



“I Notice...” Learning Observation Through Nature Journaling

Curriculum Unit 22.01.06
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Background

In the modern world, a disconnect between society and our natural world is apparent. As a life science educator, one of my core focuses is to restore this connection by encouraging my students to observe this world. Every day, a child is exposed to nature as we know it in modern times regardless of the number of biotic factors present. However, the time spent in this element is usually brief, including only the transportation to and from school. During this time, students usually tune out of the world around them and tune into their devices, missing opportunities for mindful observation and recognition of the beauty in our natural world. This has a negative impact in the science classroom when students are asked to construct their own observations, a crucial step in the inquiry process. How can we improve this skill and take our students to the next level at which their observations possess accuracy, detail, and inspire questions? If we wish to avoid our students taking short glances at objects and reporting only basic facts, we must guide them through what it means to truly, deeply observe. This will mean taking time to teach the importance of using all senses and making observations of quality and quantity. Nature journaling is a perfect method of practicing this, as it forces the observer to gather otherwise overlooked information.

Rationale

So, why nature journaling? Using a journal is a skill that can change students' lives forever in many ways. Perhaps as science educators, we wish to select exercises and activities which will hone students' abilities to become scientists. Hopefully, as one reads this, you already realize that every person, every student, is a scientist and uses science practices every day. We do not need to convince our students to become scientists, we need to convince them that they already are with the hope that they become no longer intimidated by science. The practices that are taught in the science classroom are interdisciplinary, such as arguing from evidence, asking questions, analyzing data, and interpreting models, just to name a few. All of these practices and many more stem from one skill: making observations.

Nature journaling can deepen observations, as it can include words, pictures and numbers. The combination of

these can lead the student to think in many different ways and make a more complete record of what they see.

Writing, Drawing and Using Numbers in Nature Journaling

When we write, it strengthens our thoughts because they must be organized enough to write on paper. If we are to describe something, it forms a stronger memory. There is much research to support that physically writing something helps us to remember it better than even typing on a computer or saying it aloud.¹

When we draw, we are forced to observe something closer than ever before to capture every structure, shape, and contour we see. We must look again, and again at the specimen's parts that are familiar to us, leading us to notice those details which differentiate one species from another.²

When we use numbers, it transforms our observations and helps us to recognize patterns that are in nature and can be architecturally exact, a true marvel of nature's tendencies. Recognizing these patterns, such as the number of spirals on a pine cone, can lead us to ask questions we never would have before.

Combining these three disciplines on one page makes for a richer learning experience and forms lasting memories and gives structure to the inquiry process. Furthermore, nature journaling makes the science practices accessible to all students as every student can have access to the same experience, yet process it in a different way. The use of a nature journal has long been a valuable, authentic tool and helps students to understand the scientific process and to acknowledge themselves as scientists.

What Makes a “Good” Observation?

“The essence of science is validation by observation.”³ This statement proves true to science investigations and results. For example, when scientists are presenting findings, the biggest question is, *How do you know?* or *What is your evidence?* In these instances, we are mostly referring to observations that are quantitative, such as including measurements or other numerical results. Here, it is true that there is validity contained in numbers, especially when it requires taking multiple measurements of some sort. It would also seem by this description that observations are what concludes an investigation and gives it credibility. However, observations also exist elsewhere in the scientific process and occur frequently throughout an investigation. Although there is no true sequential scientific method, there are certain features of science that give it a distinctive character as a mode of inquiry.⁴ Therefore, many places exist throughout an investigation for both quantitative and qualitative observations. While an observation can be quantitative and provide validity for a claim, it can also be the driving force to an investigation.

This can be seen in the journaling routine that will be described in the first learning activity. By noticing, we are using our senses, proving mindfulness in our environment. By wondering, we are using our observation to begin the inquiry process. By figuring out what it reminds of us, we are making connections and utilizing our previous knowledge. I will argue that there are no “bad” observations, but there are different levels of quality for observations which can either provide validity to our investigation or be the driving force for inquiry. A simple observation in nature may be “The tree has no leaves.” This still proves awareness in one's environment, and is important as an entry step to inquiry and investigations.

