

THE SASSAFRAS SCIENCE ADVENTURES

VOLUME 3: BOTANY



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THE SASSAFRAS SCIENCE ADVENTURES

VOLUME 3: BOTANY {SAMPLE}

Second Printing 2015

(First Printing 2014)

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Printed In USA For World Wide Distribution

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TOPICS COVERED IN THIS VOLUME

The Sassafras Science Adventures Volume 3: Botany covers a variety of biological topics by looking at the following plants:

- Orchid
- Fern
- Peace Lily
- Shelf Fungus
- Rose
- Boxwood
- Moss
- Grass
- Wildflower
- Ombú Tree
- Palm Tree
- Pitcher Plant
- Mold
- Giant Rafflesia
- Dwarf Birch Shrub
- Crocus
- Lichen
- Algae
- Plant Cell
- Photosynthesis
- Chestnut Tree
- Apple Tree
- Sitka Tree
- Cones
- Redwood Tree
- Fly Agaric Mushroom
- Joshua Tree
- Barrel Cactus
- Creosote Bush
- Paddle Cactus
- Plus, 8 of the world's major biomes

DON'T WANT TO DO ALL THE READING?



Check out *The Sassafras Science Adventures Volume 3: Botany* audiobook! Listen to the talented Christine Myrick take you on a journey to the Amazon, Argentina, and France with the Sassafras Twins as they about the variety of plants found around the world.

CHAPTER 1: THE BASICS OF BOTANY

Memories on the Horse Swing

She smiled as the wind whipped gently through her hair. Her upward motion gracefully stalled before back down she went, in the opposite direction. A peaceful smile had found its way to her face, and there was no sign of it leaving any time soon. Tracey Sassafraas gripped the rope tightly, happily kicked out her legs, and continued her relaxing ride on the horse-shaped tire swing.

Her uncle and brother had gone back inside, so she was left alone in the backyard with nothing to do but swing and daydream. She and her twelve-year-old twin, Blaine, had arrived at their Uncle Cecil's doorstep only a couple of weeks before, though it seemed like much longer than that now. They had both failed their science class in school this past year, so their concerned parents had packed them up on a bus and sent them to their uncle's home. The plan was to make Blaine and Tracey spend the duration of their summer break studying science again.

As they stepped off the bus, the twins had resigned themselves to spending the time being bored to tears. They knew their uncle was a bit of an eccentric scientist, but they were sure that even he couldn't make science fun. The twins were shocked to discover that Uncle Cecil had invented invisible zip lines that had the ability to whisk a person to any location on the globe at the speed of light. It was Uncle Cecil's belief that the best way for the kids to learn science was not sitting in a classroom with their heads in a book. Instead, they should be out zipping around the globe experiencing science face-to-face. That is how he believed they would not only learn but also fall in love with science.

All one needed to make these lines work was a specially designed three-ringed carabiner. One ring was set to the desired

longitude coordinate, one ring was set to the latitude coordinate, and the third ring locked the carabiner. With this device, the person was also kept safely connected in the harness to the invisible zip line. When Cecil had first explained all of this to the twins, they had thought their uncle had truly lost his mind. However, they had humored him, put on the harnesses, calibrated their three-ringed carabiners, and zipped across the invisible lines themselves. As irrational as it sounded, it really did work. The twins had spent the past two weeks using the unseen lines to zip to different locations all over the planet studying scientific topics related to zoology and anatomy.

At the start of their zip-lining adventures, they had despised science with a passion. The twins had considered it to be a long list of boring facts, but as they were encountering science face-to-face, their disposition toward it was changing. These days, Blaine and Tracey not only liked science but were also learning to love it.

The only hindrance on their path of increased desire to learn science was a certain mysterious man who had no eyebrows. He had tried to derail their progress at nearly every stop. He had left them marooned in the grasslands of Kenya among deadly predators. He had trapped them in a cobra-infested tomb in Egypt. He had helped cut down a tree out from under them in Peru. He had sabotaged their uncle's computer—sending the twins zipping off on the invisible zip lines to two different countries. He had chased them using a disappearing magician's suit and cape. Plus, Tracey was pretty sure he was the one who had trapped her and Blaine inside a couple of virtually indestructible, soundproof boxes, which had almost caused them to be buried alive. In fact, Tracey had her suspicions that this man was always lurking around, causing problems that she and Blaine weren't even aware of.

Tracey shuddered on the swing as she pictured his scowling face. Her frown disappeared in a flash of joy and confidence as she remembered that the Man with No Eyebrows hadn't stopped them yet! She was bound and determined to keep moving forward to learn

science, and she knew that Blaine felt the same way.

