Nature Notes and GLOBE Sequence - Middle School

This guide presents a flow of lessons and activities that combine GLOBE observations and the Gulf of Maine Research Institute (GMRI) Nature Notes program. Nature Notes are a form of communicating observations, making connections to background information, and making a claim or asking questions. It is not as in depth as a research project but helps lay the foundation for future research projects and activities.

The intention is to use the GMRI Nature Notes writing process with GLOBE observations to provide students with guidance on communicating their observations in a concrete way. It encompasses a peer review process that enables collaboration between schools as well. Implementing this will allow teachers to implement GLOBE observations with the objective of sharing student results in the Nature Notes format even if they do not have time to complete research projects.

Teacher Background

- **Safety Note: NEVER LOOK DIRECTLY AT THE SUN.** Follow all safety guidelines for GLOBE protocols being used. You can also show your students this safety video.
- Preview a sample of a professional nature note: Appendix C-1: Example of Professional Nature Note.

Activities with Students

1. Before Making GLOBE Observations

1.1. Initial Observations in the Field (one 45-minute class period): Students will practice scientific observation in the field, keep good records and bring back their observations to the classroom that they will use later to write their Nature Note.

Lesson objectives: Students will be able to…

- Make scientific observations in the field and generate new questions or ideas from those observations.
- Explain how background knowledge of a topic shapes how we observe and what we notice in the field.
- Accurately record data from the field

Standards alignment

- NGSS: SEP 8 - Obtain, communicate, and evaluate information.
- CCSS.ELA-LITERACY.RST.6-8.9: Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

Materials

- Appendix A: Sit Spot Senses GLOBE for ENGAGE (optional)
- Appendix B: Student Observations Datasheet
- Extra student observation datasheets
- Pens/pencils
- Optional: cameras/drawing equipment

Teacher Notes:

- The skills your students will need in the field depend on the context for your Nature Note work. If possible, bring students to the field site multiple times to practice observation or data collection.
- If your Nature Note observations are part of a larger investigation and data collection effort, be sure you give students enough time to focus on making and recording careful observations.
- *Be sure your students are recording the dates, times, locations, and detailed descriptions of their surroundings!

1.1.1. Sit Spot Senses 5-10 min (optional)

Have students find a spot to sit and spend 5-10 minutes completing the worksheet (Appendix A: Sit Spot Senses GLOBE for ENGAGE).

1.1.2. Initial Observation

1.1.2.1. Explain that today you will be going to the field to make scientific observations. Everyone should take a pencil/pen notebook, or some student observation data sheets.

1.1.2.2. Before you go, ask each student to make a prediction about what they might observe in the field. Take a couple of minutes to pair and share what they think they will see.

1.1.2.3. Make sure that students understand that Nature Notes are about recording interesting observations, but this might not happen for

everyone in a class period (and that is okay). Everyone will be learning more later. This is about practicing observation skills.

1.1.2.4. Encourage students to keep their eyes open for interesting observations at other times during their day. A Nature Note observation can happen at any time, and it does not need to occur during class time.

1.1.2.5. Use the rest of the time to have students do an initial observation using Appendix B: Student Observations Datasheet. This is not the full GLOBE protocol but should be related to it. Make sure to model enthusiasm for the natural world to help your students engage with this work.

1.2. Examine Sample Work (one 45-minute class period): Students will use Appendix C-1: Example of Professional Nature Note to preview expectations for their own writing and practice providing feedback. We recommend introducing students to the rubric early on to set them up for making high quality observations and preparing for peer review.

Learning objectives: Students will be able to…

- Read an example of a noteworthy observation explained by relevant background information.
- Use a rubric to assess an observation.

Standards Alignment:

- NGSS: Practice 8: Obtain, evaluate, and communicate information.
- CCSS.ELA-LITERACY.RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts.

Materials:

- Highlighters (optional)
- Appendix C-1: Example of Professional Nature Note
- Appendix C-2: Example of Student Nature Note (optional)
- Appendix D: Nature Note Feedback Form

Teacher preparation: Print the Nature Note student pages for each student or group of students.