Conserving and Connecting With Nature

Nature, as we exist in it, has transformed to include streets, buildings, bridges, etc. We often separate ‘nature’

from these components because we perceive it is as unnatural. But, in most if not all locations, biotic and abiotic components must coexist even if they do not have the most mutualistic relationship. It is often an argument that if we can immerse students in an experience which includes the typical definition of nature, for example, hiking through a forest, they will see that it is worth conserving. However, I believe that a student must recognize that their own neighborhood is still nature, that conserving the forest and the sea is not our only objective. Rachel Carson proclaims in her essay “Sense of Wonder” that “Even if you are a city dweller, you can find some place, perhaps a park or a golf course, where you can observe the mysterious migrations of the birds and the changing seasons.”⁵ We must take action in the small world around us as well. Nature journaling can help students to recognize beauty in their immediate surroundings, further advancing the conservation mindset we all must have if we are to move forward in protecting this world from our current climate crisis.

Practicing Mindfulness

Ask any teacher in today’s classroom environment what the largest distraction from learning is and they will most likely agree that it is the use of mobile devices. While these enable us to make invaluable connections that would otherwise be too distant, they do not help us to connect with our immediate surroundings. In fact, the numerous options we have to keep our minds occupied can be somewhat overwhelming, leaving our immediate surroundings as a backdrop.

Nature Journaling offers a way to remain present in the moment. We are forced to slow down to focus on observation, to weave our thoughts into writing and drawing. Each subject used for a journal entry becomes engraved in memory as multiple senses are used to experience that moment and that subject. In this way, a tree in your backyard is now an individual you spent much time with, not just something you walk by every day. The tree, or any other subject, is now seen in a new light. It is now seen as an invitation to slow down and be present in this moment. Each moment is unique, it has never existed before, and its exact occurrence will never exist again.

Facilitating an Outdoor Classroom

Deviating from the norm of an indoor, classroom meeting is exciting for both teachers and students. It is essential to plan accordingly for this event and present expectations for students. It should also be expressed that the teacher will work to meet the basic needs of the outdoors student and establish routines and proper notification so the student can dress and prepare accordingly.

Meeting Basic Needs

The act of journaling in the field requires a certain focus which cannot be maintained if the students’ basic needs are not addressed. It is important to note that outdoor learning is not to be centered around ‘toughing it out’ in the elements. In fact the comfort and safety of each student is a priority. In order to meet the basic needs of the students in this situation, the following tips are suggested:

1. Be aware of the weather conditions and be prepared to modify plans as needed.
2. Allow and encourage students to wear clothing that they are comfortable in and that will suit an outdoor

experience. For example, if walking to a rocky trail, sneakers may be suggested.

3. Encourage and remind students to bring sunglasses, jackets, hats, water, or other items necessary for a comfortable outdoor experience.

Meeting Emotional Needs

To accompany the basic needs of students in an outdoor environment, teachers should be ready to tend to each student's emotional needs. Each student has a different current relationship with nature which is driven by their experiences and culture. A teacher should not be surprised if, for example, their student who lives on the northern side of New Haven has never visited the beach before, even if the distance is seemingly quite short. Each perspective we are presented with should be met with curiosity and encouragement.

Establishing Routines

An outdoor session also requires routines and clear expectations. Establishing these prior to the outdoor session can provide for an easier and more productive experience. For example, students may be instructed to gather their materials upon arrival to class or complete a warm up. Once the outdoor destination has been reached, the journaling activity may commence by using a routine exercise such as the observational routine described in the first activity in the lesson plan descriptions.

