

THE SASSAFRAS SCIENCE ADVENTURES

VOLUME 6: ASTRONOMY

SAMPLE



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THE SASSAFRAS SCIENCE ADVENTURES

VOLUME 6: ASTRONOMY {SAMPLE}

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TOPICS COVERED IN THIS VOLUME

The Sassafras Science Adventures Volume 6: Astronomy covers a variety of space concepts by looking at the following topics:

- Solar System
- Asteroids
- Stars
- International Space Station
- Mercury
- Mars
- Venus
- Earth
- Jupiter
- Saturn
- Uranus
- Neptune
- Galaxies
- Telescopes
- Satellites
- Space probes
- Sun
- Day and night
- Moon
- Eclipses
- Astronauts
- Space shuttles
- Comets
- Ancient astronomers
- Spacewalks
- Rockets
- Dwarf planets
- Black holes
- Constellations (Orion, Ursa Major, and Ursa Minor)

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CHAPTER 1: TIME TO BOLDLY GO WHERE NO SASSAFRAS HAS EVER GONE

Pass the Petri Dish gone wrong

His voice was edged with anxious energy as he stood at the border of all that was familiar and the mysterious unknown.

“Everything in my life has led up to this moment.”

He paused to take it all in.

“Fate now bids me to step up, over, and then out into the great unknown. What perils are out there? I know not. What terrible and fantastic discoveries await? I know not. Regardless, it is time. Time to slip the surly bonds of Earth and dance the skies on laughter-silvered wings. Time to step foot into the final frontier, to explore strange new worlds, to go boldly where no Sassafras has ever gone before!”

The redheaded man paused, took a deep breath, grabbed the border in front of him with both hands, hoisted himself up, and then said in his loudest and highest octave yet, “One small step for man! One giant leap for Sassafras-kind!”

The twelve-year-old twins who were standing with the man both rolled their eyes and shook their heads. Why did their uncle have to be so dramatic? All he was trying to do was hop over a fence to retrieve a Frisbee that had flown over into a backyard. It’s not like he was traveling into space or anything. However, chuckles from both twins accompanied the eye-rolls and headshakes because they both loved their crazy uncle dearly, and neither would change one thing about him even if they had the power to do so.

“Oh, c’mon, Uncle Cecil! You can do it! It’s just a backyard fence.” Blaine, the older twin by five minutes and fourteen seconds, encouraged.



“Yeah, you can do it!” Tracey, the twin sister, echoed.

“Go over and get that Frisbee!”

Cecil Sassafras, with his wild, uncombed hair, white lab coat, and pink bunny houseslippers, was precariously perched on top of the six-foot wooden fence. He looked down at his niece and nephew with momentary confidence in his eyes, but the twins watched as that confidence melted back into fear. The redhead dropped back down to the grassy ground.

“B-b-b-but it’s not just any fence. And that’s no n-n-n-normal backyard,” he stammered. “That is the d-d-d-domain of the Guardian Beast!”

Tracey rolled her eyes. Blaine shook his head. The “Guardian Beast” as their uncle called it, was actually a miniature poodle. The little dog was the pet of the neighborhood resident known as “Old Man Grusher.” Grusher lived on North Pecan Street in a house just across from Uncle Cecil.

The three Sassafrases had been playing a game that Cecil

liked to call “Pass the Petri Dish.” Really though, they were just tossing the Frisbee around to get a little sunshine and exercise. Cecil’s mind was so filled with science that it was hard for him to separate it from any activity he was doing. So, Uncle Cecil pretended the Frisbee was a petri dish, and he would shout out different scientific words as he threw the flying disk.

During the game of “Pass the Petri Dish,” their uncle had gotten a little too animated and had launched the Frisbee over the backyard fence into Old Man Grusher’s yard. Blaine had offered to hop over the fence to retrieve the Frisbee because he knew his uncle was, for some strange reason, deathly afraid of his neighbor’s miniature poodle. But Uncle Cecil had rejected his nephew’s offer. The scientist had said he was the one who threw the Frisbee over the fence, so he was the one who should go get it. He had also added that it was time to face his fear of the Guardian Beast.