Tracey was lost in her memories when a soft thud broke her reverie. Her focus snapped back to the present, and she looked down at the green grass below to locate the source of the sound. She gasped as she saw that her smartphone had fallen out of her pocket.

“Whew,” Tracey thought. “That could’ve been bad. This device is far too important to lose or damage now.”



The agile twelve-year-old reached out and grabbed the phone as she passed by on the tire swing. She and Blaine both had one, which they used for more than just making calls, surfing the Internet, or playing games. The smartphones were the key to guiding the Sassafras twins on their journey. Uncle Cecil, with the help of his lab assistant prairie dog, had created several applications—the two most important being the LINLOC and SCIDAT applications. LINLOC stood for “Line Locations,” and it gave the twins the longitude and latitude coordinates for each location that they were slated to visit. This application also listed the scientific topics they would be studying and the name of a local science expert who would help facilitate the twins’ learning.

The other app, SCIDAT, stood for “Scientific Data.” This is where the twins recorded all of the information they were collecting. At each location, they entered the data they had learned into their phones and then sent it back to Uncle Cecil. This step was very important, because if they didn’t send in the scientific information correctly, they wouldn’t be able to open up the LINLOC app and go to their next location. In order to progress, Blaine and Tracey had to first gather the correct scientific facts.

At first, the need to get it right had put a lot of pressure on the twins. Now, after successfully zipping their way through zoology and anatomy, recording data was second nature to them. Their devices were also equipped with an archive app, a microscope app, and high-resolution cameras. All of these tools enabled the twins to send images of the subjects they encountered to Uncle Cecil.

Tracey closed her eyes, sighed peacefully, and continued swinging happily back and forth in the cool shade cast by the tree. She let her mind wander, thinking less about how things worked and more about all of the adventures she and Blaine had been on in the last couple of weeks. The tire swing moved gracefully back and forth through the afternoon calm. She was imagining she was back in Italy, riding in a motorcycle side car through the beautiful Venetian countryside, when she was interrupted by a familiar voice. “Tracey, I’ve got a glass of lemonade here!”

She opened her eyes and looked toward the back porch of the house where she saw her twin brother, Blaine. He was holding a big glass full of ice-cold lemonade. “Could this day get any more relaxing?” Tracey thought to herself. “First my own quiet and peaceful turn on the tire swing, and now my brother is bringing me a glass of lemonade.”

Tracey quickly hopped off the tire swing and skipped toward the back porch. She reached out to grab the waiting glass of lemony refreshment, but just as she did, Blaine jerked the glass away. He put it up to his own mouth and drank the icy-cold glass in one

long gulp. Tracey's joy turned to disgust as she crossed her arms and stood silently in front of her brother with a scowl on her face. Blaine reached up, wiped his mouth, and then let out a satisfied sigh. A half-smile half-smirk formed on his face as he stood there looking at Tracey, obviously enjoying that he had fooled her.

"I said, 'I've got a glass of lemonade here,' not 'I've got a glass of lemonade here for you.'" Blaine grinned with a cocky squint.

Tracey reached up and flicked her brother on the ear. "That wasn't very nice, meanie."

"Ouch!" Blaine smiled as he reached up to rub his ear. "Ok, ok! I was just kidding. I poured a glass for you, too. It's inside on the kitchen table."

Tracey joined Blaine in laughing as they went inside. While she gulped down her own glass of lemonade, Blaine said, "The Prez is ready to give us his presentation."

Tracey nodded, knowing exactly what her brother meant. She finished the last few drops of lemonade and then followed Blaine down to the basement. Upon their arrival, they were greeted with a shout of elation from their uncle.

"Howdy-hootie! Hello! You two super-azing Sassa-ma-fras twins!" Cecil ran over to them with outstretched arms and crazy red hair sticking out every which way. He grabbed them by the shoulders and led them over to his computer desk excitedly.

"These two science whiz-kids have now successfully completed zoology and anatomy!" Cecil announced as if he were before a large crowd. Then, he held his hands up to his ears as if the nonexistent crowd had not cheered loudly enough. He looked at two plastic mannequins standing near the desk.

"Did you hear that, Socrates? Did you catch what I said, Aristotle? I said these two fanterrific kids have successfully completed zoology AND anatomy!"

Socrates and Aristotle, the mannequins, remained still and

silent at the repeating of this wonderful news. The twins recalled how Socrates and Aristotle had started out as simple plastic skeletons. As the twins had proceeded through learning about anatomy, their uncle had added pieces to the skeletons until each had precisely represented a complete *Homo sapiens*. He had done this to show off all of the anatomy knowledge that the twins had acquired.

