Science Notebook

Universe

Sangari Active Science, 2nd Edition

sangari **active science**

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Published by Sangari Active Science,
44 Amogerone Crossway #7862, Greenwich, CT 06830.

ISBN: 978-1-940901-58-9

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Science Notebook

Dear Student,

While completing lessons for this unit, think about the following behaviors of scientists and try to do your best in each area. You will judge yourself at the end of each unit.

Scientist Behaviors

- Listen carefully to the ideas of teammates.
- Argue only with logic and scientific evidence.
- Become a science and engineering learner and problem-solver.
- Remain motivated to learn about science even when answers do not come easy.
- Collaborate with a partner to collect information.
- Think of questions about the real world and complete activities to solve those questions.
- Determine appropriate explanations based on those activities.
- Compare the observations made by different teams for the same activity.
- Think of the reasons for differences if results are not the same amongst teams.
- Keep records.

Lesson 1:

What Patterns Can You See in the Night Sky?

Question

1. Look at the photograph at the beginning of the lesson in your *Student Lab Manual*. What do you see in the night sky?

2. Do stars stay in the same position in the sky, or do they move?

3. Does the night sky look the same from everywhere on Earth?

Predict

How does the night sky change over the course of the night? What about over the course of a week? What causes this?

Observe

Lab Activity: Night Sky Observation

1. Describe what you notice when you compare the photograph of the urban area with the photograph of the rural area. (To compare two things, always consider both similarities and differences.)

Night Sky Observation

Date:		
First Observation	Second Observation	Third Observation
Time: Notes:	Time: Notes:	Time: Notes:
Date:		
First Observation	Second Observation	Third Observation
Time: Notes:	Time: Notes:	Time: Notes:
Date:		
First Observation	Second Observation	Third Observation
Time: Notes:	Time: Notes:	Time: Notes:

Explain

Lab Activity: Night Sky Observation

1. Why do some stars appear to be brighter than others?

2. What things impact your ability to see the night sky clearly?

3. What patterns were you able to see in the night sky during your observations?

4. Look back at your prediction. Based on the *Lab Activity* and readings, revise your explanation to include any new ideas you have learned.

Vocabulary

apparent motion, cardinal points, cluster, diurnal, horizon, universe

1. What does it mean when astronomers say that the movement of stars across the sky is known as **apparent motion**?

2. Why are **cardinal points** and the **horizon** important to astronomers?

3. Why do astronomers identify **clusters** of stars?

4. Name some events in your life that occur on a **diurnal** basis.

5. What are three important facts about the **universe**?

6. After this first lesson, what questions do you have about the **universe**?

Lesson 2:

What Tools Can Help You Find a Star in the Night Sky?

Question

1. Look at the photograph at the beginning of the lesson in your *Student Lab Manual*. What do you know about constellations?

2. How do constellations help you in your observations of the night sky?

3. What tools can help you find particular stars in the night sky?

Predict

How could you help someone else find a specific star you have been observing in the sky?

Observe

Lab Activity: Observation Tools

1. Use the Sky Motion Simulator to model how the night sky changes as days go by. Describe what happens to the stars over time.

2. Draw a diagram of the star or constellation you are observing.

3. Record your notes on what you see and how the position of the star or constellation changes.

Explain

Lab Activity: Observation Tools

1. What did using the planisphere help you learn about stars in the night sky?

Vocabulary

astronomer, astronomy, celestial, constellation, planisphere

1. How did ancient **astronomers** use **astronomy** to help them create calendars?

2. Name three **celestial** bodies in Earth's universe.

3. Why is it useful to know about **constellations**?

4. What information does a **planisphere** provide?

Use this space for additional notes and diagrams when you use the planisphere to observe the same star or constellation on different nights.

Lesson 3:

How Did Science and Engineers Make it Possible to Reach the Moon?

Question

1. Look at the photograph at the beginning of the lesson in your *Student Lab Manual*. What do you know about space travel?

