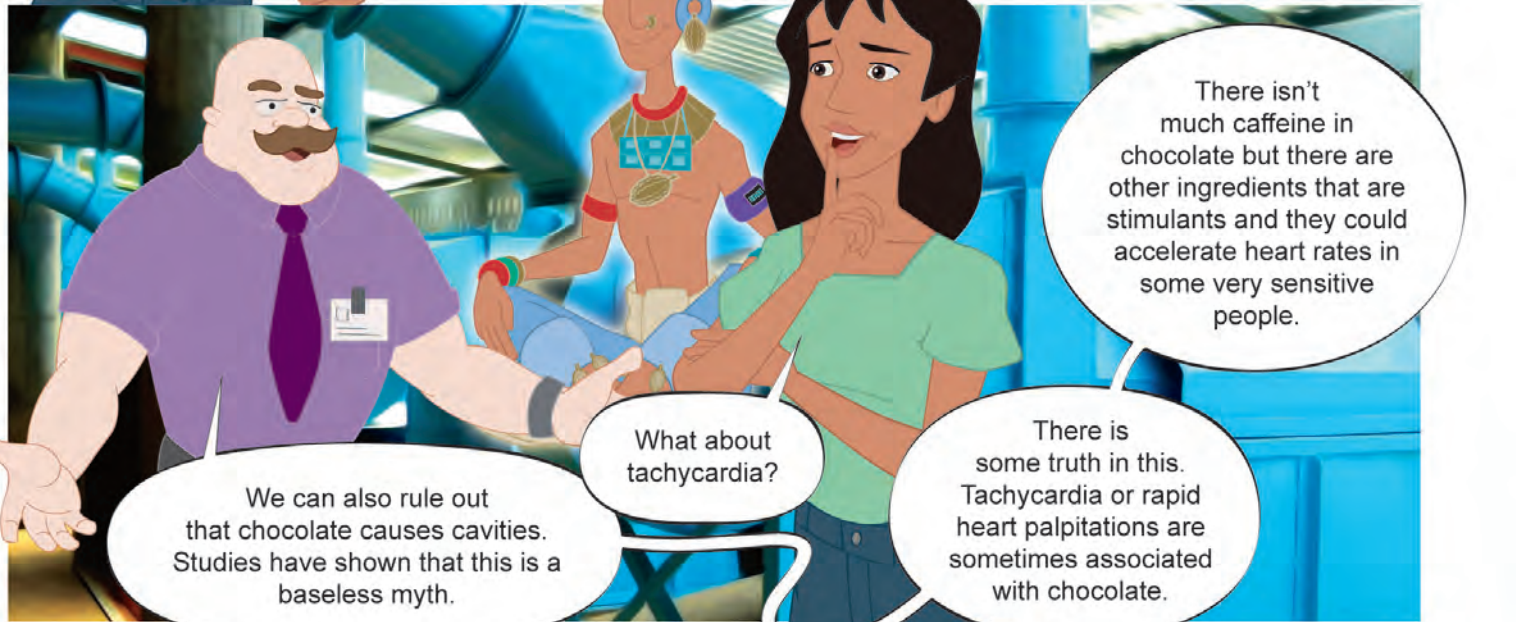
Oh, there are so many myths about chocolate.

We are talking about chocolate with more than 60% cocoa, which does not have many other ingredients like sugar and fat. Acne: although many studies have been done, no link has been found between chocolate and acne.

Acne is caused by **hormonal** changes in both men and women, and not by what they eat.

I read that some people are allergic to chocolate, but this is rare.

Chocolate would be yummy but it isn't good for us because we dogs can't digest it.



There isn't much caffeine in chocolate but there are other ingredients that are stimulants and they could accelerate heart rates in some very sensitive people.

We can also rule out that chocolate causes cavities. Studies have shown that this is a baseless myth.

What about tachycardia?

There is some truth in this. Tachycardia or rapid heart palpitations are sometimes associated with chocolate.



Nor is there any evidence that chocolate causes migraines.

Another myth is the one about obesity.

What makes us fat is eating lots of calories!

You should eat moderate amounts of chocolate that has a high cocoa content because this has fewer calories.



*Myths about chocolate are common
So don't believe all that they say
But I must emphasize it would be very wise
To enjoy this sweet treat every day!*



Well,

to finish the tour, let's try a delicious chocolate and corn-based gruel that the Aztecs used as a sacred beverage in some rituals and ceremonies. It's called Champurrado

and it is very easy to make. Here's the recipe...

Champurrado

For 8 servings

Ingredients:

- 1 ½ liters of milk
- ½ liter of water
- 110 grams of dark chocolate or homemade chocolate
- 25 grams of brown sugar
- 1 cinnamon stick
- ¾ cup of cornmeal

How to prepare:

- In a saucepan, boil water, cinnamon and brown sugar until the sugar dissolves.
- Mix the cornmeal with the liter of milk and add the boiling water to it.
- Then add the remaining milk and chocolate. Boil over low heat until the chocolate melts.
- Stir constantly, taking care not to burn your Champurrado.



Mmm... sounds wonderful.

I think we can make this beverage for the tourists who will come to tour our farm.