Cecil bounded over to the two mannequins and grabbed their arms. He made them move like they were clapping and made sounds like they were cheering for Blaine and Tracey. Over the past several weeks, the twins had become accustomed to their uncle's off-the-wall antics.

"And now that you two wonder-twins have successfully completed anatomy and zoology, we will move next to the photosyntastic subject of botany!"

Cecil raised both arms straight up into the air, with his fingers spread. "But first," he declared, leaving only one of his index fingers raised, "the President will give his presentation on anatomy."

The President that he was referring to was none other than his lab assistant, President Lincoln, the prairie dog extraordinaire. Lincoln was up on the desk with the computer mouse next to his paw, ready to give his presentation. Though they had seen proof after proof of his brilliance, the Sassafras twins still weren't exactly sure how a prairie dog had accomplished any of the feats for which Cecil gave him credit. For that matter, the twins did not even know how to communicate with him. However, here he was, once again impressing them with his abilities.

The Prez moved the mouse, and a picture of the prairie dog came up on the big screen on the wall behind the computer desk. This is what their uncle called the "tracking screen." It usually had an illuminated world map on it with two little green dots that represented the twins. When they moved from location to location around the globe, he used this map to monitor their progress. This screen was also where he received and read all of the scientific data

they sent. He could also view the pictures they sent with the data.

Cecil read aloud the text that was printed over the image of the smiling prairie dog, “President Lincoln’s ever-so-brief presentation on anatomy: A review of the systems of the human body and their functions.”

The prairie dog tapped the mouse again as Cecil continued. “First, we have the integumentary system which covers and protects the body.” Pictures of skin, sweat glands, hair, and fingernails came up on the screen, and the twins smiled. They had taken the photos while they were in the United Arab Emirates participating in a one-hundred mile horse race across the Arabian Desert called the Wind Tower 100.

“Next, we have the skeletal system,” read Cecil. “This is the system that supports the body, protects organs, and permits movement.” Now Blaine and Tracey saw pictures they had taken of the skeletal system when they were in Ethiopia looking for the Seven Monk Tomb and the lost Ark of the Covenant. Blaine nodded and smiled. That had been a good adventure and a fulfilling science learning experience.

“Then, we have the muscular system which moves the body and helps to support it,” Cecil shared. This time, the twins saw pictures they had found using the archive application on their phones. They remembered that when it wasn’t possible to take actual photographs, they could skim through the archive app to pick the appropriate pictures.

“And then, we have the nervous system which controls the body and allows a person to think and feel.” There were more wonderful pictures from the archives on the phone.

“Fifth, we have the endocrine system which releases hormones that control many of the body’s processes,” Cecil continued. This time, pictures flashed up on the screen from the microscope application on the twins’ smartphones. What a crazy leg that had been! They had been chased all over an underground lab

by crazed robot squirrels. At least the twins had gotten the chance to see Summer Beach again. She was one of the twins' all-time favorite local experts!

"The circulatory system is next," Cecil read. "It carries materials to and from cells throughout the body." The twins were enjoying this review. It made them feel satisfied about all they had learned on their journey through anatomy. They could also tell how proud their uncle was of them, and even President Lincoln beamed with pride and admiration.

He clicked on the computer's mouse again as Cecil read for him. "The next system is the respiratory system. It delivers oxygen into the bloodstream." More archive images flashed across the screen.

"The eighth system to review is the digestive system. It breaks down food so that the body can use the nutrients inside. After that, we have the urinary system which removes waste materials from the body." Cecil paused, and Tracey shivered as she remembered what had happened to Blaine and her while they were studying the two systems. She wouldn't wish being trapped and buried alive in a box even on her worst enemy.

"Last but not least, we have the immune system!" Cecil stated jubilantly. "This is the system that defends the body against disease." Pictures from the twins' time in Bangkok, Thailand, came up on the screen.

Blaine looked at his sister as he said, "An apple a day keeps the doctor away. . ."

". . . that's what they say, anyway," Tracey finished, chuckling.

President Lincoln clicked the mouse one last time, bringing up the last picture. It was an image of him, together with Socrates and Aristotle, all smiling and holding up peace signs for the camera.

"Well, whippety whoppety whoo!" Cecil exclaimed. "That's a wrap for anatomy. Up next—botany, the study of plants. But before we talk about that, let's all take a walk together!"

Next Up—The Study of Plants

Wicked confidence coursed through his veins. He finally had a plan that would bring those Sassafras twins to ruin! By bringing those pesky twins to an end, he would crush all that his arch-enemy loved and cared about. He would in effect ruin Cecil Sassafras.