1.2.1. Pass out copies of Appendix C-1: Example of Professional Nature Note.

1.2.2. Have students get into groups of 2 to 4 and read over the Nature Note in their group.

1.2.3. When they are done, have students share the most important information in the Nature Note. Some important points to highlight include:

1.2.3.1. The person was observing clouds.

1.2.3.2. They noticed an unusual cloud.

1.2.3.3. There are normally a lot of contrails in the area, and there are many cloud types.

1.2.4. Pass out copies of Appendix D: Nature Note Feedback Form.

1.2.5. Let students know that they will use this form to review their own and their peers' Nature Notes.

1.2.6. Model how to use the rubric (see Appendix C-1: Example of Professional Nature Note):

1.2.6.1. Read the first step in the "Observation" section.

1.2.6.2. Skim the Student Nature note until you find a specific observation.

1.2.6.3. Go on to read Level 2.

1.2.6.4. Have students help as you look for an example of level 2.

1.2.6.5. Have students work in their groups to find an example of level 3.

1.2.6.6. Ask students to share the noteworthy aspect of the observation.

1.2.6.7. Circle Level the highest achieved.

1.2.6.8. Based on the information provided, collect ideas for what to include in the feedback section. Point out that it's important to identify things that the students did well and to help them improve.

1.2.7. Have the students share the level reached and where in the Nature Note they see evidence of reaching that level.

1.2.8. Bring the class back together as a whole group. Challenge students to articulate what they think makes a strong scientific observation.

1.2.9. Optional: Have students repeat the exercise using a student-created nature note: Appendix C-2: Example of Student Nature Note.

2. Integration to GLOBE

2.1. GLOBE Background Training (time varies)

Lesson Objectives: Students will be able to…

- Understand the importance of background information to scientific observations.
- Find, collect, and cite relevant background information.
- Properly cite their sources.

Standards Alignment:

- NGSS: Practice 8: Obtain, evaluate, and communicate information.

- CCSS.ELA-LITERACY.RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts.

Materials:
Selected GLOBE Pacing Guide

2.1.1. Implement a GLOBE Pacing Guide (5 days) according to the topic you would like to focus on (clouds, urban heat island, land cover, etc.).
2.1.2. Find and collect relevant background information.
2.1.3. Properly cite the sources of information.

2.2. GLOBE Observations in the Field (45 minutes)

Lesson objectives: Students will be able to…
- Make scientific observations in the field and generate new questions or ideas from those observations.
- Explain how background knowledge of a topic shapes how we observe and what we notice in the field.
- Accurately record data from the field.

Standards alignment
- NGSS: SEP 8 - Obtain, communicate, and evaluate information.
- CCSS.ELA-LITERACY.RST.6-8.9: Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic

Materials:
- Appendix E: Observation Details and Connections
- GLOBE Program's GLOBE Observer App

2.2.1. Go outside and have students make their GLOBE observations and/or measurements using the GLOBE Observer app.
2.2.2. Use the Appendix E: Observation Details and Connections worksheet to help generate new questions or ideas from the observations.

3. Nature Notes

3.1. Organize Observations and Write Nature Note (two 45-minutes class periods)
Students will organize their observations and background information in preparation for writing their Nature Note.

Learning objectives: Students will be able to…
- Identify interesting observations from their fieldwork.
- Connect observations with prior knowledge.
- Communicate ideas clearly in writing.

Standards alignment:

- NGSS SEP 6: Construct explanations and define problems.
- NGSS SEP 8: Obtain, evaluate, and communicate information.
- CCSS.ELA-LITERACY.WHST.6-8.2: Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

Materials:

- Appendix D: Nature Note Feedback Form
- Appendix E: Observation Details and Connections
- Appendix F: Write the Nature Note
- Highlighters

Teacher Preparation: Print the Nature Note student pages for each student or group of students.

3.1.1. Connect observations with prior knowledge. Get students into small groups or pairs to complete Appendix E: Observation Details and Connections worksheet and connect their observations and background information.

