



All Year Long

Purpose

- To introduce students to the concept of using a science journal to record information.
- To have students use science tools to make scientific observations.
- To make observational drawings in nature and compare the results throughout the seasons.

Overview

Each student will keep a science journal during each of the four seasons. Students will record observations of the general outdoor environment they visit and then will make observations of one specific item from the habitat in each season. At the end of the school year, students will compare of their seasonal drawings and share their results with the class.

Student Outcomes

After completing this activity, students will know about seasonal changes in a particular habitat. They will learn how to make detailed observations, record their results, make comparisons, and share information using a standard format.

Science Content Standard A: Science as Inquiry

- Abilities necessary to do scientific inquiry

Science Content Standard B: Physical Science

- Properties of objects and materials
- Position and motion of objects

Science Content Standard C: Life Science

- The characteristics of organisms
- Organisms and their environments

Science Content Standard D: Earth and Space Science

- Objects in the sky
- Changes in earth and sky

Mathematics Standard: Patterns, Functions, and Algebra

- Understand various types of patterns and functional relationships
- Use mathematical models and analyze change in both real and abstract contexts

Mathematics Standard: Measurement

- Understand attributes, units, and systems of measurements

Time

- Part 1: One 30-45 minute class period
- Part 2: One 15 minute class period
- Part 3: One 60 minute class period for each month/season of the year
- Part 4: One 30 minute class period

Level

Primary (most appropriate for grades K-4)

Materials

Part 1:

- Elementary Globe book: *The Mystery of the Missing Hummingbirds*
- All Year Long Student Activity Sheets 1-3 (1 copy of Sheet 1 per student, 12 copies of Sheets 2 and 3 per student), made into a book.
- Overhead transparency of All Year Long Student Activity Sheets 1-3
- Two blank overhead transparencies
- Poster-size color pictures of a flower and a landscape

Part 2:

One of each of the following per student:

- Resealable plastic bags
- 12-pack colored pencils; pencil/eraser
- Ruler (metric)
- Magnifying Glass
- Wooden Craft Stick



Preparation

Part 1:

- Read the Elementary GLOBE book *The Mystery of the Missing Hummingbirds* – either read it to the class or have students read it to themselves. The book can be downloaded from www.globe.gov/elementaryglobe.
- Use copies of the *All Year Long Student Activity Sheets, 1-3* and to create a journal for each student.

Part 2:

- Place all the materials for the Science Journal Toolkits into separate containers and place in a workable space for students.
- Make a master Science Journal Toolkit for teacher use

Teacher's Notes

Phenology is the study of organisms' responses to seasonal and climatic changes in their environment. Seasonal changes include variations in day length or duration of sunlight, precipitation, temperature, and other life controlling factors. Most places on Earth experience seasonal variation during the year: in different areas it may be hot, cold, rainy, or dry depending on the season. Length of daylight can vary as well: latitudes near the poles experience nearly 24-hour sunlight at the peak of summer and nearly 24-hour darkness at the peak of winter. Around the world, people, plants, and animals have adapted to the types of seasonal variation experienced in their own region.

Understanding why there are seasons is not the primary goal of this activity. Rather, it should be viewed as an introductory activity that focuses students on making careful observations about seasonal changes in their local environment, recording their observations in a systematic way, and noticing the annual cycles that their observations reveal. Remember that GLOBE is an international program and that seasonal changes

vary quite a lot in the different parts of the world where GLOBE schools are located.

Studying seasonal change is very conducive to keeping a science journal. Keeping a journal throughout the year makes it possible to witness how much things in nature change month by month until the annual cycle has started over again. Once a year has passed, patterns in the new year may be the same, but details will be different, so it is beneficial to keep a journal for more than one year in the same place!

Careful observation is a foundation of all science. When making observations, it is important to look closely in order to notice details. It is also important to use many of the senses: sight, sound, smell, touch. Once careful observations have been made, then it is easier to notice connections between objects that may have seemed isolated at first; it makes it easier to be attuned to the environment. Spending time making quality observations will help students learn the skills involved in this part of scientific inquiry.

Encourage your students to make observations and carefully record them by writing and drawing. Also encourage the students to reflect on what they have learned from keeping a seasonal science journal. Some skills and learning outcomes that can result from students keeping a science journal include:

- Experience making scientific observations
- Improved creative and technical writing skills
- Experience new ways of communicating ideas
- Having the opportunity to ask more questions
- Taking time for reflection
- Gaining a greater appreciation of the natural world

See the "Earth as a System" section in the *GLOBE Teacher's Guide* for more information on phenology (www.globe.gov). For more information on keeping a science journal with students, ask your local librarian for books about science/nature journals, science notebooks, etc.



What To Do and How To Do It

Part 1: Observational Drawings

1. Using the overhead projector and the overhead transparencies of the science journal, introduce the *All Year Long Student Activity Sheet* journal pages to the class. Examine the top section of Sheets 2 and 3 inside the box and explain each item and its corresponding icon. Then, fill out the top section on the overhead page as an example for the class.
2. Next, explain to the students that they will be making observations throughout the school year during each season and they will record those observations in their journals. Explain the importance of making their drawings as accurate as possible during their fieldwork.
3. First, model the “Big Picture View.” Place the landscape poster on the wall so the entire class can see it. Using a blank transparency page, show the students how to make a journal entry of the landscape. Talk to the students about what you are drawing, commenting on what details you notice, what colors you are using, etc. Then compare your drawing to the image on the poster and have the students decide how your drawing is similar and different to the image of the landscape.
4. Next, have students practice the “Zoomed-in View.” Display the flower poster and have the students draw their own pictures of the flower and make their own comparisons. Note: have younger students trace a flower image first and then draw it free-hand.
5. Note: younger students might need more specific modeling (including a discussion) of how to make the two different types of observational drawings. This might help them understand the difference between the two types of drawings and will show the students what level of detail they should include in their own drawings. Through this discussion, students will identify what elements make a good detailed observation and the students will be ready to make “Zoomed-in View” observations of other objects.