Long, long ago, Cecil had wronged him in a way that had left a deep and lasting mark. Some may say that what Cecil had done was an accident, but that is not how he saw it. It was no accident. It had happened because Cecil was absent-minded and googly-eyed. Now, because of that man's absent-mindedness, he had to live with the repercussions.

Over the years since the accident, he had let bitterness and revenge become his driving forces. After all the effort he had put into getting back at Cecil, things were finally about to pay off.

Over the past couple of weeks, he had failed miserably in so many ways at trying to stop those twins from learning. They had proven to be much more resilient than he had thought possible, but now he had the Dark Cape. More importantly though, he now knew how to use it. He had placed hidden cameras equipped with microphones all over Cecil's house. He had seen and heard the twins sit down to recap their adventures. In the process, they had told their uncle exactly how the Dark Cape worked, and he had heard every word.

The suit was originally designed by a magician named Phil Earp. It was as black as midnight, and included gloves, a masked helmet, and a huge cape. Phil's gimmick was to use the suit to make things disappear. He would start with small items and work his way up to bigger items, but his grandest trick was when he made himself disappear. Phil had done this by attaching something he called a "vanish string" to the inside of the cape. Simply give it a tug, and voilà, you disappeared. To reappear, you just pull the string again.

He had stolen the Dark Cape from Phil once before while in Sydney, Australia. He had tried to use it against the twins, but at that time, he had not known about the vanish string. He had made a real mess of his sabotage attempt, but that was then, and this was now.

He tightened the muscles of his hairless brow and grinned with menace. He looked at his computer monitor and tapped it to illuminate images of rooms in Cecil's house at 1104 North Pecan Street. His adversary's dwelling was a mere two doors down from his own place. He was glad to see that his hidden cameras were still working. He glanced over his shoulder and saw his harness and three-ringed carabiner lying on the floor. Wherever those twins zipped off to next, he would be there.



He stood up from his seat and slowly slipped on the magic suit. He pulled the gloves on tight, fastened the masked helmet down securely, grabbed the long flowing cape, and pulled it dramatically up around himself. Then, at the top of his lungs, shouting to no one in particular, he exclaimed, "I am the Dark

Cape!”



The Sassafras twins stood on the front porch of their uncle’s house and looked at dried-up and dead potted plants. “I really should’ve remembered to water those,” Cecil mused as he scratched his head.

The twins were sure to stand clear of the trap door they knew was in the floor of the front porch, as they encouraged their uncle. Blaine said, “Oh, that’s okay, Uncle Cecil. At least that big tree in your backyard with the tire swing is nice and healthy.”

“It sure is.” Cecil smiled. “And it’s not the only plant in this neighborhood that’s looking good! Come with me, you two. Let’s take our botany introduction on the road. I want you to meet some of the neighbors and see their. . . um. . . much healthier plants!”

Blaine and Tracey followed their exuberant uncle as he skipped down the front porch steps and made his way up the sidewalk. Cecil talked as he walked, using his hands to communicate almost as much as he used his mouth.

“As I said before, botany is the study of plants. You two will learn every blooming thing there is to know about all kinds of different plants, including mosses, ferns, conifers, flowers, and more! The plant kingdom spans all the way from the world’s largest living tree, the giant sequoia, to this little tiny weed poking up right here through the crack in the sidewalk.” Cecil bent over as he stopped to point at a small green sprout protruding from between two pieces of concrete.

He looked back at each twin and whispered, as if what he was about to say was top secret, “Actually, there are plants even smaller than that.”

Cecil stood upright and continued walking down Pecan Street. “Algae and fungi are not part of the plant kingdom, but you will be studying them on this leg as well,” he informed the twins as he waved happily to an older woman sitting on her porch at 1106.

She waved back with a smile on her face. “Hello there, Cecil,” she called.

“Hello, Mrs. Pascapali! How are you on this fine day?” Cecil asked.

“Doin’ right wonderful. Is this the niece and nephew that you talk so much about?” the neighbor responded.

“It sure is, Mrs. Pascapali. This is Train and Blaisey!” The twins rolled their eyes as their uncle messed up their names once again.

“Well, isn’t that nice,” drawled Mrs. Pascapali as she waved to the twins.

The twelve-year-olds waved back as they followed behind their uncle. Cecil pointed out and named the Japanese maple tree and the geraniums in Mrs. Pascapali’s front yard.

As they moved onto 1108 North Pecan Street, Cecil mentioned, “The guy who lives here tends to be a recluse. None of us in the neighborhood see him very much, but you two are not going to believe what he has in his yard!” Cecil clapped his hands in delight.

