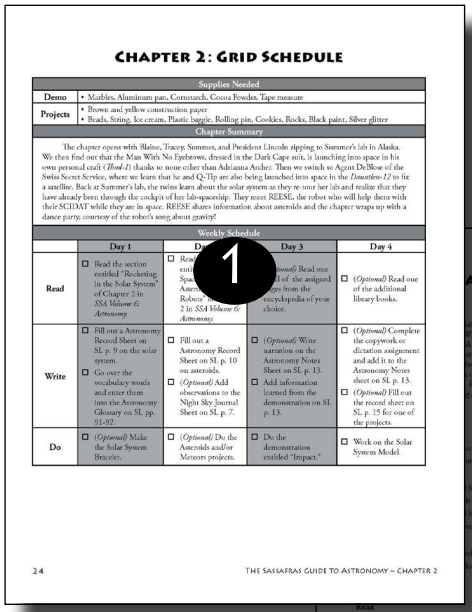
Activity Guide At-a-Glance

Take an adventure-filled journey to learn about science!

1. & 2. Scheduling Options

Choose from a grid-style schedule (1) or a list-style schedule (2). Either way, these scheduling options will make planning your weekly science adventure a snap! These schedule sheets include a summary of the chapter in case your students are reading the novel or listening to the audiobook on their own.



Chapter 2: Grid Schedule

Supplies Needed	
Demo	• Marbles, Aluminum pan, Cornstarch, Cocoa Powder, Tape measure
Projects	• Brown and yellow construction paper • Beads, String, Ice cream, Plastic baggie, Rolling pin, Cookies, Rocks, Black paint, Silver glitter

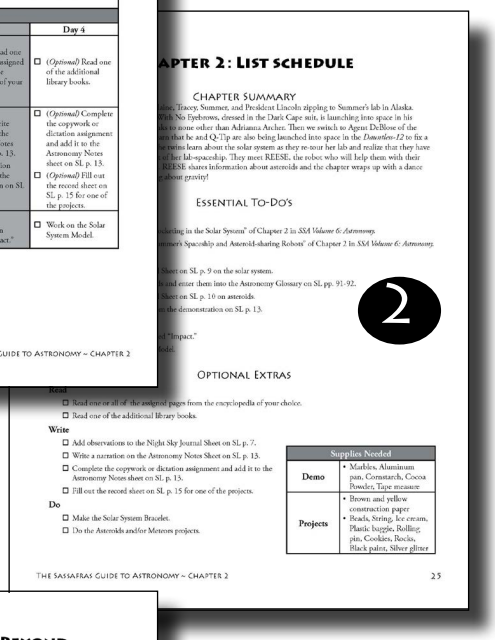
Chapter Summary

The chapter opens with Blaine, Tracey, Summer, and President Lincoln zipping to Summer's lab in Alaska. We then find out that the Man With No Eyebrows, dressed in the Dark Cape suit, is launching into space in his own personal craft (*Bond-1*) thanks to none other than Adrianna Archer. Then we switch to Agent DeBlose of the Swiss Secret Service, where we learn that he and Q-Tip are also being launched into space in the *Dunarlen-12* to fix a satellite. Back at Summer's lab, the twins learn about the solar system as they re-tour her lab and realize that they have already been through the cockpit of her lab-spaceship. They meet REESE, the robot who will help them with their SCIDAT while they are in space. REESE shares information about asteroids and the chapter wraps up with a dance party, courtesy of the robot's song about gravity!

Weekly Schedule

	Day 1	Day 2	Day 3	Day 4
Read	☐ Read the section entitled "Rocketing in the Solar System" of Chapter 2 in *SSA Volume 6: Astronomy*	☐ Read [illegible] entitled "Space Ace[illegible] Robots" [illegible] 2 in *SSA Volume 6: Astronomy.*	☐ *(Optional)* Read one [illegible] of the assigned [illegible] from the encyclopedia of your choice.	☐ *(Optional)* Read one of the additional library books.
Write	☐ Fill out a Astronomy Record Sheet on SL p. 9 on the solar system. ☐ Go over the vocabulary words and enter them into the Astronomy Glossary on SL pp. 91-92.	☐ Fill out a Astronomy Record Sheet on SL p. 10 on asteroids. ☐ *(Optional)* Add observations to the Night Sky Journal Sheet on SL p. 7.	☐ *(Optional)* Write narration on the Astronomy Notes Sheet on SL p. 13. ☐ Add information learned from the demonstration on SL p. 13.	☐ *(Optional)* Complete the copywork or dictation assignment and add it to the Astronomy Notes sheet on SL p. 13. ☐ *(Optional)* Fill out the record sheet on SL p. 15 for one of the projects.
Do	☐ *(Optional)* Make the Solar System Bracelet.	☐ *(Optional)* Do the Asteroids and/or Meteors projects.	☐ Do the demonstration entitled "Impact."	☐ Week on the Solar System Model.

1



Chapter 2: List Schedule

Chapter Summary

[illegible], Tracey, Summer, and President Lincoln zipping to Summer's lab in Alaska. [illegible] No Eyebrows, dressed in the Dark Cape suit, is launching into space in his [illegible] none other than Adrianna Archer. Then we switch to Agent DeBlose of the [illegible] that he and Q-Tip are also being launched into space in the *Dunarlen-12* to fix a [illegible] twins learn about the solar system as they re-tour her lab and realize that they have [illegible] her lab-spaceship. They meet REESE, the robot who will help them with their [illegible]CIDAT while they are in space. REESE shares information about asteroids and the chapter wraps up with a dance [illegible] about gravity!

Essential To-Do's

[illegible]ocking in the Solar System" of Chapter 2 in *SSA Volume 6: Astronomy.*

[illegible]ummer's Spaceship and Asteroid-sharing Robots" of Chapter 2 in *SSA Volume 6: Astronomy.*

[illegible] sheet on SL p. 9 on the solar system.

[illegible] and enter them into the Astronomy Glossary on SL pp. 91-92.

[illegible] sheet on SL p. 10 on asteroids.

[illegible] the demonstration on SL p. 13.

[illegible] "Impact."

[illegible] Model.

2

Optional Extras

Read

☐ Read one or all of the assigned pages from the encyclopedia of your choice.

☐ Read one of the additional library books.

Write

☐ Add observations to the Night Sky Journal Sheet on SL p. 7.

☐ Write a narration on the Astronomy Notes Sheet on SL p. 13.

☐ Complete the copywork or dictation assignment and add it to the Astronomy Notes sheet on SL p. 13.

☐ Fill out the record sheet on SL p. 15 for one of the projects.

Do

☐ Make the Solar System Bracelet.

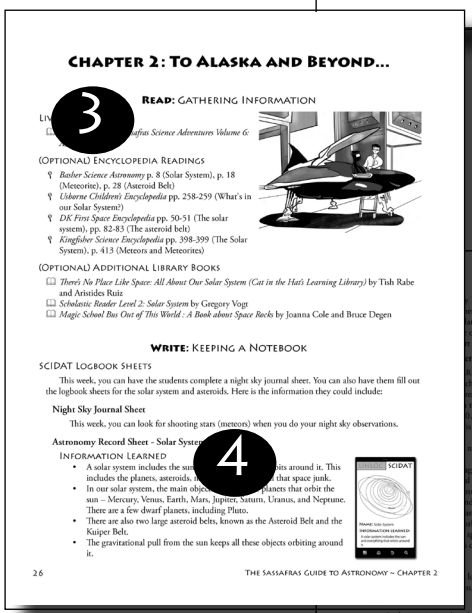
☐ Do the Asteroids and/or Meteors projects.

Supplies Needed	
Demo	• Marbles, Aluminum pan, Cornstarch, Cocoa Powder, Tape measure
Projects	• Brown and yellow construction paper • Beads, String, Ice cream, Plastic baggie, Rolling pin, Cookies, Rocks, Black paint, Silver glitter

Read

3. Reading Assignments

Know what to read each week in the corresponding Sassafras Science novel. Plus, get options for additional encyclopedia pages to read and for books to check out from the library. The novel contains the essential information for each week, but if you want to dig deeper, we've got you covered!



Chapter 2: To Alaska and Beyond...

Read: Gathering Information

Li[illegible] *[illegible]fias Science Adventures Volume 6: [illegible]*

3

(Optional) Encyclopedia Readings

- *Basher Science Astronomy* p. 8 (Solar System), p. 18 (Meteorite), p. 28 (Asteroid Belt)
- *Usborne Children's Encyclopedia* pp. 258-259 (What's in our Solar System?)
- *DK First Space Encyclopedia* pp. 50-51 (The solar system), pp. 82-83 (The asteroid belt)
- *Kingfisher Science Encyclopedia* pp. 398-399 (The Solar System), p. 413 (Meteors and Meteorites)

(Optional) Additional Library Books

- *There's No Place Like Space: All About Our Solar System (Cat in the Hat's Learning Library)* by Tish Rabe and Aristides Ruiz
- *Scholastic Reader Level 2: Solar System* by Gregory Vogt
- *Magic School Bus Out of This World : A Book about Space Rocks* by Joanna Cole and Bruce Degen

Write: Keeping a Notebook

SCIDAT Logbook Sheets

This week, you can have the students complete a night sky journal sheet. You can also have them fill out the logbook sheets for the solar system and asteroids. Here is the information they could include:

Night Sky Journal Sheet

This week, you can look for shooting stars (meteors) when you do your night sky observations.

Astronomy Record Sheet - Solar Syste[illegible]

Information Learned

- A solar system includes the sun [illegible]its around it. This includes the planets, asteroids, [illegible] that space junk.
- In our solar system, the main objec[illegible] Planets that orbit the sun – Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. There are a few dwarf planets, including Pluto.
- There are also two large asteroid belts, known as the Asteroid Belt and the Kuiper Belt.
- The gravitational pull from the sun keeps all these objects orbiting around it.

4

[illegible]000 times larger than all the planets put together.

[illegible]es in our solar system have an atmosphere, which is a thin layer of gas that [illegible]ast.