2. What effect does the atmosphere have on space travel?

3. In order to be able to travel through space, what do rockets need?

Predict

Lab Activity: Rocketry

1. Predict how far your balloon rocket will travel.

2. What could you do to make it travel farther? Write down all of your ideas.

Observe

Lab Activity: Rocketry

1. Create a table on the next page to record the results of each launch of your balloon rocket.

Rocket Launch Table

2. How far did your balloon rocket travel on your first launch? How did the result compare to your prediction?

Explain

Lab Activity: Rocketry

1. How were you able to make the balloon rocket travel farther?

2. What causes the rocket to come back down after it reaches a certain height?

3. How could you construct a different rocket that would have greater range (go farther) than the balloon rocket?

Vocabulary

aerodynamic, gravity, launch, mass, payload

1. Why are the **aerodynamics** of a rocket important?

2. What does a rocket need in order to overcome **gravity** and l**aunch** into space?

3. How are **mass** and **gravity** related?

4. What are some examples of **payload** in a rocket?

Lesson 4:

How Can Scientists and Engineers Make Rockets Go Farther?

Question

1. Look at the photograph at the beginning of the lesson in your *Student Lab Manual*. What does it tell you about the launch of a rocket?

2. What does this rocket use to overcome the force of gravity?

3. How does a rocket or spacecraft return to Earth?

Predict

Lab Activity: Long-Range Rockets

1. How far do you think your rocket will travel?

2. What could you do to improve how high or how far your rocket goes?

3. Describe the variable you are changing for your second launch.

4. Explain how you think this variable will change the rocket's performance.

Observe

Lab Activity: Long-Range Rockets

1. Construct a table to record the results of the first and second launch of your team.

2. Construct a table to record the results of the second launch for the rest of the teams in your class. (For each team you will need to know the variable they are testing, the distance of their first launch, and the distance of their second launch.)

Explain

Lab Activity: Long-Range Rockets

1. Was the variable your team changed successful? Explain why you obtained the results you did.

2. Look back at the results for each team. Which variables allowed the rocket to travel the highest or farthest? What made those variables effective?

3. What kind of variables do scientists and engineers consider when they are designing spacecraft?

4. Imagine that someone new joined your class, and missed everything you've done so far in this unit. Explain Newton's Action-Reaction Law in a way that could help that person understand it. Give an example to show what you mean.

Vocabulary

aeronautics, astronaut, variable

1. Describe some of the challenges **astronauts** living at the International Space Station might face.

2. How do **aeronautics** engineers and scientists experiment with **variables** to improve the design of rockets?

Lesson 5:

What Is the Solar System?

Question

1. Look at the photograph at the beginning of the lesson in your *Student Lab Manual*. What do you know about the solar system? Add your ideas to the first column of the KWL chart.

What I Know	What I Want to Know	What I Learned

2. Add any questions you have about the solar system to the second column of the chart.

Predict

Do all of the planets orbit the sun in the same way? For example, do they move at the same speed?

Observe

Lab Activity: Solar System Facts

1. Describe what you see when you place the transparency from April 10, 2006 on top of April 1, 2006.

2. Describe what you see when you overlay all four transparencies in the order indicated in #3 of your *Student Lab Manual*.

3. Use the *Planetary Chart* on the next page to record information about each of the planets.

Planetary Chart

Planet (List in order of distance from the sun)	Number of Moons	Size of Planet (in Relation to Other Planets)	Special Characteristics

Explain

Lab Activity: Solar System Facts

1. What did the four transparencies help you understand about the movement of the planets?

2. Add information you learned about the solar system to the last column of the KWL chart.

Vocabulary

asteroid, comet, meteor, meteorite, planet

1. How are **asteroids** similar to **planets**?

2. Describe what a **comet** is made of and what it looks like.

3. How are **meteors** and **meteorites** different from each other?

4. How do scientists believe the **planets** in our solar system were formed?

Lesson 6:

How Do Planets Move?

Question

1. You have learned that the planet Earth orbits the sun. What do you know about how the other planets in the universe move?

2. What makes the planets stay in orbit around the sun?

3. Look back at your *Planetary Chart* from Lesson 5. What questions do you still have about the planets? What information was surprising?

Predict

How do you think the orbits of the planets compare to each other? (Remember that when you "compare," you describe what is similar and what is different.)

Observe

1. Record which size ball will represent each planet in your model.

Size of Ball	Planet
20 cm	
15 cm	
13 cm	
11 cm	
10 cm	
6.5 cm	
6.5 cm	
5 cm	

Explain

Lab Activity: Solar System Model

1. What did your model of the solar system help you understand about how the planets orbit the sun?

2. All models have limitations. Even though they are useful for explaining some things, they always have things they cannot show or cannot show very well. The "limitations" of a model are those things it cannot do well. What are the limitations of the model you used in class?