The twins looked beyond their uncle into the man’s yard, but they didn’t see anything out of the ordinary. “What?” they asked simultaneously. “What is so special in his yard?”

“He has three *Sassafras albidum*!” Cecil exclaimed with bright eyes.

Blaine and Tracey looked clueless, so Cecil explained, “*Sassafras albidum* is the scientific term for Sassafras tree! See the three different types of leaves on each of the trees? There are three-

lobed leaves, two-lobed leaves, and no-lobed elliptical leaves all on the very same branch! This tree doesn't just give us our name. It can also be used to dye fabric yellow. Back in the day, it was also used to flavor tea and root beer, but nowadays, we know that it can cause cancer, so we stick to enjoying the Sassafras tree with our other senses. Take a big whiff. That amazing smell is the essential oils from the Sassafras tree, which are used in perfumes and soaps. Isn't that awesterrific!?"

Blaine and Tracey stared in wonder at the trio of trees they saw in the yard. So that was what a Sassafras tree looked like. It was truly beautiful! They hoped they could meet the man who lived here before they left at the end of the summer and talk with him about his gorgeous trees.

Cecil looked both ways before he started to cross the street. "Over on the other side of the street lives Old Man Grusher," the twins heard their uncle say as they followed him across the road. "He has quite a wide variety of interesting plants in his front yard, but there is always something I forget about his house. What was it? I think it was really important. . . but I just can't ever seem to remember. . . maybe it was. . . DOG! Beware of dog!"

Just as Cecil said this part of his sentence, Blaine and Tracey turned to see a curly-haired black miniature poodle bound off the front porch and rush toward them, furiously barking all the way. At the sight of the dog, Uncle Cecil raised his hands above his head, screamed like a choking chicken, and began running toward home. Blaine and Tracey instantly recalled that their eccentric uncle was, for some strange reason, afraid of dogs. He could barely even stand to be around a puppy without starting to shake in fear.

The twins didn't scream though because it was only one little dog. Instead, they turned to follow their blubbering uncle as they kept one eye on the approaching pooch. It was right behind the twins in a flash, but instead of biting them, it ran right past them and went for Cecil. The little barking dog jumped up and chomped

onto Cecil's white lab coat as it flapped in the breeze behind him. The dog managed to rip a piece of it off, but it obviously wasn't enough to satisfy Old Man Grusher's mini-poodle. He spit it out, caught up with the scientist once more, and nipped at his bunny slippers. At this new threat, Cecil tried for all he was worth to get home without losing any more of his clothing. By now, both Blaine and Tracey were laughing uncontrollably. It was quite a sight to behold.

Somehow, Cecil managed to get in his front door without the black dog snatching any more of his attire. He rushed forward, slamming the door as he passed, thus preventing the miniature pooch from entering the house. The twins reached the door soon after, and Old Man Grusher's dog gave them a passing glance as it turned and trotted back home.

They opened the door and walked inside to find a trembling but relieved uncle. He plopped down on a living room couch, exhausted from his epic battle with the much-feared pooch. Cecil took a deep breath before managing a crooked smile as he squeaked out, "Now you see why I chose a prairie dog, not a typical dog, to be my lab assistant."

The twelve-year-olds smiled and laughed.

"I'd planned on giving you two a much more in-depth introduction to botany with a longer tour through the neighborhood." The red-haired scientist bounced back. "But instead, how about you Sassafras just go check out botany for yourselves! Are you ready to zip?"

Blaine and Tracey looked at each other with bright excitement. "Yes!" they responded in enthusiastic unison.

Immediately, the twins got their smartphones out and opened up the LINLOC applications. Cecil smiled as he watched his niece and nephew. He was overjoyed by their enthusiasm regarding their summer science adventures.

“Well, what does it say?” he asked. “What is the location for your first leg of botany?”

“Peru!” Blaine exclaimed. “We are going back to Peru!”

“Our topics for study are epiphytes, ferns, tropical shrubs, and fungi,” Tracey added. “Look, our local expert isn’t Alvaro Manihuari this time—it’s Arrio!”

“Arrio?” Blaine asked. “Wasn’t he Alvaro’s Peruvian friend?”

“Yes,” Tracey confirmed. “He’s the native who helped save us from Ortiz and the illegal loggers. It’s strange, though. I don’t think he ever spoke one word to us the entire time we were around him.”

Blaine smiled. “We’re headed back to Peru, starting another scientific subject with a local expert who doesn’t talk. This is going to be interesting.”



CHAPTER 2: RETURN TO THE JUNGLE

Falling Orchids

Swirls of rip-roaring light encased Blaine and Tracey Sassafras. Their smiles were almost bigger than their faces could handle. Coasting along the invisible zip lines never got old!