[illegible]ly planet in our solar system that is known to have an atmosphere that can [illegible]e.

[illegible] - Asteroids

[illegible]NED

[illegible]hunk of iron [illegible]ing the sun.

[illegible]ually in size. So[illegible]ough, while some [illegible]o be named and [illegible]ough to be named, such [illegible]000 asteroids that [illegible]about 600 miles wide and is also considered a dwarf [illegible]

4

[illegible]named asteroids, had a robot spacecraft landed on in [illegible]

[illegible]ged and irregular shapes, so they don't always travel in [illegible]d pattern as the travel around the sun.

[illegible]oids in our solar system orbit the sun in two places—the Asteroid Belt, which is [illegible]d Jupiter, and the Kuiper Belt, which is beyond Pluto.

[illegible]nomy student named Giuseppe Piazzi discovered the first asteroid in the night sky. [illegible]ater much closer to Earth; we call those NEAs for Near Earth Asteroids. As they [illegible]space, they can be pulled in by Earth's gravity. Once an asteroid enters Earth's [illegible]called a meteor.

[illegible]ook up the following terms in the glossary in the appendix on pp. 141-142 or in [illegible]e have them copy each definition onto a blank index card or into their SCIDAT

- Asteroid – A rock orbiting the sun.
- Gravity – The force that pulls an object towards another larger objec[illegible]
- Meteor – A rock that travels through space and burns up when it en[illegible]e; also known as a shooting star.
- Solar System – A group of planets and other objects all in orbit aroun[illegible]

5

(Optional) Copywork

Copywork Sentence

Our solar syste[illegible] the planets, asteroids, moons, comets, and space junk.

Dictation Selecti[illegible]

Gravity pull[illegible]ter, larger object. It keeps our planets orbiting around the sun instead of floa[illegible]his is the same force that makes objects fall to the ground when you drop them.

6

4. SCIDAT Logbook Info

Have confidence that your students are grasping the key points from the reading with the information in the notebooking section. Here, you will find the scientific details that were shared in the chapter, which could be included in your students' narrations or list of facts.

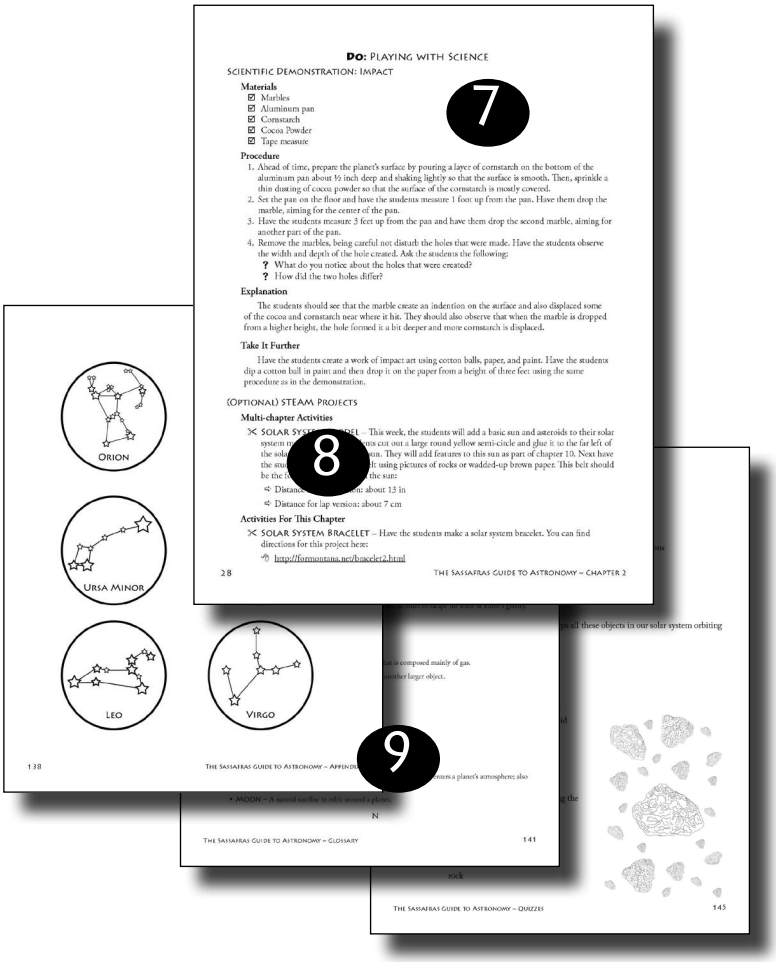
5. Relevant Vocabulary

Build your students' science vocabulary with words relevant to the topics the students are studying.

6. Copywork

Use these selections as memory work, copywork, or dictation—it's up to you!

Activity Guide At-a-Glance



Do

7. Related Scientific Demonstrations

Know what materials you will need to do a weekly hands-on science activity that coordinates with the topic. This section lists the supplies you will need, provides easy-to-follow steps, and explanations to make it a snap to complete the scientific demonstration.

8. Coordinating STEAM* Activities

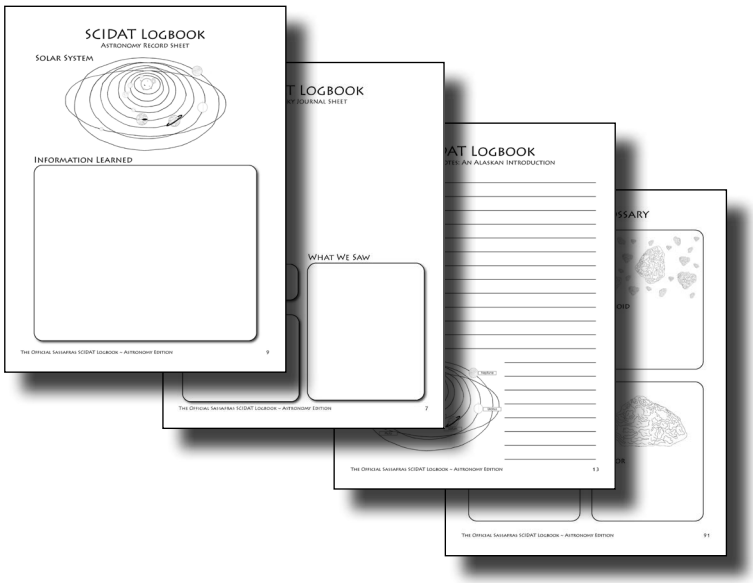
Add in a bit of STEAM with these optional activity ideas. You will find ideas for projects that last throughout the novel and ones specific to the chapter (week) you are on.

9. Templates and More

In the guide's appendix, you will find templates for the projects, a full glossary, and a set of quizzes to use along the journey.

*STEAM: Science, Technology, Engineering, Art, and Math

The SCIDAT* Logbook



Don't forget the SCIDAT logbook for your students!!

The SCIDAT logbook will serve as a record of your students' journey! It contains all the pages the students will need as they follow like Blaine and Tracey. Each page has been attractively illustrated for you so you don't have to track down pictures for the students to use! Get it all at:

https://elementalscience.com/collections/sassafras-science

*SCIDAT: Scientific Data

The Sassafras Guide to Astronomy

Second Edition 2022

Email: support@elementalscience.com

Digital Edition

Printed In USA For worldwide distribution

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Elemental Science
PO Box 79
Niceville, FL 32588
support@elementalscience.com

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Quick Start Guide

Welcome to your super, scientific journey with the Sassafras Twins!! The information and activities in this guide will help you turn a simple adventure novel into a complete science program for your elementary students. Let's start by answering three pressing questions!

What Will We Learn?

Students will learn about astronomy, which is the study of space. See p. 11 for a list of the topics explored in this program.

What Do I Need?

In addition to this activity guide, you will need the following materials

1. **Novel –** *The Sassafras Science Adventures Volume 6: Astronomy* - All the main reading assignments are from this book. You can get the paperback novel, the Kindle version, or the audiobook.
2. **Student Materials –** You can have your students use a blank notebook or you can purchase a copy of *The Official Sassafras SCIDAT Logbook: Astronomy Edition* for each student. Get a glimpse of this option on p. 7. (SCIDAT stands for scientific data and it comes from the Sassafras Twins' journey.)
3. **Demonstration Supplies –** See p. 12 for a full list, or save yourself time and get the *Sassafras Science Year 3 Experiment Kit*, which includes the materials for both volume 5 and volume 6.

If you want more information than what is already in the novel, the following encyclopedias are scheduled in this guide:

- *Basher Science Astronomy (best for 1st through 2nd grades)*
- *Usborne Children's Encyclopedia (best for 2nd through 4th grades)*
- *DK First Space Encyclopedia (best for 2nd through 4th grades)*
- *Kingfisher Science Encyclopedia (best for 4th through 6th grades)*

If you want to add more fun with optional STEAM* projects, you can find a list of the project supplies on p. 13.

*STEAM: Science, Technology, Engineering, Art, and Math

What Will a Week Look Like?

Each week you and your students will:

- **Read** scientific information from an adventure-filled novel, also known as a living book, and discuss what you read.
- **Write** down what the students have learned and seen in a way that is appropriate for their skills by keeping a notebook, or rather a SCIDAT Logbook.
- **Do** hands-on science through demonstrations using the directions found in this guide.

You can also add in the optional copywork, library books, and STEAM projects if you want to dig deeper into a topic. For a more detailed explanation of the components in each lesson, we highly recommend checking out the peek inside this guide on pp. 6-7 and reading the introduction on pp. 8-10. The chapter lessons begin on p. 17.