Thank you for your help, Hans. I think we'll be very successful with our ecological chocolate tour.

Till next time, Maya.

Well, Theo, I think it's time to return to CATIE. I found what I came to learn. Thanks for being my guide on this wonderful trip.

We'll get you back to CATIE with the Magical Cacao Pod: Weekend and weekday, work hard and then play, take us back to CATIE.

Well, I finished my research...



but I know I will never finish learning about cacao. Now I should print out several illustrations and the recipe before I go home.



Back at home...

Mom, Dad, Emilio, look what I brought.

We are going to share many interesting things about cacao with the tourists. I'm sure they will like our farm.

Welcome to our farm and our chocolate tour.

We have nice surprises for you.

Please, come this way...



Websites

<http://www.icco.org/>
<http://www.worldcocoafoundation.org/>

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Jacobsen, R. 2003. *Chocolate Unwrapped*. Invisible Cities Press. Montpelier, Vermont. 126 p.
Coe, S.D. and M.D. Coe 2007. *The True History of Chocolate*, Second Edition. Thames & Hudson Ltd. London. 280 p.
Motamayor JC, Lachenaud P, da Silva e Motta JW, Loo R, Kuhn DN, et al. 2008. Geographic and genetic population differentiation of the Amazonian chocolate tree (*Theobroma cacao* L.) *PloS One* 3(10):1-8. 2008. e3311. doi:10.1371/journal.pone.0003311.

Some chocolate museums of Europe:

Belgium
<http://www.choco-story.be/>
France
<http://www.cluizel.com/>
Germany
<http://www.schokoladenmuseum.de>
Holland
<http://www.dechocoladefabriek.nl/>
Spain
<http://pastisseria.cat/ct/PortadaMuseu>
United States
<http://www.hersheystory.org/>
Traveling exhibit
<http://www.fmnh.org/chocolate/tour.html>

Glossary

Acne: Acne is the name for certain skin rashes, especially on the face, which are more common in adolescence: Individual eruptions are also called “zits” (colloquial) or “pimples.”

Alkaline: An alkaline substance is one that counters the effect of an acidic substance.

Aphrodisiac: The name for a food or beverage that is believed to increase sexual desire in people.

Aztec: The Aztecs lived in central Mexico and developed an advanced civilization whose capital was Tenochtitlan, located in what is now the Federal District, until the arrival of the Spanish in America.

Cacao: In this book, “cacao” is used to refer to the *Theobroma cacao* plant (tree) and its parts, including the pods, and the raw seeds through fermentation and drying: Once roasted or otherwise processed, the seeds and its products are referred to as cocoa or chocolate.

Chocolate: Generally refers to products of roasted and ground cacao seeds (beans), and usually, but not always sweetened and intended for eating or drinking.

Clones: Genetic copies of plants (or animals) that are generated asexually: For plants, clones are created by grafting or rooting cuttings or using other vegetative propagation techniques.

Cocoa: In this book, cocoa refers to the powder that remains after the fat (cocoa butter) has been removed from roasted ground cacao seeds (beans): Elsewhere,

the term cocoa may refer to a broader range of products made from the roasted seeds, including what Americans call “cacao” and “chocolate.”

Cocoa liquor: Refers to the viscous liquid that results when cocoa seeds are ground.

Colonists: Colonists are human groups that reach other lands to settle them, imposing their customs and laws there. **Cosmetics industry:** The industry that produces creams, perfumes and other products to improve the appearance of skin and hair.

Emperor: An emperor is the person who has the most power to rule an empire: An empire is like a kingdom and an emperor is like a king, but an empire, in contrast with a kingdom, is always expanding and seeking to conquer new peoples.

Hormones: Substances that travel through the blood and help regulate body
Genetic types: Groups of individuals that share similar genetically determined traits: Scientists have determined that native populations of cacao encompass at least 10 genetic types, but more intense sampling may reveal additional types functions.

Hydraulic press: A press is a device used to exert great pressure or thrust: In most presses, a liquid, such as oil or a gas, is used to create hydraulic pressure:

Latin: Ancient language spoken by the Romans more than two thousand years ago: Currently used for scientific names of plants and animals.

Latitude: A measure of the distance of a country from the Earth's equator: Latitude is measured in degrees.

Migraine: Discomfort that manifests as a headache or blurred vision often accompanied by nausea and sensitivity to light: The exact causes of migraines are not known: Some people get migraines frequently and others never get them: Migraines can be triggered by some foods, stress and changes in weather.

Moctezuma: The name of the Aztec emperor who ruled at the time the Spanish arrived in Mexico.

Mole: A sauce invented in Mexico, made from chocolate, chili peppers and other ingredients.

Nobles: In Europe, nobles were people such as kings and their relatives or those who had received certain titles or privileges granted by the king: Princes, marquises and earls are examples of nobles.

Pastries: Sweet baked goods made from dough, shortening and other ingredients: They are often served with coffee, tea or chocolate.

Sustainable: Saying that something is sustainable means that it can be maintained for a long time: Producing cacao sustainably means not destroying or exhausting the soils, water sources and other natural resources, so that the farm can keep producing for many generations.

Tachycardia: Faster than normal heart rate.