The twins had all but forgotten about the zip-lining summer camp they had wanted to go to just a few weeks before. Granted, Camp Zip Fire was an exciting place, but it couldn't compare in the least bit to traveling all over the globe to learn science on Uncle Cecil's invisible zip lines.

The light-speed travel came to an abrupt halt, and the carabiners automatically unclipped from the zip lines. The twins' bodies slumped into exhausted but exhilarated heaps. As usual, it took a few moments for Blaine's and Tracey's bodies to recover. The twins knew that the blinding white they could see now would slowly fade back into color. All their senses would normalize, and their strength would return after a few moments of tingling and lethargy.

The zip lines were designed to put the twins as close to their local experts as possible without their landings being detected. The twins knew that under no circumstances were they supposed to tell anyone about the existence of the invisible zip lines. So far, during their studies of zoology and anatomy, they had been able to keep the secret.

"Ahhh! Blaine!" Tracey gasped as her sight returned. "It looks like we have landed in the top of a tree!"

"Whoa, you're right, Trace!" Blaine shouted back. "What's the matter? Are you suddenly afraid of heights?"

Tracey shook her head and rolled her eyes. Blaine was always giving her a hard time and acting like an older brother, even though

he was older by only five minutes and fourteen seconds.

Blaine stood up and grabbed a branch above him. "I'm just still amazed the zip lines can drop us into such precise spots."

Tracey nodded, agreeing as she stood up as well. "It looks like we are pretty close to the top of this tree. Do you want to see if we can climb all the way up and get a view of the canopy?"

"Sure!" Blaine grinned. "As long as it is a race!"

Tracey jumped into action before Blaine could say Rutherford B. Hayes. She grabbed a branch and hoisted herself up in front of him. He was quick on her heels, and the race was on. Branch after branch, the twins made their way swiftly to the top of the tree. The competition ended in a virtual tie, as the twelve-year-olds raised their heads just above the treetops.

"Wow!" Blaine panted as he pointed out, "Look at the Amazon rainforest! It sure is breathtaking, isn't it?"

Tracey nodded. "It sure is, but you're still the loser."

"Loser?" Blaine objected. "I clearly won that race. You were the loser."

Tracey just smiled and shook her head in disagreement.

Blaine wasn't ready to concede. "What are you talking about? I got my head above the canopy fir—"

A loud snapping sound interrupted the end of Blaine's sentence as the branch he was standing on broke. Tracey saw him disappear down into the green of the tree.

"Blaine!" Tracey shouted. "Where—" Another snapping sound. This time it was Tracey's branch. She felt herself tumbling down through the branches of the tree.

Bump, thud, snap—the Sassafras went tumbling down, until they both managed to grab a branch. Hanging there by their hands, high above the forest floor, the twins grinned nervously at each other.

Once he caught his breath, Blaine started to speak, “Well, that was a clos—” Before he could finish, his new branch broke, and down he went again.

Tracey watched as her brother managed to grab a vine that sent him speeding away from the tree toward another tree. Blaine then swung down, Tarzan-like, through the rainforest using available vines as they appeared. As he was making his way down, his foot got stuck in a tangle of vines. He reached out to a nearby tree to prevent an inverted dive to the ground, but all he managed to do was grab a nearby flower that was growing on the tree. The flower came loose, and Blaine kept tumbling down with it in his hands. The boy continued to careen down toward the forest floor face-first.

Tracey held her breath as she watched Blaine’s crown headed straight for the ground at a fast rate of speed. Just before impact, the vine stretched to its full length, and Blaine came to a stop before bouncing back into the air a bit. Tracey started laughing when she saw that Blaine’s tumble ended with him hanging upside-down, caught by his left ankle. His head was at least five feet from the ground, and he was still holding on to the flower.



Tracey swung from her branch to a larger one further down

and then descended the big tree to meet up with her brother. She jumped down to the ground and jogged over to where Blaine was hanging upside down. She reached him in no time and was about to zing him with her sarcastic wit when she saw something that made her stop in her tracks.

A native man wearing only a satchel, a dagger, and a loin cloth was standing completely still, staring directly at Blaine. As Tracey approached, the man's body did not move, but his eyes shifted from Blaine to Tracey and then back to Blaine.

Blaine's breathing stopped, like he was holding his breath, and then he suddenly burst out in exclamation. "Arrio! Trace, look! It's Arrio!"

Tracey looked more closely at the man who had some kind of red paint smeared in lines across his face. Blaine was right! She recognized the man. It was Arrio.