“Sit Spots”

In accordance with establishing routines, it is important to allow students to select a spot which they will return to during each nature journaling session. In the book titled “What the Robin Knows”⁶ Jon Young writes of a boy who is initially resistant to remaining in a sit spot, observing, and journaling. He writes that in a way, this boy was refusing to see the birds and wildlife around him, but the experience was also so new to him that he needed to further develop the senses required for this exercise. Through repetition, this young boy was eventually able to identify several species as well as observe certain behaviors of these species. This growth would not have occurred if this young boy were to charge in a different direction in the forest with each session. Instead, he selected the same “secret spot” to return to each time. Over time, the boy built a relationship with this spot and the wildlife around him. It is this example that proves that requiring students to return to their same sit spot each time will encourage the journey towards detailed observation in nature journaling.

It is also important to choose an area for these sit spots that is convenient. For example, Jon Young argues that any place that is more than a two-minute walk from the doors may be too far.⁷ Teaching in an urban setting, I can relate to the challenges of finding locations that are considered “Nature” as mentioned before, nature is all around us, even if it does not meet our conventional views of what a “natural environment” is. For the purposes of nature journaling, a tree, or garden that is in a city is just as effective as one that is in a forest. Birds, for example, are very prevalent in the city, and are often heard in the early morning hours.

Probing Questions

For the purpose of this unit, the practice of nature journaling is meant to hone one's thinking and observation skills for successful instruction in a science classroom. When discussing what makes a “good” observation for a science classroom, it was mentioned that a teacher as the facilitator for these observations can be encouraging, and sometimes necessary. We desire our students to make observations which will drive their investigations and lead to further inquiry on that topic. Some students may find it easy to make observations

and create their own inquiry experience while nature journaling. However, other students may need intervention from the teacher. This intervention is not meant to tell the student exactly what to notice, but may offer a broader idea of what they can look for. This can be as simple as the teacher suggesting a key concept from the material they are teaching in class such as structure and function. With a suggestion such as this, the student can then begin to notice the parts of an item they are looking at and offer hypotheses for figuring out why this is so.

Bringing Nature Journaling Into the Classroom

It may not be possible to take students outside for every day that nature journaling is practiced. For example, weather conditions may prevent us from staying outside. In this situation, natural objects can be brought into the classroom such as leaves, pinecones, sticks, shells, etc. Eventually, you may be able to procure a small nature museum of sorts which will add to the curiosity in the classroom. An alternative to this is to ask students to bring in their own item that sparks their curiosity, perhaps one that is in their backyard or found on their route to school.

Unit Goal and Objectives

This unit is designed to hone a student's core science skills as well as provide a foundation for the practices used throughout the year. Therefore, it is suggested that this unit be implemented at the start of the year, especially taking weather conditions into account. Teachers may find it quite engaging to implement this unit as the leaves begin to change color, as this obvious indicator of the change in season can be a phenomenon that creates many opportunities for reflection and inquiry. While this unit is specifically designed to meet the learning objectives of high school science standards, it can easily be modified or implemented as is to middle school classes and even upper elementary classes. In list form, the objectives in this unit are as follows:

Students will be able to:

1. Identify patterns in surroundings to form questions, observations, and connections.
2. Engage with the first steps of the scientific practice.
3. Recognize journaling as a valuable tool for science and mindfulness.

These objectives are, in a sense, the overarching theme for the unit and every lesson addresses the objectives above. Each lesson also contains objectives that are specific to it. Used sequentially, the lessons in this unit guide the student through a process which hones their observation skills in order to provide for a meaningful introduction to the inquiry and investigation experience. Previously, I have discussed what it means to create a “good” observation and the different levels of quality each one possess. The overall goal to this unit is for the students to create a high quality observation that leads to a driving question. In the activity titled “Sit Spot” one should notice that it lead by student choice and gives the student freedom to record in their nature journal in whatever way inspires them. As a mode of formative assessment for this unit, students will be asked at the end of the sit spot activity “In your nature journal or at your sit spot, if you had to investigate one of your observations, what would it be? What would be the first step in your investigation?” By answering this question, students are displaying that their observation is of high quality, as it also produces a driving question.