THE SASSAFRAS SCIENCE ADVENTURES

The Sassafras Guide to Astronomy
Table of Contents

The Sassafras Guide to Astronomy Introduction

Our living books method of science instruction was first proposed in *Success in Science: A Manual for Excellence in Science Education*. This approach is centered on living books that are augmented by notebooking and scientific demonstrations. The students read (or are read to) from a science-oriented living book, such as *The Sassafras Science Adventures Volume 6: Astronomy*. Then, they write about what they have learned and complete a related scientific demonstration or hands-on project. If time and interest allow, the teacher can add in non-fiction books that coordinate with the topic, do an additional activity, or memorize related information. If you want to learn more about how this works, you can listen to this free conference session on using living books for science:

- Inspiring your students to love science through living books: https://youtu.be/Dvk1LfYGONw

The books in *The Sassafras Science Adventures* series are designed to give you the tools you need to employ the living books method of science instruction with your elementary students. For this reason, we have written an activity guide and a logbook that corresponds to each novel. This particular activity guide contains 18 chapters of activities, reading assignments, scientific demonstrations, and so much more for studying astronomy.

Each of the chapters in this guide corresponds directly to the chapters in *The Sassafras Science Adventures Volume 6: Astronomy.* They were written to give you the information you need to turn the adventure novel into a full science course for your elementary students. They will provide you with a buffet of options you can use to teach the students about the planets, the stars, and more. So pick and choose what you know you and your students will enjoy!

What Each Chapter Contains

Each chapter begins with two schedule sheets for the corresponding chapter in *The Sassafras Science Adventures Volume 6: Astronomy.* On the schedule sheets, you will find a chapter summary, plus an overview of the supplies you will need for the demonstration, projects, and activities for the chapter. After that, you will find the optional schedules – one laid out as a four-day grid schedule and one laid out as a list to check off. These schedules are included to give you an idea of how your week could be organized, so please feel free to alter them to suit your needs.

After the scheduling information, you will find the information for the reading, notebooking, and activities for the particular chapter. This information is divided into the following sections:

Read: Gathering Information

- Living Book Spine – This section contains the corresponding chapter in *The Sassafras Science Adventures Volume 6: Astronomy.*

- (Optional) Encyclopedia Readings – This section contains possible reading assignments from:
  - *Basher Science Astronomy* (best for 1st through 2nd grades)
  - *Usborne Children's Encyclopedia* (best for 2nd through 4th grades)
  - *DK First Space Encyclopedia* (best for 2nd through 4th grades)

- *Kingfisher Science Encyclopedia* (best for 4th through 6th grades)

You can choose to read them to the students or have the students read them on their own.

📖 (Optional) Additional Library Books – This section contains a list of books that coordinate with what is being studied in the chapter. You can check these books out of your local library.

Write: Keeping a Notebook

🗒 SCIDAT Logbook Information – This section has the information that the students could have included in their SCIDAT logbooks. (SCIDAT stands for scientific data and it comes from the Sassafras Twins' journey.) The students may or may not have the same information on their notebooking sheets, which is fine. You want their SCIDAT logbooks to be a record of what they have learned. The logbook information is included as a guide for you to use as you check their work. For more information about notebooking, please read the following article:

- What is notebooking? – https://elementalscience.com/blogs/news/what-is-notebooking
- How to use notebooking with different ages – https://elementalscience.com/blogs/news/notebooking-with-different-ages

✎ Vocabulary – This section includes vocabulary words that coordinate with each chapter. If the students are older, we recommend that you have them create a glossary of terms using a blank sheet of lined paper or the glossary sheets provided in *The Official Sassafras Student SCIDAT Logbook: Astronomy Edition*. You can also have them memorize these words and their definitions.

☞ (Optional) Copywork – This section contains a short copywork passage and a longer dictation passage for you to use. Some students may use the shorter passages for dictation or the longer passages for copywork. Feel free to tailor the selections to your students' abilities. You can also use the selections as memory work assignments for the students.

⌛ (Optional) Quiz – This section contains the answers for the quizzes included in the appendix. These simple, short quizzes are optional. You can use them as graded quizzes or as review sheets.

Do: Playing with Science

☑ Scientific Demonstration – This section includes a list of materials, the instructions, and an explanation for a scientific demonstration that coordinates with the chapter. There is a blank lab report sheet provided for you in the appendix on pp. 127-128 if you would like the students to do a write-up of the demonstration. If the students are in grade 4 or higher, we recommend that they complete at least one of these activities for this course.

✂ (Optional) STEAM* Projects – These sections contain additional STEAM projects and activities that correspond to the topics in the chapter. There are multi-chapter activities that students can do over the course of several chapters or over the full novel. Plus, there are activities that coordinate with each specific chapter. Pick and choose the activities that interest you and your students.

*STEAM: Science, Technology, Engineering, Art, and Math

Additional Materials

We have provided a few additional materials in the back of this guide for your convenience. First, you will

find the templates you need for the projects suggested in this guide. Next, you will find a glossary of terms, which you can use with the students as they define the words for each chapter. And finally, you will find a set of eight simple quizzes you can use with the students to verify they are retaining the material.

Quick Links

View all the links mentioned in this guide in one place and get a digital copy of the templates, glossary, and quizzes by visiting the following page:

- https://elementalscience.com/blogs/resources/volume-6-links

For the students

The SCIDAT logbook is meant to be a record of the students' journey through their study of astronomy. It is explained in more detail in Chapter 1 of this guide. You can choose to make your own or purchase a premade logbook from Elemental Science. *The Official Sassafras SCIDAT Logbook: Astronomy Edition* has all the pages the students will need to create their own logbook. Each page has been attractively illustrated for you so you don't have to track down pictures for the students to use. This way they can focus on the information they are learning.

Final Thoughts

As the author and publisher of this curriculum I encourage you to contact me with any questions or problems that you might have concerning *The Sassafras Guide to Astronomy* at support@elementalscience.com. I, or a member of our team, will be more than happy to assist you. I hope that you and your students enjoy your journey through space with the Sassafras twins!

~ Paige Hudson

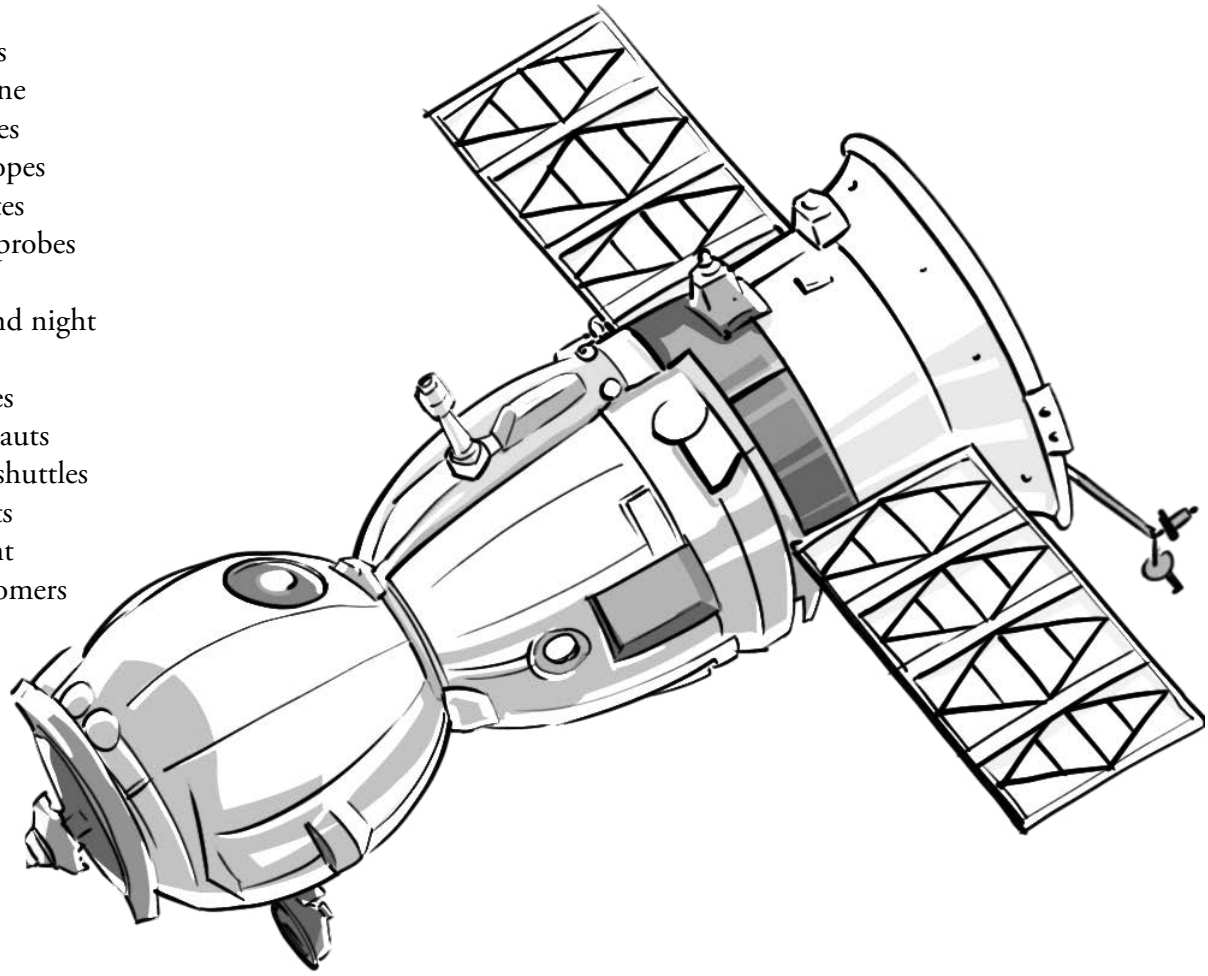
Topical List

The Sassafras Science Adventures Volume 6: Astronomy covers a variety of aspects of astronomy, such as:

- Our Solar System
- Night Sky Spotting
- The Lunar Cycle
- The Space Race
- People in Space
- Stars

In the process, you will learn about the following specific topics:

- 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)