Part 2: Science Journal Toolkits

1. Have the items for the Science Journal Toolkits set out in an area where students will be able to assemble their own bags.
2. Gather the students into a circle sitting on the floor and empty out your model version of the Science Journal Toolkit. Pick up each item, identify it, and ask students how they think that particular item might be useful to them when outside doing their observations and their drawings. This will help the students use the tools when they go outside to make their observations.
3. Next, have each student assemble his/her own bag and label it with his/her name.

Part 3: Observational Procedures

1. Explain to students that they will make observations and record them in their journals. They will be making observations of two different things. First is the “Big Picture View,” which is the entire habitat/environment or system where they are making their observations. This may include many different plants, animals, and landforms/bodies of water.
2. The second observation will be the “Zoomed-in View;” for this, each student will select one thing they will observe in detail throughout the four seasons. This could be a tree, shrub, flower, pond, stream bank, etc. Note: One way to help students understand the “Zoomed-in View” observation is to go outside and have all of the students make observations of the same thing, e.g. a tree branch. Then, as a class, share what they drew and how they made their observations. Through this discussion, students will identify what elements make a good detailed observation and the students will be ready to make “Zoomed-in View” observations of other objects.
3. For each season, on the left page of their journals the students will record observations of the Big Picture View. On the page on the right they will record their Zoomed-in View observations. They will label the name of the season at the top of each page.



4. When recording their observations the students should both draw pictures and write words about what they see. Younger students may need adult assistance writing out their observations.
5. Instruct students that the first time they go into the field during a certain season they will be making a Big Picture View observation and the second time they go into the field it will be to make a Zoomed-in View observation.
6. Before students begin their work in the field, clarify that they will have a full 30 minutes to work on each observation (this may be broken into two 30-minute time periods or one 60-minute time period). Explain that they need to take the time to make careful observations using some or all of the tools in their Science Journal Toolkits. Also remind students to use more than their sense of sight when making observations. (Younger students may also need the reminder that they will not be using their sense of taste when making any observations outside).
7. Remind the students that they will need to save some time to record their observations in their journals. They don't want to be hurried in this part of the process. Remind students that their drawings are like "taking a picture" so they can share it with someone who would be seeing it for the first time. During the first two observation sessions, the teacher may want to help students monitor their time to ensure that both observations and recordings take place.
8. Optional: use a digital camera or a video recorder to document what the outside environment looks like each time the students go outside to make observations. This information can be used at the end of the school year when they are making comparisons.

Part 4: Sharing Results

1. At the end of the school year, have the students take some time to study all their drawings for each season. Encourage them to look carefully at the details they included in their drawings.

2. Next, have them concentrate on their Zoomed-in View drawings and decide what changes have occurred throughout the four seasons.
3. Have students discuss their findings with a partner. Then, have each pair share their conclusions with the whole class.
4. Record the students conclusions on chart paper so the class can see the similarities and differences between their individual observations.

Adaptations for Younger and Older Students

Younger students may need some help labeling their drawings. One way to do this is to prepare season labels in advance so the students can glue them into their science journals (for example, write/type Summer, Autumn, Winter, Spring on pieces of paper). Also, additional adults or older students can help young students label their drawings. As the year progresses, younger students may be able to handle this task on their own.

Older students can make additional observations of other "Zoomed-in Views" to add to their journals. They can also pair up and make observations of the same things as other students and then compare their observations for similarities and differences.

Further Investigations

- **Observation guessing game:** Have pairs of students take turns describing different objects to each other. The student who is listening to the description shouldn't be able to see the object. One way to make this easier is to have the students sit with their backs to each other or to place the object in a box so only the student making the description can see or feel it. At the end, have them place the objects they described into a pile with other objects and try to guess which object was described to them. Some good objects to use here are rocks, leaves, etc.



- **Scientists' Journals:** Show your students examples of published journals that well-known scientists kept in the past. Some good examples to use are the journals of Charles Darwin, Leonardo Da Vinci, Henry David Thoreau, and Merriweather Lewis & William Clark.
- **Field Trips:** Take your students on a field trip to museums, zoos, botanic gardens, or a park to make additional observational drawings. Also, contact a museum curator and arrange a presentation to your class on the importance of observational drawings both historically and in the present day.
- **Classroom Gallery:** Create a gallery in the classroom to display all of the students' seasonal observations/journal entries – invite families or other classes to visit the gallery.
- **Using journals for other science investigations:** Use the *All Year Long Student Activity Sheets* to make journals for science investigations in other topic areas as a way to encourage students to make observations when they are studying a new topic.

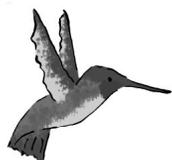
Elementary

GLOBE



The Mystery of the Missing Hummingbirds

All Year Long Student Activity Sheet 1



My Science Journal



A large rectangular area enclosed by a decorative border of small grey dots, intended for students to write in their science journal.

Name: _____



All Year Long Student Activity Sheet 2



Name _____

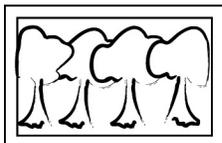


Date _____



Weather _____

Temperature Hot Warm Cool Cold



Big Picture View

Write or draw your observations here.



All Year Long Student Activity Sheet 3

Season _____



Clothing _____

Zoomed-in View

Write or draw your observations here.