Cecil’s first attempt to hop the fence had consisted of him touching the fence and then backing away. His second attempt had included the amazing and spirited speech the twins had just heard, but those words hadn’t gotten their uncle over the fence either. The twins now stood here wondering how far a third attempt would get him or if there even would be a third attempt.

“What about the zip lines?” Cecil suddenly asked and pointed at his niece and nephew.

“The zip lines?” The twins question-answered in unison.

“Yep, yes, yep, yessiree,” Cecil quivered.

“I could use a harness and a specially designed three-ringed carabiner. I could set the coordinates for Old Man Grusher’s backyard. Then I could zip through the fence on the invisible lines at the speed of light, retrieve the Frisbee, and zip back!”

Blaine and Tracey looked at each other skeptically. They loved the invisible zip lines, but in their opinion, this was much too short a distance for this fantastical mode of transportation.

About five weeks ago, Blaine and Tracey had rolled into town on a hot and shaky bus with bad attitudes. They had both failed science, so their parents had sent them to their uncle's house for the summer to nip that problem in the bud. Uncle Cecil happened to be a pseudo-famous research scientist, and the twins' parents were sure that he could help the children improve their knowledge of science.

Over the past five weeks, that is exactly what had happened. They had morphed from kids who despised science into kids that absolutely loved it. The twelve-year-olds quickly found out that not only was their uncle not an ordinary person, but he was not an ordinary scientist either. On the contrary, he was extraordinary. And with the help of President Lincoln, his prairie dog lab assistant, he had invented invisible zip lines that could be used to travel at the speed of light to any destination on the planet.

Blaine and Tracey had been successfully using these zip lines for weeks now to study all kinds of scientific topics within the subjects of zoology, anatomy, botany, earth science, and geology. The zip lines were designed to drop the twins in precise, undetectable spots, where they would then meet local experts. These experts would help them learn about the scientific topics for the given locations. But now Uncle Cecil was proposing the idea of using the invisible zip lines to travel a distance of mere feet. Neither Blaine nor Tracey thought this was a good idea.

"Uncle Cecil, c'mon," Blaine hollered. "Just let me hop over the fence and get the Frisbee."

"No how, no who, no why, no way!" Cecil blurted. "This task is mine. This feat is something I must diggity diggity dig down and do!"

Even though he said this boldly, the twins could see that their uncle was still shaky and uncertain.

"Okay, Uncle Cecil, you do it," Tracey exhorted. "We know you can. You don't need to use the zip lines. You just need to hop

over that fence and get that Frisbee!”

“But I’ve never been over that fence before. I have no idea what’s back there!” Cecil answered, his courage retreating again.

“It’s just a backyard,” Blaine reminded. “It’s probably like most other backyards with some grass, some bushes, maybe a shrub or two. It’s just a backyard. It’s probably pretty normal and... backyardy.”

“But what about the Guardian Beast? What if he bursts out of the back door and comes after me?” their uncle whimpered.

“Maybe he’s not even home,” Tracey offered. “Or maybe he’s taking a nap or something. Besides, doesn’t he usually hang out on the front porch?”

“Okay, okay,” the eldest Sassafras stammered. “But what about Old Man Grusher? He’s the meanest old man in the whole neighborhood. You have to be mean to be the owner of such a foul creature as the Guardian Beast. What if he spots me in his backyard and then comes out to get me?”

At this point, all Blaine and Tracey could do was sigh. They were trying to be encouraging to their uncle, but their patience was wearing thin.

Cecil could sense what was happening in the younger Sassafrases. “Okie, okie, okay, so there is no need to use the zip lines, but what about your smartphones? Do you guys have any application on them that I can use to retrieve the petri dish; I mean flying saucer; I mean Frisbee?”

“Our smartphones?” the twins question-answered in unison. Cecil nodded vigorously.

Currently, neither of the twins had their smartphones with them. The devices were across the street in their uncle’s basement. The smartphones and their applications were inherently tied to the invisible zip lines. For instance, the LINLOC application, which was short for Line Locations, gave the exact longitude and latitude

coordinates in which the twins were supposed to land. They would set these coordinates on the rings of the carabiners. One ring was for longitude. One ring was for latitude. The third ring was to lock the carabiner securely shut. Then, the carabiner would automatically attach itself to the correct invisible zip line. The twins would hang in midair for approximately seven seconds before zipping off at the speed of light to the line location landing spot. Another thing the LINLOC app did for them was give them the name of the local expert along with the topics they would be studying at the location.