Demonstration Supplies Listed By Chapter

Chapter	Supplies Needed
1: Observing the Night Sky	No supplies needed
2: Impact	Marbles, Aluminum pan, Cornstarch, Cocoa Powder, Tape measure
3: Shining Stars	Black construction paper, Toothpick, Tape, Flashlight, Large clear bowl, Water
4: Trapped Heat	2 Thermometers, Cutting board, Clear glass bow
5: Solar Rover	A solar-powered mini-car kit (OR a DC motor, Solar panel with wires, 2 Sets of wheels with axles or steel wires, Cardboard, Hot glue, Plastic tubing)
6: Stormy Swirls	Bowl, Milk, Food Coloring, Liquid soap, Toothpick
7: Planetary Orbit	Marble, Smooth pie plate or cake pan
8: Magnify	Glass bowl, Cooking oil, Piece of paper with words on it, Magnifying glass
9: Reflection Direction	Small mirror, Small flashlight, A dark room
10: Solar S'mores	Large marshmallows, Chocolate squares, Graham crackers, Foil, Cardboard box, Plastic wrap
11: Moon Cookies	8 Sandwich-style cookies, Picture of the phases of the moon (Appendix p. 135)
12: Space Tasks	Thick yellow rubber gloves or work gloves, LEGO bricks, Several bolts, washers, and nuts
13: Simple Astrolabe	Thin wooden dowel or a straw, String (about 12" long), Heavy metal nut or washer, Protractor, Tape
14: Balloon Rocket	Straw, String (5 feet), Scissors, Large balloon, 2 Chairs, Tape
15: Sucked In	Hard-boiled egg, Warm water, Bottle with large-mouth (i.e., sports drink bottle), Access to a freezer
16 : Flashlight Planetarium	Foil, Toilet Paper Tube, Pin, Small flashlight
17: Flashlight Planetarium	Constellation pictures (Appendix p. 138), Rubber band Sharpie marker
18: Planetary Bingo	Planetary Bingo Cards (Download these for free from Elemental Science.)

STEAM Project Supplies Listed By Chapter

The multi-chapter and specific chapter STEAM projects listed in this guide are optional, so you may not need all of these supplies. However, this list has been provided for your convenience. If you do decide to do these projects, in addition to the items listed each week you will need glue, scissors, a variety of paint colors, and a set of markers.

Chapter	Supplies Needed
1	Black construction paper (2-11"x 17" or 3-8 ½" x 11" sheets), Clear gel glue, Water, Silver glitter, Black (or purple) food coloring, Plastic baggie, Cup, Borax Laundry Booster
2	Brown and yellow construction paper, Beads, String, Ice cream, Plastic baggie, Rolling pin, Cookies, Rocks, Black paint, Silver glitter
3	Black construction paper, 2 Cotton balls, 1 Small yellow pom-pom, 1 Large red pom-pom, 1 Large white sequin
4	Materials will vary based on the type of planet model you choose to make.
5	
6	
7	
8	White tissue paper or white chalk pastel, White chalk pastel or crayon, black construction paper, silver glitter
9	Bottle caps, Toothpicks, Thin cardboard, A small juice box, Glittered blue decorative card stock, Gold and silver paint, 12x12-inch Foam piece, Aluminum foil, Glue, 1/4-inch Wooden dowel, Scissors, Pencil, Measuring tape (Or LEGO bricks), Smartphone
10	White glue, Food coloring, Toothpicks, Yogurt container lid, Hole punch, String, Colored pencils or magazine pictures
11	Black poster board, White toothpaste or shaving cream, Butter knife, Tape, Wiffle ball, 2 Sheets of paper, Scissors, Yellow and orange paint, Paintbrush
12	Soda bottle, Cardstock, White and black paint, Glue, String, Small paper cup, Mini-marshmallows, Potential parachute material (paper, tissue, thin fabric, felt), Scissors or a hole punch
13	3’ Curling ribbon, Tennis ball, Foil, Straight pin
14	Build-a-rocket kit
15	Plastic cup, Sharpie markers, Pan, Spray oil, Foil
16	Marshmallows, Toothpicks, Gold star stickers, White crayon, Paper, Dark blue or black paint
17	Materials will vary based on what you decided to do for your constellation party.
18	Materials will vary based on what you decided to do for the alien craft.

The Sassafras Guide to the Characters Found in Volume 6: Astronomy

Old Friends that Appear Throughout the Book

- **Blaine Sassafras –** A.K.A. Train and Rowboat, this boy is the male twin of the soon-to-be-famous Sassafras twins. He also has a wide range of acting abilities and a talent for finding things in space.
- **Tracey Sassafras –** A.K.A. Blaisey and Fish Hook, this girl is the female twin of the soon-to-be-famous Sassafras twins. She also plays a mean game of Pass the Petri Dish and Copernicus Code.
- **Uncle Cecil –** The Sassafras twins' talented, eccentric, and messy uncle who can never get their names right. He is an inventor with friends and colleagues that are out of this world.
- **President Lincoln –** A.K.A. Linc Dog and The Prez, this prairie dog is Uncle Cecil's lab assistant. He doesn't say much, but without his talent for inventing, the twins' adventures wouldn't be the same.
- **Summer Beach –** The sandwich-loving, excitable scientist who is a dear friend of Uncle Cecils. Her lab in Alaska is packed with out of this world tech!
- **Ulysses S. Grant –** Summer's lab assistant, who happens to be an Arctic ground squirrel, and best friend of President Lincoln. He invents all kinds of technology, such as robot squirrels and zip-zop cuffs, when he isn't hibernating.
- **The Man With No Eyebrows –** The memory-erasing, disappearing cape-wearing, eyebrow-less man who has tried just about everything he can think of to stop the twins. In the last volume we found out his name: Thaddeus.
- **Adrianna Archer –** The former Triple S agent who the twins met during their Earth Science leg. She worked with the Man With No Eyebrows behind the scenes during their Geology leg.
- **Evan DeBlose –** A.K.A. Agent Beans, this Triple S agent who serves as the twin's local expert on their Earth Science. He was friends and colleagues with Adrianna Archer until she went rogue.
- **Q-Tip –** A Triple S's agent and resident expert in technologizing. The twins got a glimpse of his talents on their Earth Science leg.
- **Captain Marolf –** Head of the Triple S Agency. The twins met the captain during the Earth Science leg.
- **Yuroslav Bogdanovich –** The rogue scientist who bears an uncanny resemblance to Uncle Cecil. He tried to stop the twins during their Earth Science leg, but his memory was erased during the twin's Geology leg and now he works as a clerk at the Left-Handed Turtle Market.

Cecil's Neighborhood (Chapter 1)

- **The Guardian Beast (in name only) –** This miniature poodle is the stuff nightmares are made of, according to Cecil Sassafras.
- **Old Man Grusher –** Uncle Cecil's neighbor and owner of the Guardian Beast.

Summer's Alaskan Lab (Chapters 2-3)

- **REESE –** The robotic creation of President Lincoln and Ulysses S. Grant. His name stands for Robotic Exploration, Entertainment, and Scientific Enhancement. REESE joins the twins at several other locations throughout the book.

International Space Station (Chapters 4-7)

- **Yang Bo –** The twins' local expert in space. He is a Chinese astronaut living on the International Space Station, serving as the station's astrobiologist. He is also a former classmate of Uncle Cecil and Summer.
- **Captain Dianna Sturgess –** The decorated American astronaut who is currently in charge of the International Space Station.

- ✯ **Sander Petrov –** The Russian astronaut who serves as the International Space Station mechanic.
- ✯ **Bayard Clemence –** The French astronaut who serves as the International Space Station physician.
- ✯ **Anna Maria Bezerra –** The Brazilian astronaut who serves as the I.S.S. meteorologist.
- ✯ **Parth Banerjee –** The Indian astronaut who serves as the International Space Station mathematician.
- ✯ **SLIM –** The QA-700 robot aboard the International Space Station Its name stands for Super Literal Information Machine.
- ✯ **Brett Frye –** The billionaire space tourist who spent some time on the International Space Station.
- ✯ **Queenie Clemence (in name only) –** The sister of Bayard Clemence.

Hawaii (Chapters 8-9)

- ✯ **J.P. Jungos –** The twins' local expert for their time in Hawaii. He is a burn victim on the journey of his lifetime.
- ✯ **Peter Karko –** An employee at the Mauna Kea Observatories, who also turns out to be a very opportunistic and cranky tour guide.
- ✯ **Dr. Ellison Ocampo –** Lead scientist at the Mauna Kea Observatories.

Washington, D.C. (Chapters 10-11)

- ✯ **Paul Sims** – The twins' local expert as they explore the National Air and Space Museum. He is a very knowledgeable museum curator, but there is more to him than meets the eye.
- ✯ **Wiggles and Fidget** – The excitable museum security guards.
- ✯ **Sparks Sheen** – The leader of the family custodial crew, Shine-O-Mite.
- ✯ **Flash Sheen** – A member of the Shine-O-Mite crew.
- ✯ **Pat Sheen** – Short for Patina, she is the only sister on the Sheen Shine-O-Mite crew.
- ✯ **Lumin Sheen** – A member of the Shine-O-Mite crew.
- ✯ **Alexander Slote** – A member of the Rotary Club – not the one you are thinking, it's a club extoling the virtues of the rotary telephone.
- ✯ **Graham Slote** – Another member of the Rotary Club.
- ✯ **Belle Slote** – The final member of the Rotary Club. She is the only female in the three-member group.

Poland (Chapters 12-13)

- ✯ **Minka Ziven –** The twins' local expert for their time in Poland and the clue guide for the Copernicus Code Escape Room.
- ✯ **Clive Stanek –** One of the players at the Copernicus Code Escape Room. He is Halley's brother.
- ✯ **Halley Stanek –** Another one of the players at the Copernicus Code Escape Room. She is Clive's sister.