3.1.2. Encourage students to offer opinions about which observation is most interesting and why. Based on what they think is the most interesting or noteworthy, students may choose one observation to focus on for their Nature Note. If their observations are connected to one another, they may choose to include more than one.

3.1.3. After students have completed the “Background” and “Connections” they can work together or individually to fill in their questions or claims in the box at the bottom of the page.

3.1.4. Have each student look over the rubric in Appendix D: Nature Note Feedback Form to see what they have already accomplished and what they still need to do.

3.1.4.1. Students should focus on one section at a time.

3.1.4.2. They should check off all the criteria that they have already met by gathering information in the “Organize and make connections” student pages.

3.1.4.3. Students should circle anything on the rubric that they are missing.

3.1.4.4. Students are likely to notice that the rubric mentions a photo or a sketch.

3.1.4.5. In order to reach Level 4, they also need to include an idea for a follow up investigation.

3.1.4.6. Students may want to make some notes of things they need to be sure to add into their Nature Note.

3.1.4.7. Emphasize that all the information that students need for a Level 3 Nature Note should be captured in the work they did on the "Organize and make connections" student page.

3.1.4.8. If necessary, give students time to conduct additional research needed to address any gaps in information. If any students have all the information they need, consider letting them move on to writing their Nature Note. Alternatively, have them help a classmate conduct additional background research. They may uncover new information to add to their own Nature Note.

3.1.5. Pass out copies of Appendix F: Write the Nature Note if students need help with wording and structure.

3.1.6. Give students the remaining time to turn their graphic organizer into a draft Nature Note.

3.2. Review and Revise the Nature Note (one 45-minute class period)

Students will use the Appendix D: Nature Note Feedback Form to conduct in-class peer review and then hold peer review conferences.

Learning objectives: Students will be able to…

- Connect observations with prior knowledge.
- Communicate ideas clearly in writing.
- Review and revise their work.

Standards alignment:

- NGSS SEP 8: Obtain, evaluate and communicate information.
- CCSS.ELA-LITERACY.WHST.6-8.5: With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.

Materials:

- Highlighters
- Appendix G: Example of Nature Note Feedback
- Appendix D: Nature Note Feedback Form
- Appendix H: Guidelines for Running a Peer Review Conference

Teacher Prep:

- Print Appendix G: Example Nature Note Review - GLOBE (one for the model conference is enough).
- Print Appendix D: Findings from the Field Nature Note Peer Review Feedback Form and Appendix H: Guidelines for Running a Peer Review Conference for each student or group of students.
- Decide how you want students to be paired for peer review.

3.2.1. Explain to students that they are going to work together to improve each other's work. Research has shown that scientists who work collaboratively tend to publish more results and have more significant findings. In this class, students will review each other's Nature Notes and coach each other through improving their Nature Notes.

3.2.2. Ask for a volunteer to help model a peer review conference.

3.2.3. Use Appendix G: Example of Nature Note Feedback to model providing feedback.

3.2.3.1. Start by greeting the researcher and then open with a broad statement about something great in the Nature Note. Example: "Hello, I really loved your Nature Note on birds feeding on newts. You provided so much detail on the birds' behavior, I really felt like I was there!"

3.2.3.2. Explain how you will go through the rest of the feedback. "Now I'm going to give a little more detail on each part of the rubric".

3.2.3.3. Read the highest level achieved in each section and read through the strengths and opportunities.

3.2.3.4. After each section, pause and ask if the student has any questions on the feedback. Queue the student to use one of the questions on the handout if he or she doesn't have any questions.

3.2.3.5. At the end, repeat a strong part of the Nature Note. Example: "Overall, you have done a great job showing why your observation is important. With a few additions, you'll be ready for submission. Thanks for sharing your work!"

3.2.4. After the model conference, ask students to share what they noticed between the researcher and reviewer. Prompt students to think about:

3.2.4.1. How did the reviewer start a productive, friendly interaction?

3.2.4.2. What did the researcher do to get more information from the reviewer?

3.2.4.3. What useful information was shared?

3.2.4.4. What will the researcher be able to do as a result of this interaction?

3.2.5. Pass out the Appendix H: Guidelines for Running a Peer Review Conference. Work as a class to add to or revise the guidelines listed.