The SCIDAT app (short for scientific data) was another super important application on the twins' phones that they used to record all the scientific information they were learning. The twelve-year-olds would gather the data with the help of their local experts and then record that data in the SCIDAT app. Finally, they would text that data to their uncle's basement lab, where he could view it on his screen. This way Cecil was able to track and confirm the science his niece and nephew were learning. The basement data screen could also function as a tracking screen, enabling Cecil to keep tabs on the twins, represented by two green dots, as they zipped around the globe. Obviously, neither of these applications was going to help their crazy uncle retrieve the lost Frisbee, so why was he asking about phone apps right now?

Cecil was frantically running through the applications, grasping for hope. "L-l-l-let's see, there's the LINLOC and SCIDAT apps. Nope, nope, nopity, nope. Neither one of those can provide any help for this current situation we find ourselves in. How about the microscope application or the archive application, or the high-resolution cameras? Can I use any of those to get our Frisbee back?"

Blaine and Tracey answered with impatient, shaking heads. Those three applications were used for obtaining images of scientific topics—images that they sent in with their SCIDAT data.

"No-eee, no-eee, no-eee way. Taking a picture of the Frisbee will do us absolutely no good," Cecil screeched, "nor will picture

taking protect us from Old Man Grusher or the Guardian Beast! Okay, okay, if those apps are a no-kay, what else is there on your phones? There is also a compass application. Will that help? No, no, I'm a frayed knot . . . What else? The phones are equipped with a waterproof casing . . . but that's not really . . . even applicable . . . Isn't there one more application that I'm forgetting? There's also . . . what else do we have? Oh, yes! Your phones each have tasers! Can I use the taser application to get the petri dish back? Can I tase the Guardian Beast?"

"No, Uncle Cecil, no," Tracey answered. "You can't taser Old Man Grusher's miniature poodle. You need to just hop this wooden fence and go get the Frisbee!"

"Oh, sweet sassy molassy. I just can't!"

"Yes, you can!" Blaine encouraged. "And you're going to do it right now, with our help!"

With that, the twelve-year-old boy stepped over to the fence and climbed to its top. He then waved for his uncle and sister to follow. Tracey hopped right to it and was up next to her brother almost instantly. Cecil wasn't quite as quick, but surprisingly he did make his way to the top of the fence. All three Sassafras let their eyes wander across the backyard of Old Man Grusher.

Just like Blaine had guessed earlier, it was a pretty normal backyard with grass, some bushes, and a shrub or two. There was also a bird bath, a flower garden, and . . . a Frisbee. The flying disk had landed harmlessly right next to the bird bath. Now all they needed to do was hop down from the fence, walk over, and go get it.

Tracey was the first to jump down and plant her feet in the backyard. Blaine was a second and a half behind her but not Uncle Cecil. He remained frozen in fear on top of the fence. Blaine and Tracey looked at their uncle and then at each other. Uncle Cecil was ordinarily one of the bravest men they had ever known. It was just this one dog that scared him. However, today was the day their brave, visionary, and creative uncle was going to face his fear. They

were sure of it.

The twins looked back toward their uncle, still on the fence. The scientist's face was wrinkled in fear as he looked out over this new and scary backyard—this domain of the Guardian Beast, as he called it. He might as well have been a first-time astronaut looking out into the dark unknown throws of space. The Sassafras twins kept looking hopefully at their uncle's face, silently cheering him on; and as they did, the wrinkles of fear slowly began to melt into a courageous face full of resolve. Cecil was a Sassafras after all, and Sassafrases never give up.

All at once, the scientist jumped down from the fence, his bunny slippers landing firmly on the surface of the Beast's domain. Upon Cecil's landing there were three Sassafras hearts soaring. However, zero Sassafrases noticed that at the exact same time Cecil's feet hit the ground, the backscreen door of Old Man Grusher's house began to slowly creak open.

A look back at geology

“Where are those three silly-sassys, Prez?” A white-coat-clad female scientist with frizzy blonde hair exclaimed with no worry in her voice. Summer T. Beach was playfully curious as she questioned Cecil Sassafras's lab assistant, who also happened to be a prairie dog.