New Zealand (Chapters 14-15)

- **Arty Stone –** He is the lead foreman for the Professional Gamer Championships and the twins' local expert for their time in New Zealand.
- **Mr. Sebastian –** The production manager and announcer for the Professional Gamer Championships.
- **Wayne Hammer –** The boisterous American gamer competing in the Professional Gamer Championships.
- **Ms. Pink Rocker –** The pink-clad Russian gamer competing in the Professional Gamer Championships.
- **Mohawk Wellington –** The preppy, Mohawk-wearing British gamer competing in the Professional Gamer Championships.
- **Agnes the Librarian –** The quiet, middle-aged Canadian gamer competing in the Professional Gamer Championships.
- **El Cohete Loco (The Crazy Rocket) –** The easy-going Mexican gamer competing in the Professional Gamer Championships.
- **Robbie Thistler –** The mysterious gamer who set an unbeatable record on Planet Prowess before disappearing from the gaming scene.
- **Kiwi Jones –** The young gamer who ends up shows up all of the top five gamers at the Professional Gamer Championships.

Mumbai, India (Chapters 16-17)

- **Ravi Chopraz** – The twins' local expert for their time in India and star of Bollywood's famous *Star Check* show. He plays the handsome Captain Cutta.
- **Varun Gowda** – The director of *Star Check*.
- **Preathi** – The digital effects specialist for *Star Check*.
- **Sana and Puji** – Two of the stylists for *Star Check*.
- **Jaya Amin** – She plays First Lieutenant Ursa, the captain's wiser and better-looking counterpart.
- **Rom Basu** – He plays the factual and stoic Second Lieutenant Denab.
- **Chiku Kapadia** – He plays a Worbflyster from the planet Worbflyse, who only speaks Worbflystian.
- **Dhruv Dalal** – The resident *Star Check* stunt man, who also plays the part of a Borbothian alien who is out to get the captain.
- **Aja and Ru Katri** – Executives from the company that is responsible for producing *Star Check*.

Back at Uncle Cecil's Lab (Chapters 18)

- **Socrates and Aristotle** – The skeletons-turned-mannequins from the twins' Anatomy leg that Cecil frequently talks to as if they are friends.

Chapter Lessons

Chapter 1: Grid Schedule

Supplies Needed	
Demo	• No supplies needed
Projects	• Black construction paper (2-11"x 17" or 3-8 ½" x 11" sheets), Clear gel glue, Water, Silver glitter, Black (or purple) food coloring, Plastic baggie, Cup, Borax laundry booster

Chapter Summary

The chapter opens with a dilemma: Uncle Cecil must risk going into Old Man Grusher's backyard, possibly facing off with his Guardian Beast, in order to retrieve the petri dish, otherwise known as a frisbee, that landed there during a game of Pass the Petri. After several pep talks, he finally makes it over the fence with the help of Blaine and Tracey. They meet Old Man Grusher and learn that he is not as bad as they thought before heading back to Cecil's basement lab where the twins get to hear President Lincoln's ever-so-brief presentation on geology. We learn that the next leg of the twin's journey is Astronomy, and Summer is going to be their local expert. Before the chapter closes, we also learn that the Man With No Eyebrows has not given up; in fact, he has a whole army of scientists helping him now, thanks to Adrienne Archer, the rough Swiss Secret Service agent!

Weekly Schedule

	Day 1	Day 2	Day 3	Day 4
Read	☐ Read the section entitled "Pass the Petri Gone Wrong" of Chapter 1 in *SSA* Volume 6: Astronomy.*	☐ (*Optional)* Read one or all of the assigned pages from the encyclopedia of your choice.	☐ Read the section entitled "A Look Back at Geology" of Chapter 1 in *SSA Volume 6: Astronomy.*	☐ (*Optional)* Read one of the additional library books.
Write	☐ Set up your students' SCIDAT logbooks.	☐ (*Optional)* Write a narration on the Astronomy Notes Sheet on SL** p. 5. ☐ Add information learned from the demonstration on SL p. 5.	☐ Go over the vocabulary word and enter it into the Astronomy Glossary on SL p. 91.	☐ (*Optional)* Complete the copywork or dictation assignment and add it to the Astronomy Notes sheet on SL p. 6.
Do	☐ (*Optional)* Play a game of "I Spy."	☐ Do the demonstration entitled "Observing the Night Sky."	☐ (*Optional)* Make Night Sky Slime.	☐ Work on the Solar System model.

**SSA = The Sassafras Science Adventures*

***SL = The Official Sassafras SCIDAT Logbook: Astronomy Edition*

Chapter 1: List schedule

Chapter Summary

The chapter opens with a dilemma: Uncle Cecil must risk going into Old Man Grusher's backyard, possibly facing off with his Guardian Beast, in order to retrieve the petri dish, otherwise known as a frisbee, that landed there during a game of Pass the Petri. After several pep talks, he finally makes it over the fence with the help of Blaine and Tracey. They meet Old Man Grusher and learn that he is not as bad as they thought before heading back to Cecil's basement lab where the twins get to hear President Lincoln's ever-so-brief presentation on geology. We learn that the next leg of the twin's journey is Astronomy, and Summer is going to be their local expert. Before the chapter closes, we also learn that the Man With No Eyebrows has not given up; in fact, he has a whole army of scientists helping him now, thanks to Adrienne Archer, the rough Swiss Secret Service agent!

Essential To-Do's

Read

- ☐ Read the section entitled "Pass the Petri Gone Wrong" of Chapter 1 in *SSA* Volume 6: Astronomy.*
- ☐ Read the section entitled "A Look Back at Geology" of Chapter 1 in *SSA Volume 6: Astronomy.*

Write

- ☐ Set up your students' SCIDAT logbooks.
- ☐ Add information learned from the demonstration on SL** p. 5.
- ☐ Go over the vocabulary word and enter it into the Astronomy Glossary on SL p. 91.

Do

- ☐ Do the demonstration entitled "Observing the Night Sky."
- ☐ Work on the Solar System model.

Optional Extras

Read

- ☐ Read one or all of the assigned pages from the encyclopedia of your choice.
- ☐ Read one of the additional library books.

Write

- ☐ Write a narration on the Astronomy Notes Sheet on SL p. 5.
- ☐ Complete the copywork or dictation assignment and add it to the Astronomy Notes sheet on SL p. 6.

Do

- ☐ Play a game of "I Spy."
- ☐ Make Night Sky Slime.

Supplies Needed	
Demo	• No supplies needed
Projects	• Black construction paper (2-11"x 17" or 3-8 ½" x 11" sheets), Clear gel glue, Water, Silver glitter, Black (or purple) food coloring, Plastic baggie, Cup, Borax laundry booster

**SSA = The Sassafras Science Adventures*
***SL = The Official Sassafras SCIDAT Logbook: Astronomy Edition*

Chapter 1: Time to Boldly Go Where...

Read: Gathering Information

Living Book Spine

- 🕮 Chapter 1 of *The Sassafras Science Adventures Volume 6: Astronomy*

(Optional) Encyclopedia Readings

- *Basher Science Astronomy* p. 4 (Introduction)
- *Usborne Children's Encyclopedia* pp. 246-247 (Amazing Space)
- *DK First Space Encyclopedia* pp. 4-5 (What is space?)
- *Kingfisher Science Encyclopedia* p. 385 (Space and Time)

(Optional) Additional Library Books

- 🕮 *A Cat's Guide to the Night Sky* by Stuart Atkinson and Brendan Kearney
- 🕮 *Space: A Visual Encyclopedia* by DK

Write: Keeping a Notebook

SCIDAT Logbook Sheets

This week, you will set up the students' SCIDAT logbooks. You can use blank sheets of copy paper with dividers for each section or purchase *The Official Sassafras Student SCIDAT Logbook: Astronomy Edition* with all the pages and pictures from Elemental Science. For each of these sheets, you can have the students enter information only from *The Sassafras Science Adventures Volume 6: Astronomy*, or you can have them do additional research to gather more facts. The following video shares a peek inside a 2nd-grader's SCIDAT Logbook:

- 🖱 https://www.youtube.com/watch?v=0m4nj-K7s58

What you choose to do will depend upon the ages and abilities of your students. Below is an explanation of each of the student sheets.

Night Sky Journal Sheets

The purpose of these sheets is to give the students an opportunity to work on their spotting skills as they create a night sky journal throughout this leg of the journey.

Blank Space: Have the students draw what they see or add a picture in the space above the boxes.

Date and Time: Have the students add the date and time they made the observations they recorded on the night sky journal sheet.

Where we Were: Have the students write down the location that they were at when they made the observations they recorded on the night sky journal sheet.

What we Saw: Have the students enter the observations they have on the night sky journal sheet.

Astronomy Record Sheets

The purpose of these sheets is for the students to record what they have learned about the various topics that are introduced in *The Sassafras Science Adventures Volume 6: Astronomy*.

Information Learned: The students should color the picture above the box, if they desire, and enter any information that they have learned about the particular topic.

Astronomy Science Notes Sheets

The purpose of these sheets is for the students to record any additional information that they have learned during their study of astronomy. You can use these sheets to record additional narrations, copywork, or dictation assignments.

Project Record Sheets

The purpose of these sheets is for the students to record the projects they have done during the course of their study of astronomy.

Astronomy Glossary

The purpose of the glossary is for the students to create a dictionary of terms that they have encountered while reading *The Sassafras Science Adventures Volume 6: Astronomy*. They can look up each term in a science encyclopedia or in the glossary included on pp. 137-138 of this guide. Then have the students copy each definition onto a blank index card or into their SCIDAT logbooks. They should also illustrate each of the vocabulary words. (Note—In *The Official Sassafras Student SCIDAT Logbook: Astronomy Edition*, these pictures are already provided.)

Vocabulary

Have the older students look up the following terms in the glossary in the appendix on pp. 137-138 or in a science encyclopedia. Then, have them copy the definition onto a blank index card or into their SCIDAT logbook.

- Astronomy – The branch of science that studies what is out in space.

(Optional) Copywork

Copywork Selection

Astronomers study what is out in space.

Dictation Passage

Astronomy is the branch of science that studies what is out in space. Astronomers study planets, stars, black holes, galaxies, and much more. They use telescopes, satellites, and space probes to learn about space.