3.2.6. Have students take out their draft Nature Note, completed in the last lesson and switch papers with a classmate.

3.2.7. Have students use Appendix D: Nature Note Feedback Form to review each other's work. Be sure students record successes and opportunities for their partner, using the sentence starters provided, if needed.

3.2.8. After they are finished, have partners get together in a one-on-one conference to share the highest level achieved and the successes and opportunities for each section of the rubric.

3.2.9. If any students have a particularly constructive conference, invite them to repeat their conversation in front of the class.

3.2.10. Allow the remaining time for students to revise their work based on the feedback they have received.

3.3. Peer Review with Partner School (one 45-minute class period).
Emphasize to your class that the purpose of peer review is to help other scientists improve their work. The entire scientific community benefits when we put all our brains together. Have students read the student work carefully and review it using the Appendix D: Nature Note Feedback Form. Plan to complete the reviews you receive as soon as possible, with a goal of a two-week turnaround.

3.4. Optional - Revise and Submit (one 45-minute class period).

As noted at the start of this guide, the supplied rubric does not include grammar and mechanics, nor does it specify style guidelines. Neither the cross-school review nor the editorial board review will assess work on these factors either.

It is essential that you include time for students to review and revise grammar and mechanics. Use your existing standards, guidelines, and rubrics. We recommend partnering with an ELA teacher on this step.

Nature Note Full Rubric

Nature Notes must reach a level three in each category to be recommended for submission.
Recommended length is 500 words or less.

NGSS Scientific & Engineering Practice (SEP)	**Level 1 (Beginning)**	**Level 2 (Developing)**	**Level 3 (Meets)**	**Level 4 (Exceeds)**
Observe (SEP 3, 8)	Records an observation using a GLOBE protocol.	and provides context for the observation including the timing, location, and observations of the field site.	and records an observation that is interesting or noteworthy.	and presents a visual such as a photo or scientific sketch that adds to or clarifies the written description.
Connect to background information (SEP 6)	Includes background information about the observation.	and includes background information that adds to the observation, referring to reliable	and explains what is interesting or noteworthy about the observation, based on background information.	and explains how the observation builds on, contributes to, or addresses gaps in existing scientific knowledge.

		information that is cited accurately.		
Construct an argument/ Pose a question (SEP 1, 7)	Makes a claim or poses a question based on the observation.	and identifies evidence in the observation that supports the claim or that leads to the question.	and uses background information to explain how the observation supports the claim or leads to the question.	and proposes an investigation that would gather more information and lead to better understanding.

Appendix A: Sit Spot Senses GLOBE for ENGAGE

Findings from the Field Sit Spot Senses

Find a spot to sit outside. Make sure you are on your own and in a place where you can be calm, focused, and not around other students.

Examples of what you might see, hear, and smell are included below in italics.

Close your eyes. Listen for one minute. Notice as many sounds as you can. Write them down.	I hear…. *the wind blowing in my ears.*
Close your eyes. Use your sense of smell. Record all the smells you notice.	I smell… *fresh cut grass.*
Open your eyes and look around. What do you notice? Pay attention to colors, textures, sizes, and movements. Record your observations.	I see… *a tree with narrow, smooth, green leaves that is about my height.*
What did you notice that you are curious about? Record your thoughts.	Three things in my spot that I'm curious about are…

Appendix B: Student Observations Datasheet

Use the following observation datasheet or blank piece of paper to record your observations.

Observation Data Sheet
Date: Time: Detailed description of the location:
Observation Notes:
What background information might help you understand this observation better?
❑ Check this box if you took photos or video, too. ❑ Check this box if you did a sketch on another piece of paper

Appendix C-1: Example of Professional Nature Note

I was outside on a farm on the top of a mountain in Hardy County, West Virginia at 6:40 pm on April 29, 2022. I was surrounded by open fields with growing grass, and there were clouds in the sky.
There were a lot of birds flying around, mostly bluebirds and swallows with a few American goldfinches. It was cool outside, and I could smell smoke from a wood burning fireplace. I could also hear a plane flying above.