Setting up a Nature Journal

Using Metadata

Metadata can be described as data that explains other data, or refines the structure and context of the data presented. For each journal entry, it is a good habit to have students record this metadata on their journal page and can include the date, time, location and weather. This information may be helpful in providing context to the teacher and student when looking at journal entries later.

Learning Activities

Activity 1: Routine for Observational Thinking⁸

Objective: At the end of this activity, students will be able to construct an observation using the prompt and set up a nature journaling page.

During the first activity of the unit, tell students that they are going to participate in activities that will make them better observers. It should be explained to students that they are all scientists even if they do not think so. Without paying much mind to this thought, all students engage in core science practices every day such as asking questions, arguing from evidence, constructing explanations, and communicating information. All of these practices, along with a few others, are ones that are addressed by the current science standards. They also begin with a fundamental skill in science: making observations.

This activity can be completed outside by participating in a quick walk, or in the classroom by bringing in natural items as described previously. Instruct students to set up their journal page using metadata. Then, instruct students to find an item that interests them. After students have located their item, introduce the first prompt: “I observe.” Explain to students that by starting a sentence with “I observe” they are making an observation, however, this should not include opinion or explanation. Instead, it uses senses such as sight or hearing. Allow students a few minutes to create these observations based on their item and record them on their journal page. You may wish to have students share out their observations, or keep them to themselves. Next, explain the second prompt “I wonder” as a way to focus on asking questions about their item. Encourage students to ask all questions about their item that come to mind and record them. Allow students a few minutes to share their questions. Introduce the last prompt: “It makes me think of.” Students may feel motivated to make connections to other concepts that are not science related, such as art or emotions, and it is important to honor and encourage this. Through sharing these connections, whether emotional or scientific, the student was able to learn something new about the item. Taking a few minutes for reflection, allow the student to record these on their journal page and then explore some other items within the environment/classroom. Tell students to use their new observation skills!

These prompts can be used as a routine for regular instruction, especially when an opportunity presents itself unprompted in the environment. From this point forward, students should be reminded to refer to these prompts when using their new observation skills.

Activity 2: Diagram Matching Game

Objective: At the end of this activity, students will be able to construct a diagram and search for patterns amongst these diagrams.

For this activity, items can be brought into the classroom or students can be brought outside for a hike. Prior to beginning the activity, instruct students to label their journal using metadata. Tell students to select a natural object from their surroundings. All of the objects for the class should be of the same category, such as species of trees and their leaves, sticks, or flowers. Once the items are found, instruct students to use their observation skills to create a diagram of their item. These journal entries should include words, pictures and possibly numbers. Students may only select a method they are comfortable with, but it should also provide as a good description of their item. Students should be encouraged to create their diagrams to emphasize structure meaning that the picture does not have to be pretty, it simply needs to be accurate. Tell students that they should diagram their item well enough that another student could identify the object by using their diagram.

After a period of time that suits your class schedule, have students return to the group and place their diagrams in a circle, or in a manner where they can all be seen, and then place their items together in a different spot. To add variation to this, as the teacher you may shuffle the diagrams and lay them out. Instruct students to match the item to the diagram, and then select another of the item from the same species in the environment to match the diagram.

With a partner, have students discuss general questions about the process of journaling and matching the items with their diagram. Here, it is beneficial to use questions which address the science practices. For example, ask students which details were the most helpful and least helpful in identifying the item or if they noticed any patterns between diagrams. You may also ask students to determine what caused the patterns we observed or about the structures of each item and if this structure serves a particular purpose.

Activity 3: Transect Inventory

Objective: At the end of this activity, students will be able to practice making observations, diagramming, and looking for patterns amongst species.

This activity must be completed outdoors, so warning students ahead of time of this is good practice. Remember to address the basic needs of students that were discussed in the “Meeting Basic Needs” section.