Vocabulary

ellipse, solar system, trajectory

1. Why is it important to know that the orbits of the planets are **ellipses** rather than perfect circles?

2. Describe two ideas you think are important to remember about the **solar system**.

3. What does the **trajectory** of a planet have to do with how long it takes to orbit the sun?

Lesson 7:

How Can Astronomers Measure the Distance to a Star?

Question

1. Look at the image at the beginning of the lesson in your *Student Lab Manual*. What do you know about the bright star you see?

2. How could astronomers measure the distance to a star?

3. What is difficult about measuring distances in the universe around you?

Predict

If people standing a few feet away from each other look at an object, do they see the object in the same way? Explain your ideas.

Observe

Lab Activity: Parallax View

Part I

1. What did you see when you closed each eye?

Part II

2. Describe what happened when everyone looked at the red ball from 1-m away.

3. Describe what happened when everyone looked at the red ball from 45-cm away.

Explain

Lab Activity: Parallax View

1. What happened to your thumb in relation to the object in Part I of the *Lab Activity*?

2. What caused the position of the "star" to change for everyone in Part II of the *Lab Activity*?

3. Look back at your prediction. What did this *Lab Activity* help you understand about how people view objects from different positions?

Vocabulary

light-minute, light-year, luminosity, parallax

1. What do **light-minutes** and **light-years** measure?

2. Why is the **luminosity** of a star important to astronomers?

3. What does the concept of **parallax** mean for scientists when they try to measure distances in space?

Lesson 8:

How Can Light Tell Scientists What Stars Are Made Of?

Question

1. Look at the image in the beginning of the lesson in your *Student Lab Manual*. What do you notice about the stars?

2. Why is it useful to know the color of a star?

3. How are stars and planets different?

Predict

How can astronomers study the light that stars emit?

Observe

Lab Activity: Spectroscope

1. Draw the spectra you see for each lamp.

Lamp 1

Lamp 2

Lamp 3

2. What differences do you see in the spectra for each lamp? (Include observations of the widths of the colored bands.)

Explain

Lab Activity: Spectroscope

1. What information do these different spectra give you about the light in each type of lamp?

2. How do your observations help you think about the color of stars?

Vocabulary

emit, spectroscope, spectrum, wavelength

1. What would happen if the sun were to **emit** less light?

2. What information does a **spectroscope** give an astronomer about stars?

3. Why would someone be interested in studying a star's **spectrum**?

4. How are you able to see **wavelengths** of light?

My Notes

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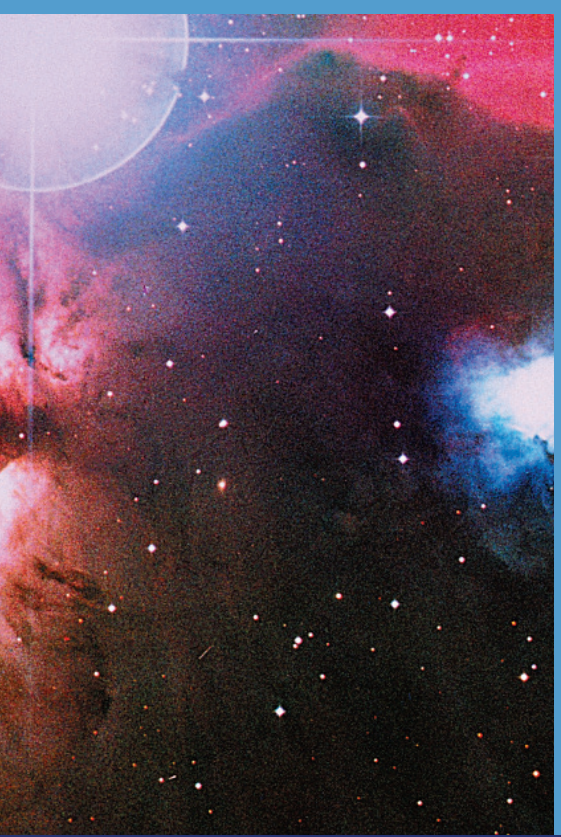

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