I frequently make cloud observations and noticed that there were some clouds that I don't often see. I saw a cloud that was difficult to identify using the GLOBE cloud chart. I noticed that it was long and narrow like a contrail, but it was also thicker and was a bit puffy which made me think it might not be a contrail.

I know that airplanes departing and arriving in the Washington DC airports often fly overhead, and it is very common to see many contrails in the sky at this location. Sometimes, they even spread out and run into each other. The clouds I saw were interesting because I was not certain what type of clouds they were. I could not tell if one particular cloud was a persistent spreading contrail or if it was a small altostratus cloud or even some sort of cumulus cloud because it was somewhat puffy. (see GLOBE cloud chart)

Stratus clouds can break up after a storm or rain, so it is possible that this could have been an altostratus cloud moving into the area which was breaking up after a storm. Or, it could be some contrails that spread out and merged with each other.

I would like to research the weather for the previous day to see if I can determine what caused the formation and what type of cloud this was. I can do this by looking at historical weather and wind data to see if there was a storm recently that may have been associated with this cloud.

Gulf of Maine Research Institute

The GLOBE Program

Appendix C-2: Example of Student Nature Note

Waves in the Sky

Alpena Elementary/Middle School, Alpena, AR

5th Grade

On January 4th, 2023, at 11:00am, we were outside during recess when we noticed some really wavy looking clouds up in the sky. We went over to the GLOBE Weather Station on the Alpena Elementary/Middle School Playground, in northwest Arkansas. The wind was really blowing 3.8 to 4.6mps and temperature was cold, 7.2°C, and felt even colder because of the wind chill. Even though there were not any leaves on the trees, we could hear the wind blowing through the limbs. We recorded weather data and made a cloud observation using the GLOBE Cloud Protocol. Total cloud coverage was isolated (10-25%) with blue sky and clear visibility. No contrails, but observed a few cirrus and cirrocumulus clouds. The really interesting thing we saw was a lot of really wavy altocumulus clouds. They were all lined up, stretching across the sky from east to west. They looked live wavy ripples left in the muddy sand down at the creek. They also looked like the waves in the sand along the ocean shore where the waves have been going in and out.

We first thought that the clouds might be contrails that the wind was moving around, but after looking at the Flight Radar-24 app we knew that that there had not been that many aircraft pass overhead that could have made that many contrails. We looked at the GLOBE Cloud chart to try and identify the type clouds. We got background information on the NOAA cloud photo library and found out that the clouds are called “Undulatus” clouds. From the NOAA website, we also learned that sometimes, these types of clouds are seen 20 hours or so before an overcast sky or rainy weather. We wondered if we would get rainy weather the next day. We checked the weather forecast on the local TV station, KY-3, website, and conducted a cloud observation the next day. We had a clear blue sky. We were surprised to not at least find some clouds in the sky based on what we had read on the NOAA website.

Atmospheric data was collected, and the Cloud observation was conducted using the GLOBE Observer App. The GLOBE Cloud Identification sheet was used to help identify the clouds. (GLOBE.gov).

Further cloud identification was done using the NOAA Cloud Photo Library found at:

https://photolib.noaa.gov/Collections/National-Weather-Service/Weather-Wonders/Cloudy-Days/emodule/658/eitem/2505

West

East

Up

South

Appendix D: Nature Note Feedback Form

Date:

First Name of Reviewer(s):

First Name of Author(s):

Nature Note title:

Directions:

1. Read the full Nature Note.
2. Focus on the **Observation** section.
3. Read the criteria for Level 1.
4. Look for evidence of Level 1 in the Nature Note you are reviewing.
    - If you find it: mark that level 1 had been reached
    - If you do NOT find the information needed to meet Level 1, circle what is missing and jump straight to step 6. Do NOT continue to the next level.
5. Repeat step 4 for Levels 2, 3, and 4 until you cannot find evidence of a level, or level 4 is reached.
6. Repeat this process for the other sections: **Background information** and **Claim or question**.
7. Determine whether the submission is ready for publication. If the submission scores a level 3 or higher in all categories, you can **accept** it for publication! If there are some

scores of 1 or 2, you should **encourage major revisions**. Mark your decision at the end of this form.