Still hanging upside-down, Blaine attempted to explain to their new, yet familiar, local expert what had just happened. He used big hand motions and loud, slow English. "We . . . fall from sky . . . land in tree . . . me . . . won race . . . top of tree."

Tracey again rolled her eyes at this part of her brother's explanation. Blaine continued. "Then . . . I fall from tree . . . tumble through branches and vines... me also win race to bottom of tree . . ." Blaine looked at Tracey and smiled. Tracey just sighed, not impressed.

Arrio's expression changed from a non-expression to one with a slight smile. "Why are you talking so funny, Blaine?" the native Peruvian said in perfect English.

Blaine's face now held a look of confusion, even viewed from an upside-down angle. "What? We thought . . ." the boy stammered.

"We didn't know you spoke English," Tracey answered for her brother.

"You never asked," Arrio stated plainly. "What are the two

of you doing back in the Amazon?”

“We want to know more about the plants of the rainforest,” Tracey answered. “Can you help us with that?”

“I would be happy to,” replied the tribesman. “I don’t consider myself an expert like Alvaro, but I have been working to learn as much as I can. My ancestors have passed down thousands of years of knowledge about the rainforest to me and my fellow tribesmen. You know that rainforests are found all over the world, but the largest is here in the Amazon.”

Arrio unsheathed the dagger from his side and swiftly cut Blaine down. He landed with a thud and jumped up as quickly as possible, flower still in hand. Arrio reached out, grabbed the plant, and looked it over.

“What you have, Blaine, is a Moth Orchid. It is one of more than twenty thousand species of orchid found here in the Amazon rainforest. Orchids are epiphytes, which means that they are plants that sprout and grow on the branches of trees. Generally, these plants do not harm the tree to which they are attached. Instead, they use their position in the tree to receive more light than the other plants on the forest floor. The orchids manage to get the water and nutrients they need from the air and the rain that comes down through the canopy. Epiphytes include orchids, ferns, and bromeliads, all of which can be found in tropical climates. Mosses and lichens, which are normally found in more temperate climates, are also considered epiphytes.”

The Sassafras twins were amazed. Not only did Arrio speak, but he also spoke English. And not only did he speak English, but he also spoke it well enough to clearly explain what an epiphyte was. For someone who didn’t consider himself much of an expert, Arrio sure knew a lot of detailed information about the orchid.

Both twins smiled as they used their phones to take a picture of the Moth Orchid. They were glad Peru was on the itinerary again, and they were ecstatic that Arrio was the local expert. They were

looking forward to getting to know him more.

Arrio continued. “Orchids are known worldwide for their fragrance and beauty. However, there is so much more to these amazing plants. Did you know that their seeds are carried throughout the rainforest by the wind? Or that they can survive with little water? In the rainforest, orchids typically attach themselves to trees and exposed roots of trees, so they can collect as much water and nutrients as possible.”

The native handed the orchid back to Blaine as he went on. “Personally, my favorite orchid is the *Cattleya* orchid. It has a thickened bulb at the base of the stem and wide fleshy leaves that store food and water. *Cattleya* are usually found on trees near a stream or higher up because they prefer a fair amount of sunlight. The stream allows for a break in the canopy, which lets more sunlight in.”

Arrio paused and looked curiously at the twins before asking, “What were the two of you doing up in that Kapok tree?”

“We were trying to get a peek above the canopy,” Tracey answered.

“And we were racing,” Blaine added. “A race that, of course, I won.”

Tracey elbowed her brother in the ribs. “I won the race,” she stated confidently. “And besides, I’m not the one who fell all the way down.”

A slight smile again formed on Arrio’s face as he witnessed the Sassafras’ good-natured competitiveness. “Well, you just encountered the five layers of the rainforest. Of course, Blaine did so from the top down. He fell first through the emergent leaves, then the canopy, next the understory, then the shrub layer, and finally, he nearly hit the forest floor. This Kapok tree you two were in is the most important tree species in the rainforest. It plays host to many of the Amazon’s plants and animals. It is also where my tribe, the

Yora tribe, and others find the bark, resin, seeds, and leaves that we use to make medicines we need.”

Arrio paused and opened up his satchel. “But not even the Kapok tree and all of its wonderful resources can cure every disease. That’s why Alvaro just gave me this,” he said, pulling out a vial of medicine.

“What is that?” Blaine asked.

“This is the measles vaccination,” the native said. “I was just now heading back to my tribe to administer it to those who need it. Do you two want to come with me?”

The Sassafras twins nodded vigorously. The twelve-year-olds followed the native Peruvian on a narrow and heavily foliated trail through the rainforest. They were happy to follow Arrio and help with anything he or his tribe needed. One thing did worry them, though.