An outdoor area containing varying ground cover is necessary for this activity. Examples include anywhere that contains different species of weeds and other small plants along with natural items. A string or rope loop/ circle that is about arms length should also be made if quadrats are not available in the classroom. Hula hoops also make for good quadrats.

After recording daily metadata for the entry, ask students to make a prediction about what species or items they think they will see in their quadrat. Then, instruct students to place their string loop/ quadrat on the ground, specifically in a location with multiple species. For a set amount of time, allow students to record as many items as they can find and identify within their string loop or quadrat. Remind students of their observation skills and the observational routine. Here, it is encouraged that students record their findings using multiple modes including numbers, pictures, and words.

It may also be found that students announce they are done. At this point, encourage the individual to take a “brain break” and look away from the zone of interest and then look back and see what else they can notice, or try to explain the zone in other ways such as different drawing angles.

For the discussion portion of this activity, have students join in small groups and share the details of their journal page. Encourage students to compare findings, searching for similarities and differences between structure of the journal entries or general observations.

Activity 4: Sit Spot

Objective: At the end of this activity, students will be able to practice their observation skills and create a driving question.

In this activity, students find their own place in an outdoor area and pay attention to whatever may inspire them. They will record their experience in their nature journal along with metadata. This act of utilizing a sit spot should be done at least 3 times across class periods. At this point, sit spot experiences can be scattered throughout class periods, for example at a frequency of one experience per week or every other class. Students should return to the same sit spot at each experience.

Teachers will offer guidance but not requirements for how students can record their experience in their journal. Students can write, draw, or record in whatever way feels right to them. As discussed, students will appreciate a menu of sorts of activities to choose from to guide their reflection. These activities are described below.

Poem Writing

At the sit spot, a poem inspired by the students’ experience can be written. This can be done in multiple ways if the student already possesses a poem style they like or feel inspired to write. If this is not the case, students can use the sentence starters from the first activity: “I observe, I wonder, it makes me think of” and turn these statements from an observing point of view to one that reveals internal emotions or experiences.

Diagram Drawing

Using skills from the activity “Diagram Matching Game” students can create a diagram in a style that appeals to their inspiration. They may choose to focus on an individual item or the landscape view from their sit spot. Encourage students to use numbers, drawings, and words for their diagrams.

Scientific Illustration

Similar to drawing a diagram, a scientific illustration is one which emphasizes unique and significant structures of an organism or item. Students may choose to color or shade their drawing, but the baseline requirements for an illustration follows the ABCD’s of scientific illustration:

A: Accurate- Draw exactly what you see

B: Big- Fill the whole piece of paper

C: Color: Add in color or shading that is accurate

D: Detailed: Add as many details as you can

Nature Autobiography

Write an autobiography from the perspective of something at the sit spot such as a tree, insect, or general landscape. Students may also choose to create a comic autobiography.

Leaf Rubbing Collage

Gather some leaves from the sit spot and place them one at a time under the paper. Using the side of the tip of a pencil, shade the paper to reveal the textures on the leaf. Arrange multiple leaves on the paper and repeat this process until a collage is created.

At the end of this activity, students will be asked ““In your nature journal or at your sit spot, if you had to investigate one of your observations, what would it be? What would be the first step in your investigation?””

Conclusion

In this modern world, it remains of the utmost importance that students gain and sustain a connection with their natural environment. By practicing nature journaling, students are able to achieve this, and more, especially as it pertains to the science classroom. Making quality observations is one of the first steps in an investigation and leads to the creation of driving questions. Through these series of activities and other nature journaling exercises, the student is able to hone these skills, practice mindfulness, and gain confidence in their inner scientist.

Notes

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Appendix on Implementing District Standards

The NGSS standards met in this unit are as follows:

1. Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, the introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value. (secondary to HS-LS2-7) (Note: This Disciplinary Core Idea is also addressed by HS-LS4-6.)
2. Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (HS-LS1-3)
3. Ask questions that arise from examining models or a theory to clarify relationships. (HS-LS3-1)

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