Observation
The researcher includes...

Level 1	Level 2	Level 3	Level 4
an observation of a species and/or habitat.	and context for the observation including the timing, location, and observations of the field site.	and an observation that is interesting or noteworthy.	and presents a visual such as a photo or scientific sketch that adds to or clarifies the written description.

Highest level achieved:_____

Strengths	Opportunities for improvement
A particularly interesting observation is...	*I recommend adding more information on...*

Background information
The researcher...

Level 1	Level 2	Level 3	Level 4
includes background information about the observation.	and includes background information that adds to the observation, referring to reliable information that is cited accurately.	and explains what is interesting or noteworthy about the observation, based on background information.	and explains how the observation builds on, contributes to, or addresses gaps in existing scientific knowledge.

Highest level achieved: _____

Strengths	Opportunities for improvement
You do a great job showing why your observation is interesting by connecting...	*You could add background information about…*

Putting it all together

The researcher...

Level 1	Level 2	Level 3	Level 4
poses a question or makes a claim based on the observation.	and identifies evidence in the observation that supports the claim or leads to the question.	and uses background information to explain how the observation supports the claim or leads to the question.	and proposes an investigation that would gather more information and lead to better understanding.

Highest level achieved: _____

Strengths	Opportunities for improvement
Your question/claim is interesting because…	*I am not sure about your question/claim because…* *You could improve by...*

Recommendation: Does this Nature Note achieve a Level 3 in each category? (Choose one)

NO - some level 1 or 2 = Encourage major revisions

YES - all level 3 or higher = Accept this article with minor (or no) revisions

Appendix E: Observation Details and Connections

Name: _____ Date: _____

Use the following observation datasheet or blank piece of paper to record your observations.

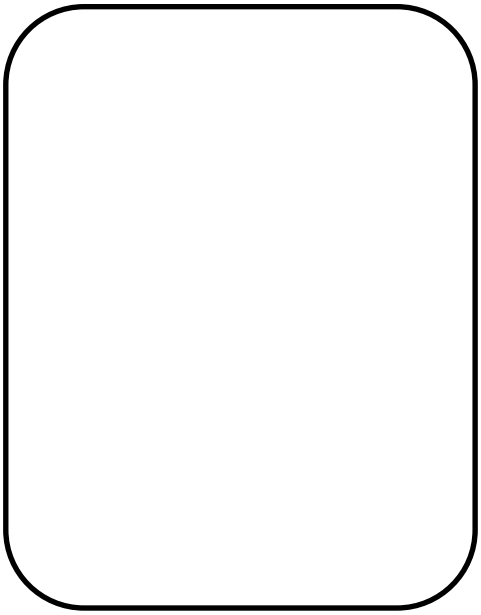
Time:

Detailed description of the location:

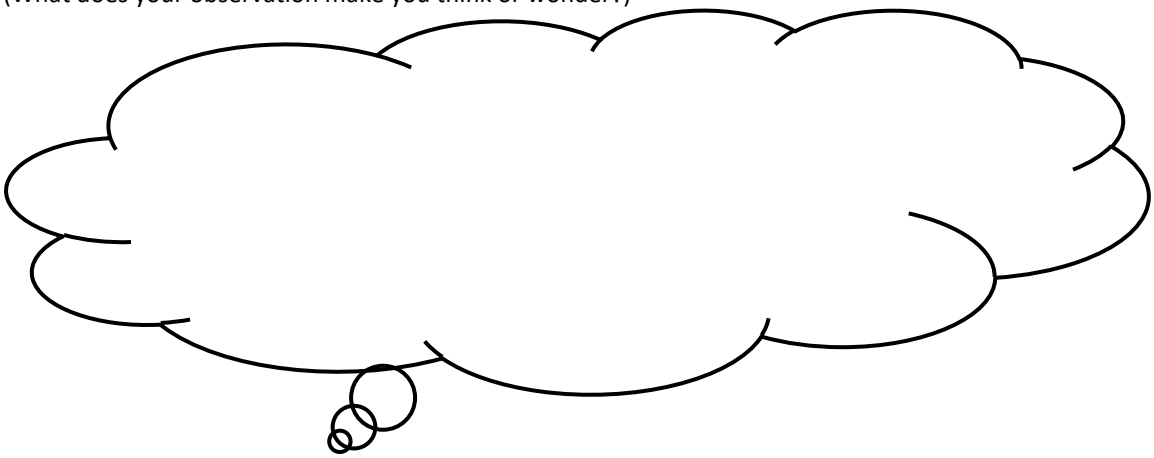
Observation Notes
(What the scientist saw, heard, smelled)