Summer was an old friend and classmate of Cecil's. Plus, she had served as a local expert for the twins on multiple occasions. She was beyond excited that she was in the lineup to serve in that capacity again during their upcoming astronomy study. The twins didn't know yet, and she was dying to share this information with them. However, before they zipped off to study astronomy, they were supposed to walk through a review of what they had learned about geology.

President Lincoln always put together a presentation using

images the twins had captured during their studies and words Cecil would read aloud. The presentation could be viewed on the basement data screen that was affixed to the wall behind the computer desk. Even now, illuminated in bright lights on that very screen was a picture of President Lincoln with exciting text arched over his head saying, “President Lincoln’s Ever-so-brief Presentation on Geology.”

Summer Beach was ready for the presentation. President Lincoln was ready for the presentation. The only problem was that there were no Sassafrases present for the presentation.

Summer shot another question the prairie dog’s way. “They were playing ‘Pass the Petri Dish,’ right? Oh my! What a fun game! But, wow, they have been playing for such a long time now. Prez, do you think something unpredictable happened?”



As the screen door opened wider, the hushed creaking turned into loud, rusty screeching. All three Sassafrases turned their heads toward the sound. As they did, their victorious smiles immediately turned to open mouths of shock and fear. There now, standing on the back porch, filling up the entire door frame, was Old Man Grusher himself. There was no Guardian Beast with him. It was just the lone man accompanied by an unasked question.

The man was big. He was wearing baggy, pleated khakis and a long-sleeved, button-up sweater. He had strands of gray hair swimming across his mostly bald head, and he was walking with the use of a gnarly wooden cane.

The aging man stepped out far enough onto the porch as to let the screen door slam shut behind him. Cecil, Blaine, and Tracey all involuntarily jumped at the sound of the slamming door but otherwise remained frozen. There was a long, brief silence as Old Man Grusher stared the three down with slanted eyebrows.

The unasked question took its time, but it eventually made its way up through a scratchy throat to the man's lips. "What are the three of you doing in my backyard?"

Cecil remained silent. Blaine managed only a moan.

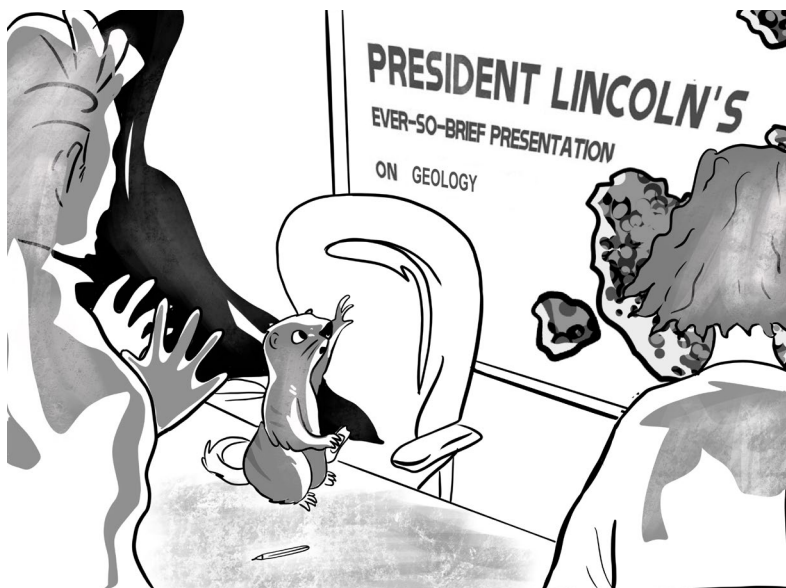
Tracey, however, was able to get an actual coherent response to come out of her mouth. "Our Frisbee flew over the fence into your backyard. We hopped over to get it."

Old Man Grusher glared at the three fence hoppers and then glanced at the Frisbee lying on the ground next to the birdbath. "Well, why didn't you three knock on the front door? I would've happily come back here and retrieved it for you." At the conclusion of this statement, Old Man Grusher's eyebrows moved up, all of his wrinkles disappeared, and the big man let out a bellowing, good-hearted, neighborly laugh that flooded the three Sassafras with surprised relief.