Do: Playing with Science

Scientific Demonstration: Observing The Night Sky

Begin by taking a moment to discuss things that you can see in the night sky, such as stars, planets, satellites, and the moon. You can also discuss how important observation skills are for the scientist who is studying astronomy. You can view the following blog posts and podcast for more information on the subject of observation:

- http://elementalscience.com/blogs/news/63858627-observation-is-key
- http://elementalscience.com/blogs/homeschool-science-tips/71117699-3-ways-to-work-on-observation
- https://elementalscience.com/blogs/podcast/episode-9

Explain that, today, the students are going to practice their observation skills while doing a bit of night sky spotting. Then, head outside and use a telescope or binoculars to look up at the night sky. Allow the students to make observations and ask questions. Ask the students:

? What do you see?

Allow the students to observe the night sky for a time. You can use apps like Google Sky (Android) or StarWalk (Apple) to help identify what you are seeing. Have the students look for constellations and planets, or just have them identify the phase of the moon. Record their observations on the sheet provided in the SCIDAT logbook or in a night sky journal, as explained below.

(Optional) STEAM Projects

Multi-chapter Activities

- ✂ Solar System Model – Over the weeks of this study, the students will create a large wall-sized solar system model or a smaller lap-sized construction-paper version. This week, you will need to get your model space ready. If you are going to do a wall version, pick out the wall you would like to use. If you are going to do the lap version, have the students tape together two 11"x 17" (or three 8 ½" x 11") sheets of black construction paper together to make an 11" x 34" (or 8 ½"x 33") sheet of paper.

Activities For This Chapter

- ✂ I Spy – Play a game of "I Spy" to help the students work on their observation skills.
- ✂ Night Sky Slime – Have the students make a batch of night sky slime! You will need clear gel glue, water, silver glitter, black (or purple) food coloring, a plastic baggie, a cup, and borax laundry booster. Begin by mixing 4 oz. of glue with 4 oz. of water, a few drops of food coloring, and a shake of glitter in a plastic bag. Next, in a separate cup, mix a quarter cup of water with half a teaspoon of borax. Then, add the borax solution to the baggie and massage the bag for a few minutes until a nice firm slime has formed. Pull the slime out of the baggie and have fun!

Chapter 2: Grid Schedule

Supplies Needed	
Demo	• Marbles, Aluminum pan, Cornstarch, Cocoa Powder, Tape measure
Projects	• Brown and yellow construction paper • Beads, String, Ice cream, Plastic baggie, Rolling pin, Cookies, Rocks, Black paint, Silver glitter

Chapter Summary

The chapter opens with Blaine, Tracey, Summer, and President Lincoln zipping to Summer's lab in Alaska. We then find out that the Man With No Eyebrows, dressed in the Dark Cape suit, is launching into space in his own personal craft (*Thad-1*) thanks to none other than Adrianna Archer. Then we switch to Agent DeBlose of the Swiss Secret Service, where we learn that he and Q-Tip are also being launched into space in the *Dauntless-12* to fix a satellite. Back at Summer's lab, the twins learn about the solar system as they re-tour her lab and realize that they have already been through the cockpit of her lab-spaceship. They meet REESE, the robot who will help them with their SCIDAT while they are in space. REESE shares information about asteroids and the chapter wraps up with a dance party, courtesy of the robot's song about gravity!

Weekly Schedule

	Day 1	Day 2	Day 3	Day 4
Read	☐ Read the section entitled "Rocketing in the Solar System" of Chapter 2 in *SSA Volume 6: Astronomy.*	☐ Read the section entitled "Summer's Spaceship and Asteroid-sharing Robots" of Chapter 2 in *SSA Volume 6: Astronomy.*	☐ (*Optional)* Read one or all of the assigned pages from the encyclopedia of your choice.	☐ (*Optional)* Read one of the additional library books.
Write	☐ Fill out a Astronomy Record Sheet on SL p. 9 on the solar system. ☐ Go over the vocabulary words and enter them into the Astronomy Glossary on SL pp. 91-92.	☐ Fill out a Astronomy Record Sheet on SL p. 10 on asteroids. ☐ (*Optional)* Add observations to the Night Sky Journal Sheet on SL p. 7.	☐ (*Optional)* Write narration on the Astronomy Notes Sheet on SL p. 13. ☐ Add information learned from the demonstration on SL p. 13.	☐ (*Optional)* Complete the copywork or dictation assignment and add it to the Astronomy Notes sheet on SL p. 13. ☐ (*Optional)* Fill out the record sheet on SL p. 15 for one of the projects.
Do	☐ (*Optional)* Make the Solar System Bracelet.	☐ (*Optional)* Do the Asteroids and/or Meteors projects.	☐ Do the demonstration entitled "Impact."	☐ Work on the Solar System Model.

Chapter 2: List schedule

Chapter Summary

The chapter opens with Blaine, Tracey, Summer, and President Lincoln zipping to Summer's lab in Alaska. We then find out that the Man With No Eyebrows, dressed in the Dark Cape suit, is launching into space in his own personal craft (*Thad-1*) thanks to none other than Adrianna Archer. Then we switch to Agent DeBlose of the Swiss Secret Service, where we learn that he and Q-Tip are also being launched into space in the *Dauntless-12* to fix a satellite. Back at Summer's lab, the twins learn about the solar system as they re-tour her lab and realize that they have already been through the cockpit of her lab-spaceship. They meet REESE, the robot who will help them with their SCIDAT while they are in space. REESE shares information about asteroids and the chapter wraps up with a dance party, courtesy of the robot's song about gravity!

Essential To-Do's

Read

- ☐ Read the section entitled "Rocketing in the Solar System" of Chapter 2 in *SSA Volume 6: Astronomy.*
- ☐ Read the section entitled "Summer's Spaceship and Asteroid-sharing Robots" of Chapter 2 in *SSA Volume 6: Astronomy.*

Write

- ☐ Fill out a Astronomy Record Sheet on SL p. 9 on the solar system.
- ☐ Go over the vocabulary words and enter them into the Astronomy Glossary on SL pp. 91-92.
- ☐ Fill out a Astronomy Record Sheet on SL p. 10 on asteroids.
- ☐ Add information learned from the demonstration on SL p. 13.

Do

- ☐ Do the demonstration entitled "Impact."
- ☐ Work on the Solar System Model.

Optional Extras

Read

- ☐ Read one or all of the assigned pages from the encyclopedia of your choice.
- ☐ Read one of the additional library books.

Write

- ☐ Add observations to the Night Sky Journal Sheet on SL p. 7.
- ☐ Write a narration on the Astronomy Notes Sheet on SL p. 13.
- ☐ Complete the copywork or dictation assignment and add it to the Astronomy Notes sheet on SL p. 13.
- ☐ Fill out the record sheet on SL p. 15 for one of the projects.

Do

- ☐ Make the Solar System Bracelet.
- ☐ Do the Asteroids and/or Meteors projects.

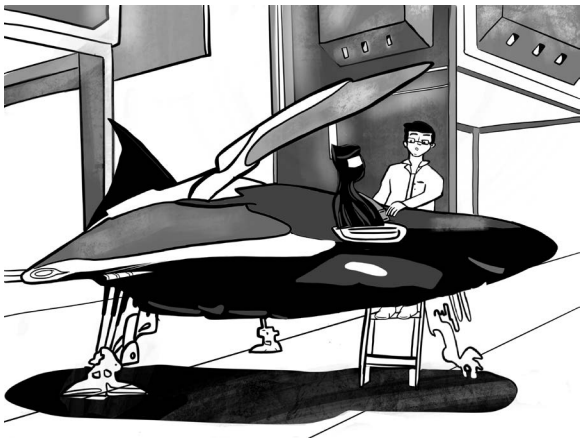
Supplies Needed	
Demo	• Marbles, Aluminum pan, Cornstarch, Cocoa Powder, Tape measure
Projects	• Brown and yellow construction paper • Beads, String, Ice cream, Plastic baggie, Rolling pin, Cookies, Rocks, Black paint, Silver glitter

Chapter 2: To Alaska and Beyond...

Read: Gathering Information

Living Book Spine

📖 Chapter 2 of *The Sassafras Science Adventures Volume 6: Astronomy*



(Optional) Encyclopedia Readings

- *Basher Science Astronomy* p. 8 (Solar System), p. 18 (Meteorite), p. 28 (Asteroid Belt)
- *Usborne Children's Encyclopedia* pp. 258-259 (What's in our Solar System?)
- *DK First Space Encyclopedia* pp. 50-51 (The solar system), pp. 82-83 (The asteroid belt)
- *Kingfisher Science Encyclopedia* pp. 398-399 (The Solar System), p. 413 (Meteors and Meteorites)

(Optional) Additional Library Books

📖 *There's No Place Like Space: All About Our Solar System (Cat in the Hat's Learning Library)* by Tish Rabe and Aristides Ruiz
📖 *Scholastic Reader Level 2: Solar System* by Gregory Vogt
📖 *Magic School Bus Out of This World : A Book about Space Rocks* by Joanna Cole and Bruce Degen

Write: Keeping a Notebook

SCIDAT Logbook Sheets

This week, you can have the students complete a night sky journal sheet. You can also have them fill out the logbook sheets for the solar system and asteroids. Here is the information they could include:

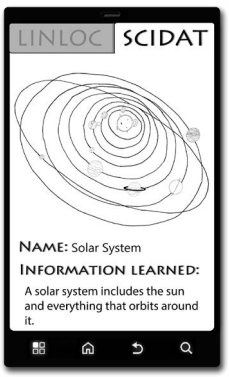
Night Sky Journal Sheet

This week, you can look for shooting stars (meteors) when you do your night sky observations.

Astronomy Record Sheet - Solar System

Information Learned

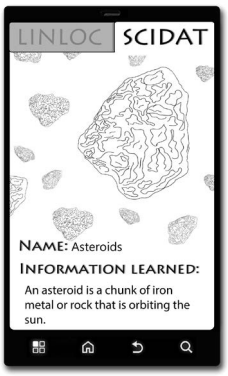
- A solar system includes the sun and everything that orbits around it. This includes the planets, asteroids, moons, comets, and all that space junk.
- In our solar system, the main objects are the eight planets that orbit the sun – Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. There are a few dwarf planets, including Pluto.
- There are also two large asteroid belts, known as the Asteroid Belt and the Kuiper Belt.
- The gravitational pull from the sun keeps all these objects orbiting around it.



