

WE COULDN'T MAKE CHOCOLATE WITHOUT MONKEYS

[Note to editor: Two cartoon-y characters (possibly bookworms) appear throughout the book. Character 1 is disbelieving and has lots of questions. Character 2 is the voice of reason. In a fun, light-hearted way, they add context and reinforce concepts.]

Character 1: That's the craziest title I ever heard! Who wrote this book, anyway?

Character 2: Look, up there. It says the authors are Melissa Stewart and Allen Young. Maybe they know what they're talking about. Let's read the book and find out.

Character 1: Well, okay.

Pages 2-3

Chocolate chip cookies.

Chocolate ice cream.

Moist, fudgy brownies.

What makes all these foods so delicious? Chocolate, of course.

But we couldn't make chocolate without . . .

Character 1: Hey, this book is making me hungry. I need a snack.

Character 2: But we just started reading.

Character 1: I'll be back in a flash – before you even turn the page.

Pages 4-5

. . . cocoa beans.

SIDEBAR

Cocoa beans are the seeds of the cocoa tree. Cocoa trees grow naturally in the tropical rainforests of Central and South America. But today farmers grow them in other tropical areas, too.

Character 1: There's a bunch of beans in my chocolate bar? That's ridiculous.

Character 2: Wait, it's true. I read about it in another book. After cocoa beans dry in the sun, workers roast them in an oven. Then a machine mashes them into a thick paste. Then another machine presses all the liquid out of the paste, leaving behind cocoa powder. Finally, the cocoa powder is mixed with sugar, vanilla, and a few other ingredients.

Character 1: You're such a bookworm.

Character 2: It takes one to know one.

Pages 6-7

And cocoa beans only grow inside cocoa pods.

SIDEBAR

Cocoa pods are the fruits of the cocoa tree. They look like small, lumpy footballs. Inside each pod, white, gooey pulp surrounds thirty to forty cocoa beans — just enough for one candy bar.

Character 1: Is a cocoa pod like an i-pod?

Character 2: Very funny. No, it's more like a peapod.

Character 1: Oh yeah, I've seen those in cookbooks.

Pages 8-9

Cocoa pods can't form without cocoa flowers . . .

SIDEBAR

When pollen from one cocoa flower lands on another cocoa flower, a tiny tube opens up. Sperm cells inside the pollen travel down the tube. They fuse with material deep inside the flower, and a pod begins to grow.

Character 1: I love flowers!

Character 2: Shhh! Be quiet. I'm trying to read.

Pages 10-11

. . . and midges.

SIDEBAR

Before a female midge can lay her eggs, the little insect needs a hearty meal of rich, nutritious cocoa pollen. To find food, she crawls deep inside a cocoa blossom. As the midge climbs out, pollen sticks to her body. When she lands on another cocoa flower, some of the pollen falls off. Cocoa flowers use the pollen to make pods with seeds inside.

Character 1: So we couldn't make chocolate without midges?

Character 2: Nope, those itty-bitty bugs carry pollen from one cocoa flower to another.

Pages 12-13

Cocoa flowers can't bloom without cocoa leaves . . .

SIDEBAR

As cocoa leaves soak up sunlight, they make sugar. And that sugar gives the tree all the energy it needs to live and grow and make flowers.

Character 1: I love flowers!

Character 2: Is there an echo in this book?

Pages 14-15

. . . and maggots.

SIDEBAR

As soon as leaf-cutter ants spot tender, new leaves on a cocoa tree, the little insects race to reach them. While the hard-working ants carve up leaves and carry them away, female coffin flies land on their heads and lay eggs. When the eggs hatch, tiny maggots wriggle out, burrow into the ants' heads, and eat their brains.

Character 1: Maggots? That's disgusting!

Character 2: Maybe, but it looks like we couldn't make chocolate without them. They attack the ants that destroy cocoa leaves.

Pages 16-17

Cocoa leaves can't survive without cocoa roots . . .

SIDEBAR

A cocoa tree needs more than food to survive. It also needs water and minerals. The

tree's roots absorb, or take in, water and minerals from the soil. They also hold the tree in place.

Character 2: Now we're really getting to the root of things.

Character 1: Is that supposed to be funny?

Pages 18-19

. . . and fungi.

SIDEBAR

The minerals in soil come from the bodies of dead plants and animals. Fungi living in the soil and on the cocoa tree's roots break down the dead bodies and release the minerals. Fungi digest some of the minerals, but the rest can be absorbed by the cocoa tree's roots.