A few minutes later, Tracey, Blaine, and Cecil came bounding down into the basement lab with bellowing, good-hearted, neighborly laughs of their own. They had retrieved the 'petri-dish.' They had not been attacked by any beast. They had made friends with Old Man Grusher. And now they were going to dive into some science!

Summer was there to greet the twins with one of her patented happy jumping dance hugs. Cecil, however, slid through the hug, somersaulted over a short file cabinet, sideswiped a plastic mannequin, bounced off a section of rock climbing wall, hurdled a potted plant, careened over a homemade rocket, and then finally slid to a stop in front of his muddled computer desk, where he immediately launched into his job as an orator. "President Lincoln's Ever-so-brief Presentation on Geology," the redhead read.



The prairie dog stood on the desk with a proud smile that looked exactly like the one he was showcasing in the picture on the screen. The animal tapped at the computer keyboard, causing the presentation's next image to come up. Uncle Cecil read the new text.

"With the exception of a few islands here and there, all land on Earth can be divided into seven continents. These continents are: North America, South America, Europe, Africa, Asia, Australia, and Antarctica."

The picture being displayed was a very white picture. It was a picture of ice—or more specifically, "the Ice," otherwise known as the continent of Antarctica. The twins had taken the picture as they had trekked across the frozen continent with their brave local expert, Isaac Revvington. He was a blind adventurer who, with his Seeing Eye dog, Nyles, had been attempting to reach the South Pole in addition to the North Pole and the summit of Mount Everest. The twins were sure he was the bravest person they'd ever met.

“The Earth has three main layers: the crust, the mantle, and the core,” Cecil read the next frame. The picture was now that of an erupting volcano. It was an image the twins had captured in Ecuador, where they had studied the topics of both “layers of the earth” and “volcanoes” with the help of a local expert who the twins were pretty sure was an actual superhero by the name of Brick Kid.

“Volcanoes can be active, dormant, or extinct,” the twins’ uncle narrated. “Active means they erupt periodically or continuously. Dormant means they have been known to erupt in modern times. And extinct means they have not erupted in modern times.”

President Lincoln tapped the keyboard again. The picture changed to that of a rocky, shaking beach, and Uncle Cecil read on.

“An earthquake is a release of energy that happens when the Earth’s plates rub together at places called fault lines, causing the ground to shake.” It had sure been shaking on the beach of that island off the coast of Sri Lanka when the twins had taken this picture, and the poignant memory almost caused the ground to feel like it was shaking right now here in their uncle’s basement.

The next picture to come up was of an igneous rock. It was a picture the two had taken in Norway while being chased all over the place by the Fjord Gerry Monster. “The three types of rock are igneous, metamorphic, and sedimentary,” Cecil said in his own unique, upbeat way. “Igneous rock is formed by fire. Metamorphic rock is rock that has been changed by heat or pressure. Sedimentary rock is formed layer by layer from tiny bits of rocks, dead plants, and dead animals.”

“And last, caves!” Cecil exclaimed as the last image appeared, “Caves, which are also known as caverns, are naturally occurring spaces or areas found under the surface of the ground.”

The twins smiled as they saw the picture of the cave they had seen while in Australia. Their local expert, Jackie Ray Wagon, had successfully found a diamond in a cave full of dripstone pillars.

He then used the diamond to successfully ask his love, Peggy Jo, to marry him.

“Stalagmites form on the floor of the cave, whereas stalactites form on the ceiling,” Cecil said, wrapping up the ever-so-brief presentation. The redheaded scientist then clapped, gave a few fist pumps, wiggled all ten of his fingers above his head, and looked like he was about to make a big announcement.

But before he could, Summer stole his thunder. “It’s time to study astronomy!” the female scientist exclaimed with wiggling fingers of her own.

“So sorry to interrupt you, Sizzle, er, I mean, Cecil,” the excitable woman apologized. “I am just so pumped about these two brilliant little brainey-frasses starting their next scientific subject. They are going to get to learn all about the planets and the stars! They are going to study things like astronauts, telescopes, space travel, and more! It’s all so fantastically exciting! So sorry I interrupted.”

“No apology needed, Summer Thyme! I am super-sizzling-sassy-excited too! Why don’t you go ahead and tell these two who their first local expert is going to be!”