- The sun is nearly 1000 times larger than all the planets put together.
- Most of the planets in our solar system have an atmosphere, which is a thin layer of gas that surrounds the planet.
- Our Earth is the only planet in our solar system that is known to have an atmosphere that can currently support life.

Astronomy Record Sheet - Asteroids

Information Learned



- An asteroid is a chunk of iron metal or rock that is orbiting the sun.
- Asteroids vary greatly in size. Some are only meters in length, while some are large enough to be named and considered planetoids.
- There are over 10,000 asteroids that are large enough to be named, such as Ceres, which is about 600 miles wide and is also considered a dwarf planet.
- Eros, one of the named asteroids, had a robot spacecraft landed on in 2001.
- Asteroids have jagged and irregular shapes, so they don't always travel in an even, elliptical pattern as the travel around the sun.
- Most of the asteroids in our solar system orbit the sun in two places—the Asteroid Belt, which is between Mars and Jupiter, and the Kuiper Belt, which is beyond Pluto.
- In 1801, a Sicilian monk named Giuseppe Piazzi discovered the first asteroid in the night sky.
- Some asteroids orbit much closer to Earth; we call those NEAs for Near Earth Asteroids. As they tumble through space, they can be pulled in by Earth's gravity. Once an asteroid enters Earth's atmosphere, it is called a meteor.

Vocabulary

Have the older students look up the following terms in the glossary in the appendix on pp. 137-138 or in a science encyclopedia. Then, have them copy each definition onto a blank index card or into their SCIDAT logbook.

- Asteroid – A rock orbiting the sun.
- Gravity – The force that pulls an object towards another larger object.
- Meteor – A rock that travels through space and burns up when it enters a planet's atmosphere; also known as a shooting star.
- Solar System – A group of planets and other objects all in orbit around the sun.

(Optional) Copywork

Copywork Sentence

Our solar system includes the sun, the planets, asteroids, moons, comets, and space junk.

Dictation Selection

Gravity pulls an object towards another, larger object. It keeps our planets orbiting around the sun instead of floating off into space. This is the same force that makes objects fall to the ground when you drop them.

Do: Playing with Science

Scientific Demonstration: Impact

Materials

- ☑ Marbles
- ☑ Aluminum pan
- ☑ Cornstarch
- ☑ Cocoa Powder
- ☑ Tape measure

Procedure

1. Ahead of time, prepare the planet's surface by pouring a layer of cornstarch on the bottom of the aluminum pan about ½ inch deep and shaking lightly so that the surface is smooth. Then, sprinkle a thin dusting of cocoa powder so that the surface of the cornstarch is mostly covered.
2. Set the pan on the floor and have the students measure 1 foot up from the pan. Have them drop the marble, aiming for the center of the pan.
3. Have the students measure 3 feet up from the pan and have them drop the second marble, aiming for another part of the pan.
4. Remove the marbles, being careful not disturb the holes that were made. Have the students observe the width and depth of the hole created. Ask the students the following:
   - ? What do you notice about the holes that were created?
   - ? How did the two holes differ?

Explanation

The students should see that the marble create an indention on the surface and also displaced some of the cocoa and cornstarch near where it hit. They should also observe that when the marble is dropped from a higher height, the hole formed it a bit deeper and more cornstarch is displaced.

Take It Further

Have the students create a work of impact art using cotton balls, paper, and paint. Have the students dip a cotton ball in paint and then drop it on the paper from a height of three feet using the same procedure as in the demonstration.

(Optional) STEAM Projects

Multi-chapter Activities

- ✂ Solar System Model – This week, the students will add a basic sun and asteroids to their solar system model. Have the students cut out a large round yellow semi-circle and glue it to the far left of the solar system model for the sun. They will add features to this sun as part of chapter 10. Next have the students add the asteroid belt using pictures of rocks or wadded-up brown paper. This belt should be the following distance from the sun:
  - ⇨ Distance for wall version: about 13 in
  - ⇨ Distance for lap version: about 7 cm

Activities For This Chapter

- ✂ Solar System Bracelet – Have the students make a solar system bracelet. You can find directions for this project here:
  - 🖱 http://formontana.net/bracelet2.html

✂ Asteroids – Have the students make an edible asteroid. You will need ice cream, a plastic baggie, a rolling pin, and cookies, such as vanilla wafers or Oreos. Have them place the cookies in the plastic baggie and crush them with the rolling pin. Then, have them take a scoop of ice cream and roll it around in the crushed cookies. Now that they have made your edible asteroid, the students can eat and enjoy!

✂ Meteors – Watch the following video on meteorites with your students:

https://www.youtube.com/watch?v=ZxmuB66iAiQ

Then have the students make their own meteorite. You will need rocks, black paint, and silver glitter. Have them paint their rocks completely black, then dust them with the sliver glitter to make their own meteorite.

Chapter 3: Grid Schedule

Supplies Needed	
Demo	• Black construction paper, Toothpick, Tape, Flashlight, Large clear bowl, Water
Projects	• Black construction paper, 2 Cotton balls, 1 Small yellow pom-pom, 1 Large red pom-pom, Paint, Markers, 1 Large white sequin

Chapter Summary

The chapter opens with the twins, Summer, and the two animal lab assistants outside the lab gazing up at the stars. The twins learn more about the stars and Summer's spaceship-lab, *Ulysses-1*, which has ties to a company in Switzerland. We then find out that the Man With No Eyebrows did indeed make it to space, where he meets the Triple S agents. We then head back to Summer's to find the twins getting into their IEVA space suits to prepare to launch. Back in space, we find out the Man With No Eyebrows has fired upon the Triple S agents and sent them spinning out into space. Eventually, the come up with a plan to recover – they plan to use the top-secret taser Q-Tip brought. Meanwhile the Man With No Eyebrows is preparing to fire *Thad-1*'s ray gun once more as soon as they twins leave the atmosphere. The chapter wraps us with the twins blasting off just as *Thad-1* is hit with a blast from the Triple-S taser!

Weekly Schedule

	Day 1	Day 2	Day 3	Day 4
Read	☐ Read the section entitled "Smashing Spray-Painted Stars" of Chapter 3 in *SSA Volume 6: Astronomy.*	☐ Read the section entitled "Blast off to the International Space Station" of Chapter 3 in *SSA Volume 6: Astronomy.*	☐ (*Optional)* Read one or all of the assigned pages from the encyclopedia of your choice.	☐ (*Optional)* Read one of the additional library books.
Write	☐ Fill out a Astronomy Record Sheet on SL p. 11 on stars. ☐ Go over the vocabulary words and enter them into the Astronomy Glossary on SL p. 92.	☐ Fill out a Astronomy Record Sheet on SL p. 12 on the international space station. ☐ (*Optional)* Add observations to the Night Sky Journal Sheet on SL p. 8.	☐ (*Optional)* Write narration on the Astronomy Notes Sheet on SL p. 14. ☐ Add information learned from the demonstration on SL p. 14.	☐ (*Optional)* Complete the copywork or dictation assignment and add it to the Astronomy Notes sheet on SL p. 14. ☐ (*Optional)* Fill out the record sheet on SL p. 16 for one of the projects. ☐ (*Optional)* Take Astronomy Quiz #1.
Do	☐ (*Optional)* Make the Life Cycle of a Star poster.	☐ (*Optional)* Do the International Space Station project.	☐ Do the demonstration entitled "Shining Stars."	☐ Work on the Solar System Model.

Chapter 3: List schedule

Chapter Summary

The chapter opens with the twins, Summer, and the two animal lab assistants outside the lab gazing up at the stars. The twins learn more about the stars and Summer's spaceship-lab, *Ulysses-1*, which has ties to a company in Switzerland. We then find out that the Man With No Eyebrows did indeed make it to space, where he meets the Triple S agents. We then head back to Summer's to find the twins getting into their IEVA space suits to prepare to launch. Back in space, we find out the Man With No Eyebrows has fired upon the Triple S agents and sent them spinning out into space. Eventually, the come up with a plan to recover – they plan to use the top-secret taser Q-Tip brought. Meanwhile the Man With No Eyebrows is preparing to fire *Thad-1*'s ray gun once more as soon as they twins leave the atmosphere. The chapter wraps us with the twins blasting off just as *Thad-1* is hit with a blast from the Triple-S taser!

Essential To-Do's

Read

- ☐ Read the section entitled "Smashing Spray-Painted Stars" of Chapter 3 in *SSA Volume 6: Astronomy.*
- ☐ Read the section entitled "Blast Off to the International Space Station" of Chapter 3 in *SSA Volume 6: Astronomy.*

Write

- ☐ Fill out a Astronomy Record Sheet on SL p. 11 on stars.
- ☐ Go over the vocabulary word and enter it into the Astronomy Glossary on SL p. 92.
- ☐ Fill out a Astronomy Record Sheet on SL p. 12 on the international space station.
- ☐ Add information learned from the demonstration on SL p. 14.

Do

- ☐ Do the demo entitled "Shining Stars."
- ☐ Work on the Solar System Model.

Optional Extras

Read

- ☐ Read one or all of the assigned pages from the encyclopedia of your choice.
- ☐ Read one of the additional library books.

Write

- ☐ Add observations to the Night Sky Journal Sheet on SL p. 8.
- ☐ Write a narration on the Astronomy Notes Sheet on SL p. 14.
- ☐ Complete the copywork or dictation assignment and add it to the Astronomy Notes sheet on SL p. 14.
- ☐ Fill out the record sheet on SL p. 16 for one of the projects.
- ☐ Take Astronomy Quiz #1.

Do

- ☐ Make the Life Cycle of a Star poster.
- ☐ Do the International Space Station project.