As they thought back to their first trip to the Amazon, they remembered how Arrio’s tribesmen had helped rescue them from some nasty illegal loggers. The tribesmen had used blowguns in the process, blowguns that had been equipped with poison darts coated with a toxic goo secreted from the Amazon’s poison dart frogs. The twins guessed that this meant Arrio’s tribe was a warrior tribe that was probably not very used to outsiders. Sure, he was nice and they could communicate fine with him, but what would happen when they marched into the tribal camp unannounced? The twins gulped and prayed that Arrio’s tribesmen were as friendly as he was.

They had been hiking for over two hours when finally the three came to a small clearing. Arrio walked purposefully out from the cover of trees with the twins cautiously following behind him. At first, the only thing Blaine and Tracey saw in the clearing was a cluster of small huts. Then, slowly, dozens of the Yora tribe members made their way out into the open to greet Arrio and his curious

guests.

The men were dressed just like Arrio, wearing only loincloths. They had red paint streaked in different places across their faces and bodies. They had piercings in their ears and noses, mostly ornamented with bone. The women also had multiple piercings, but they were even more heavily adorned. They wore multiple necklaces and bracelets, as well as earrings and nose rings. They had the same red paint, but it was mainly concentrated around their eyes and cheekbones. The women's clothes covered more of their bodies than the men's did, but everyone was barefoot. In addition, they all seemed to be holding some kind of weapon.

The Sassafras twins stood nervously still as the Yora surrounded them. They examined the twins by grabbing the twins' arms, squeezing and pushing at different parts of their faces, and running their hands through their hair. The twins glanced over at Arrio to see his reaction. The man wasn't too expressive, but the twins were pretty sure that he was laughing. The twins relaxed a bit because that meant this behavior from his tribe mates was customary.

After their curiosity was satisfied, the natives went back to doing the various tasks they had been doing. The twins, who were now apparently accepted by the tribe members, joined Arrio as he went around administering the measles vaccination.

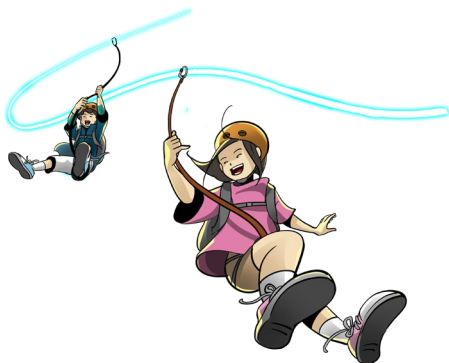
"Here in the Yora tribe," Arrio told them, "we have been visited by several foreigners before. So far, all of these foreigners have been kind and helpful. For example, Alvaro Manihuari, whom the two of you know, has brought medicine several times for us. He also made the effort to learn our language, on top of teaching me Spanish, English, and Latin. Most important of all, he has taken up the cause to protect our native land from the illegal intrusion of loggers and oilmen. Over the years, he has become a very good friend of mine. We are always willing to give each other assistance and teach each other about our different cultures.

"However, this has not always been the case for the other

native Amazonian tribes of Peru. Many know foreigners only as strange-looking people who steal their land. Foreigners have destroyed their hunting and farming grounds, and spread deadly diseases. So many native tribes have become suspicious of and violent against these invaders.” Blaine and Tracey both shuddered. They hoped they never came across any of these violent tribes.

“It is true the shrinking rainforest has become a major problem.” Arrio continued. “Much of this is natural and can’t be stopped, but when oil companies and logging companies come to our forest and illegally cut, dig, drill, and destroy, they escalate the problem and threaten our very livelihood. Tonight, around the fire, we are going to have a tribal meeting about this very subject.”

The Sassafras tried to be as helpful as possible as they assisted Arrio in getting everyone vaccinated. Their minds dwelled on the things he had said about the shrinking rainforest and the intrusion of foreigners. They wondered if there were any solutions to these problems.



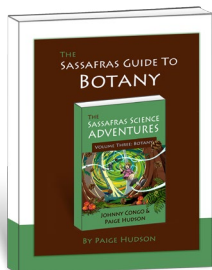
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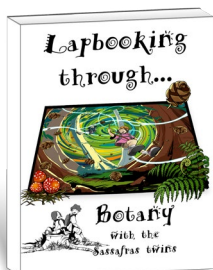
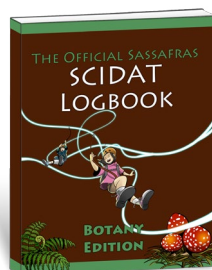
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