Summer’s eyes got excited and wide. She curled her upper body into a little ball with her head down and her arms and hands pulled in close to her chest. Blaine and Tracey could barely hear it at first, but Summer started a squeal of delight that crescendoed from a whisper into a shout. All at once she popped her head up with exploding frizzy hair and then threw her arms out as wide as they would go.

The loud, happy squeal then turned into actual words, “Your first local expert is me!”

“Really?” The Sassafras Twins responded in a unified squeal of their own.

“Really!” Summer responded. “Go ahead and check it out

on your smartphones!”

Blaine and Tracey both scrambled to find their backpacks and then both pulled out their phones. Tracey was the first to get the LINLOC application open, and she immediately read aloud the information it held. “Our first astronomy location is Alaska, longitude $-163^{\circ} 4' 12.24''$, latitude $+67^{\circ} 3' 58.91''$. We will be studying the topics of the solar system, asteroids, stars, and the International Space Station. And our first local expert is indeed the one, the only, Summer Beach!”



Summer squealed again. Tracey squealed. Cecil even squealed. Blaine attempted a manly grunt, but it came out as a . . . squeal. The one Beach and the three Sassafras were more than a little excited to get started studying astronomy.



He had seen them. He had heard them. He knew all their plans. He smiled a wicked smile. The capabilities he had at his fingertips right now were light-years better and more advanced than anything he had tried in his old basement at 1108 N. Pecan Street. One of his satellites had transmitted the video image of Cecil and those twins walking from Old Man Grusher’s house back to their house at 1104. Then another new tech satellite had transmitted the audio about their plans to zip to Alaska, complete with LINLOC

coordinates.

From this point on, nothing the Sassafras did would be hidden from him. They would have no secrets.

Currently he was standing on his glossy, white pedestal, the one that stood right in the middle of his underground Siberian lab. He loved the feeling of standing higher than everyone else. He loved the view from here, looking out at the scores of submissive scientists that obeyed his every wish and command.

Even now, a group of them was working on building a new Forget-O-Nator machine. This one would be the size of a mobile home. Another group was working to duplicate the Dark Cape suit so that he could eventually have an army of invisible henchmen. Yet another group was putting the finishing touches on a personal spacecraft. This was a sleek vehicle that he was hoping might be useful as the twins attempted to learn astronomy.

And out among all the white coats was one black coat. It belonged to the gorgeous Adrianna Archer. The beautiful blonde used to be a Swiss Secret Service agent, but now she served as his loyal right-hand woman, helping direct and guide all the ant-like scientists.

His hope for vengeance against Cecil Sassafras was now stronger than ever. He had never felt more empowered to carry out revenge against the one that had taken his eyebrows.



Blaine did have a little question about the scientific subject at hand. “Hey, you know, I don’t know all that much about astronomy yet, but isn’t it kind of, well, you know, the study of outer space and stuff?”

Nods and shrugs came from both scientists that communicated a “pretty much” response.

“Well, then, how, you know . . .” Blaine stammered, trying to put his question into words. “How are we going to be able to study astronomy on Earth, you know, in places like Alaska? Shouldn’t we, or couldn’t we, I mean, can we zip to outer space?”

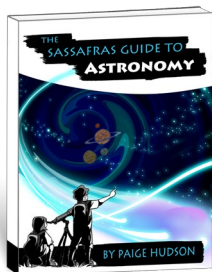
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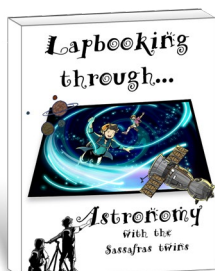
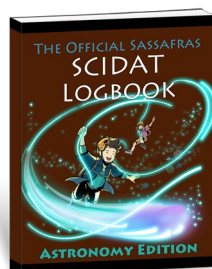
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Add our activity guide, logbook, or lapbooking guide to create a full science curriculum for your students!



The Sassafras Guide to Astronomy includes chapter summaries and an array of options that coordinate with the individual chapters of this novel. This guide provides ideas for experiments, notebooking, vocabulary, memory work, and additional activities to enhance what your students are learning about space!

The Official Sassafras SCIDAT Logbook: Astronomy Edition partners with the activity guide to help your student document their journey throughout this novel. The logbook includes their own SCIDAT log pages as well as night sky journal sheets and an astronomy glossary.



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