Supplies Needed	
Demo	• Black construction paper, Toothpick, Tape, Flashlight, Large clear bowl, Water
Projects	• Black construction paper, 2 Cotton balls, 1 Small yellow pom-pom, 1 Large red pom-pom, Paint, Markers, 1 Large white sequin

Chapter 3: Zipping Out of this World

Read: Gathering Information

Living Book Spine

📖 Chapter 3 of *The Sassafras Science Adventures Volume 6: Astronomy*

(Optional) Encyclopedia Readings

- *Basher Science Astronomy* p. 20 (International Space Station), p. 60 (Star Birth Nebula), p. 80 (White Dwarf)
- *Usborne Children's Encyclopedia* pp. 252-253 (Living in space)
- *DK First Space Encyclopedia* pp. 40-41 (Living in space), pp. 102-103 (A star is born), pp. 104-105 (Death of a star)
- *Kingfisher Science Encyclopedia* pp. 392-392 (Stars), p. 423 (Space Stations)

(Optional) Additional Library Books

- 📖 *The Sky Is Full of Stars (Let's-Read-and-Find-Out Science 2)* by Franklyn M. Branley and Felicia Bond
- 📖 *Jump Into Science: Stars* by Steve Tomecek
- 📖 *Stars! Stars! Stars!* by Bob Barner
- 📖 *If You Were a Kid Docking at the International Space Station (If You Were a Kid)* by Josh Gregory and Jason Raish
- 📖 *International Space Station (Let's-Read-and-Find-Out Science 2)* by Dr. Franklyn M. Branley and True Kelley

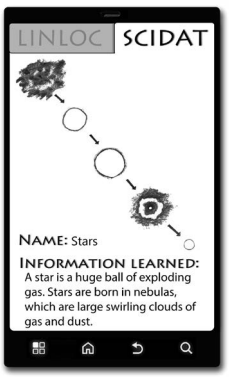
Write: Keeping a Notebook

SCIDAT Logbook Sheets

This week, you can have the students complete a night sky journal sheet. You can also have them fill out the logbook sheets for stars and the international space station. Here is the information they could include:

Night Sky Journal Sheet

This week, you can look for different types of stars and for the international space station when you do your night sky observations.



Astronomy Record Sheet - Stars

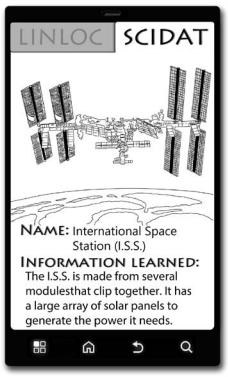
Information Learned

- A star is a huge ball of exploding gas.
- The stages of a star's life can take millions of years.
- Stars go through a life cycle – they are born, they shine, and one day they die out.

1. Stars are born in nebulas, which are large, swirling clouds of gas and dust. Inside a nebula clouds of gas clump together and collapse inward, forming the core of the star.
2. Once the core of the star is formed, it grows hotter and hotter. Eventually, the gas starts to explode and the star begins to shine.
3. As the gas in the star's core burns out, it begins to die. The star becomes a red giant, meaning that it swells up and turns red.
4. The gas on the outside burns up and dissipates into space, leaving a small ball known as a white dwarf. As the white dwarf cools, it fades away and the star is gone.

- The larger the star, the quicker it burns out; the smaller the star, the star the longer it will shine.
- A supernova is a large explosion in space that is produced as a very large star, one much larger than our sun, explodes near the end of its life cycle.

Astronomy Record Sheet - International Space Station



Information Learned

- A space station is a man-made structure that is launched into space and orbits the Earth as it orbits the sun.
- The International Space Station, also known as the I.S.S., is made from several modules that clip together.
- Since 2000, the I.S.S. has been manned by a team of astronaut scientists year-round. The researchers come from several different countries and they perform various experiments to learn how humans and plants are affected by space.
- The astronaut scientists live a zero-gravity environment, which means they have to be strapped in when they sleep and exercise.
- As of right now, the International Space Station is the most expensive thing man has ever built.
- The I.S.S. has solar panels to generate the power it needs and radio antennae and satellite dishes to send signals back to earth with the information from experiments and observations.

Vocabulary

Have the older students look up the following terms in the glossary in the appendix on pp. 137-138 or in a science encyclopedia. Then, have them copy each definition onto a blank index card or into their SCIDAT logbook.

- Space Station – A man-made structure that is launched into space and orbits around the sun-orbiting earth.
- Star – A huge ball of exploding gas out in space.
- Universe – The collection of all the matter, space, and energy that exists.

(Optional) Copywork

Copywork Sentence

A star is a huge ball of exploding gas.

Dictation Selection

We call everything, all the matter, space, and energy that exists, the universe. Everything in our universe is constantly in motion. Space is full of objects in motion. Some we can see from Earth with just our eyes, like the stars. Some of these objects, we need telescopes to see.

(Optional) Quiz

This week, you can give the students a quiz based on what they learned in chapters 2 and 3. You can find the quiz in the appendix on p. 147.

Quiz #1 Answers

1. All of the answers should be circled.
2. Gravity
3. Asteroids
4. Rock
5. Gas
6. 3, 1, 5, 2, 4
7. True
8. Modules

Do: Playing with Science

Scientific Demonstration: Shining Stars

Materials

- ☑ Black construction paper
- ☑ Toothpick
- ☑ Tape
- ☑ Flashlight
- ☑ Large clear bowl
- ☑ Water

Procedure

1. Have the students begin by using the toothpick to poke holes in the paper. These are the stars in the night sky. As they create the stars in their night sky, fill the bowl about three-quarters full of water; this will serve as the atmosphere.
2. When the students are done, tape their night sky to the back of the bowl and head into a room without windows. Set the bowl on a flat surface and wait for the water to settle.
3. Turn on the flashlight before turning off the lights in the room. Shine the flashlight on the back of the paper so that the light shines through the star holes and into the atmosphere bowl.
4. Gently tap the bowl so that the water begins to move and let the students observe what happens to the light.

Explanation

The students should see that when you tap the bowl the light moves and their "stars" appear to twinkle. The light is being refracted, or bent, by the water. The same thing happens when light rays from the stars enter Earth's atmosphere, which is why the stars appear to twinkle at night!

Take It Further

Have the students turn on the light in the room and see how this changes the light coming from their stars. (Note—They should no longer be able to see the distinct "stars" in the bowl. This is because the light in the room is too bright to distinguish the difference. This is why we can't see the stars during the day - the light from the sun is too bright.)

(Optional) STEAM Projects

Multi-chapter Activities

✂ Solar System Model – This week, there is nothing specific to add to the model. However, if you creating the smaller, lap-sized model you can have the students use silver crayon, paint, or glitter to add stars to their model.

Activities For This Chapter

✂ Life Cycle of a Star – Have the students make a Life Cycle of a Star poster. You will need a sheet of black construction paper, two cotton balls, a small yellow pom-pom, a large red pom-pom, paint, markers, and a large white sequin. Have the students use a pulled-out white cotton ball to make a stellar nebula with its cloud of dust and gas. Then, have them use a small yellow pom-pom for the average star and a large red pom-pom for the red giant. Next, have them paint a cotton ball purple, orange, and a bit of blue. Let it dry and pull it out of shape and use it for the planetary nebula. Finally, have the students use a small white sequin for the white dwarf. You can see what this project looks like on this post:

🖱 https://elementalscience.com/blogs/science-activities/119870275-the-life-cycle-of-a-star-poster

✂ International Space Station – Have the students watch a live feed from the International Space Station and see current updates from NASA. You can find that here:

🖱 https://www.nasa.gov/mission_pages/station/main/index.html

We also recommend checking out NASA's YouTube channel. They have several playlists of missions on the International Space Station, simply look for playlists with "I.S.S." in the title.

Astronomy Quiz #1

Chapters 2 and 3

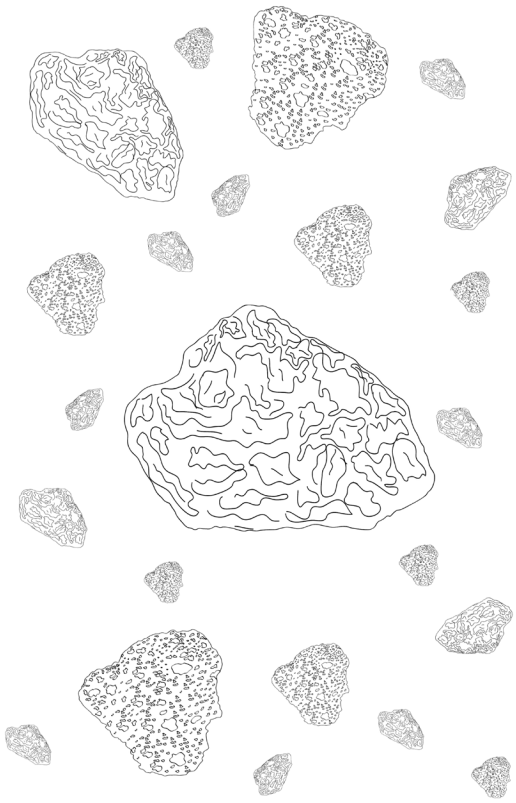
1. Our solar system includes:

The sun The 8 planets The moons

Asteroids Comets

2. _____ from the sun keeps all these objects in our solar system orbiting around it.

3. Our solar system includes two bands of drifting _____ called the Asteroid Belt and the Kuiper Belt.



4. An asteroid is a _____ orbiting the sun.

planet

rock

star

5. A star is really a huge ball of exploding _____.

gas water air

6. Put the life cycle of a star in order from the birth of a start to the end of its life.

____ Explodes and shines.

____ Born in a nebula.

____ Becomes a white dwarf.

____ Grows hotter and hotter.

____ Burns out and begins to die.

7. **True or False:** As of right now, the International Space Station is the most expensive thing man has ever built.

8. The International Space Station, also known as the I.S.S., is made from several _____ that clip together.