Character 1: Good thing there's fungus among us.

Character 2: You bet! Fungi supply the minerals cocoa leaves need to grow

Character 1: I never knew we depended on so many different creatures to make chocolate.

Character 2: Amazing, isn't it.

Pages 20-21

Cocoa roots can't grow without cocoa stems . . .

SIDEBAR

A cocoa tree's stems give it support. They also transport food, minerals, and water. A

cocoa tree's trunk is a thick central stem made of wood. Its branches are smaller woody stems. The tree's smallest stems are soft and green. They connect leaves to branches.

Character 1: I thought this book was supposed to be about monkeys.

Character 2: Well, we aren't done yet. They must be coming.

Pages 22-23

. . . and lizards.

SIDEBAR

Aphids jab holes in a cocoa tree's soft, green stems and suck up sugary juices. But a hungry anolis lizard is close by. It skitters along the tree's branches, catching aphids and other insects.

Character 1: You mean we couldn't make chocolate without the lizards, either?

Character 2: Sounds like they eat the insects that harm cocoa stems.

Character 1: Okay, okay, but what about the monkeys?

Character 2: Why are you always so impatient?

Pages 24-25

Cocoa leaves, roots, and stems can only grow from cocoa seeds . . .

SIDEBAR

If a cocoa seed lands in just the right place, a tiny root pushes down into the soil. Then a slender shoot stretches up toward the sky. As time passes, the little seedling grows into

a tree. When it is about five years old, the cocoa tree begins producing flowers and fruit. Some cocoa trees live up to sixty years.

Character 1: But wait, aren't cocoa seeds the same things as cocoa beans?

Character 2: Yeah, so what?

Character 1: I thought we made cocoa beans into chocolate.

Character 2: Not all of them. There are still plenty left to grow new trees.

Character 1: Are you sure?

Character 2: Sure, I'm sure.

Pages 26-27

... spread by monkeys.

SIDEBAR

Monkeys yank pods off cocoa trees, gnaw holes in the fruits, and pull out the sticky insides. As the monkeys swing through the trees, they suck on the lemony-lime pulp and spit out the seeds.

Cocoa pods never fall off cocoa trees. If monkeys, squirrels, bats, and other small mammals didn't scatter the seeds on the ground, no new trees could grow.

Character 1: Finally, the monkeys! I guess we really couldn't make chocolate without them.

Character 2: See, I told you the authors knew what they were talking about.

Pages 28-29

Monkeys and midges, lizards and fungi all depend on the tropical rainforests they call home. But these special woodlands are in trouble.

SIDEBAR

In the last 30 years, more than 40 percent of the world's tropical rainforests have been destroyed. People have cut down the trees and sold the wood. They have burned the land so they can raise cattle. As the forests disappear, so do the plants and animals that live there.

Character 2: Did you know 100 acres of tropical rainforest are lost every minute?

Character 1: At that rate, they could be all gone in 50 years.

Character 2: Wow, how'd you do that math so fast.

Character 1: Face it, I'm a genius.

Pages 30-31

There are lots of important reasons to save tropical rainforests. One of them is to protect the future of cocoa trees . . .

. . . because we couldn't make chocolate without them.

Character 1: Wow, that was a great book.

Character 2: Yeah, let's read it again.

Character 1: Okay, but let's take a break first. I could use a snack.

Saving Rainforests

Luckily, many people are working to save tropical rainforests and the creatures that live in them. Even cocoa farmers are getting involved.

On traditional cocoa farms, cocoa trees are planted in neat rows with only a few kinds of trees shading them from the sun. But fewer than 5 percent of all cocoa flowers produce cocoa pods. Some scientists and farmers wondered if there was a better way to grow cocoa.

Working together, they discovered that cocoa trees produce more pods when they grow in patches of thinned-out rainforest, where many kinds of trees provide shade. These cocoa groves are the perfect home for midges, coffin flies, and other insects. And they're a great place for monkeys, squirrels, and bats to find temporary food and shelter. This new way of growing cocoa helps protect rainforests and the creatures living in them. It also provides a steady supply of cocoa beans.

What You Can Do to Help Rainforests

- Join a group that's working to protect tropical rainforest.
- Work with people at your school to raise money to buy rainforest land.
- Write an article about tropical rainforests for your school newspaper.