Connections
...stood out because…
...was unexpected because…
...confirms what was already known about...

Background information
(what the scientist knows)



Question or Claim
(What does your observation make you think or wonder?)



What additional information do you need to better understand your observation?

Appendix F: Write the Nature Note

Name: _____ Date: _____

Use the writing frame below to help you get started. In each section, choose one or two sentences to complete and then add more information where needed.

Your Nature Note should be no more than 500 words.

Set the Stage	
Where were you when you? When was it? What were your surroundings like?	*I went out to conduct fieldwork on _____ (date, time) at _____ (location).* *I was surrounded by…*
The observation	
What did you observe? Provide a detailed description. Focus on what was interesting or surprising.	*I observed …* *I noticed...* *I was surprised to find…*
Connect to background information (include citations)	
Why was your observation interesting? How does what you observed connect to what you already know?	*This was interesting/stood out to me because I had learned that…* *I was/was not expecting this because of what I know about…* *This connects to what I already know because…*
Pose a claim or question	
What does your observation make you think? What does it make you wonder? What could you do to find out more?	*This observation makes me wonder if…* *Based on what I observed and what I know, I think…* *I could investigate this issue further by…*

Appendix G: Example of Nature Note Feedback

I was outside on a farm on the top of a mountain in Hardy County, West Virginia at 6:40 pm on April 29, 2022. I was surrounded by open fields with growing grass, and there were clouds in the sky.

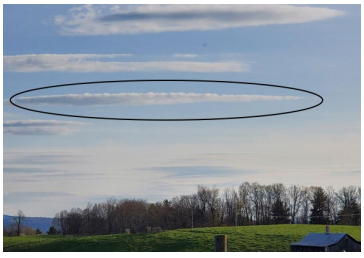
There were a lot of birds flying around, mostly bluebirds and swallows with a few American goldfinches. It was cool outside, and I could smell smoke from a wood burning fireplace. I could also hear a plane flying above.

I frequently make cloud observations and noticed that there were some clouds that I don't often see. I saw a cloud that was difficult to identify using the GLOBE cloud chart. I noticed that it was long and narrow like a contrail, but it was also thicker and was a bit puffy which made me think it might not be a contrail.

I know that airplanes departing and arriving in the Washington DC airports often fly overhead, and it is very common to see many contrails in the sky at this location. Sometimes, they even spread out and run into each other. The clouds I saw were interesting because I was not certain what type of clouds they were. I could not tell if one particular cloud was a persistent spreading contrail or if it was a small altostratus cloud or even some sort of cumulus cloud because it was somewhat puffy. (see GLOBE cloud chart)

Stratus clouds can break up after a storm or rain, so it is possible that this could have been an altostratus cloud moving into the area which was breaking up after a storm. Or it could be some contrails that spread out and merged with each other.

I would like to research the weather for the previous day to see if I can determine what caused the formation and what type of cloud this was. I can do this by looking at historical weather and wind data to see if there was a storm recently that may have been associated with this cloud.



Observation

The researcher includes...

Level 1	Level 2	Level 3	Level 4
an observation of a species and/or habitat	and context for the observation including the timing, location, and observations of the field site	and an interesting or noteworthy observation	and presents a visual such as a photo or scientific sketch that adds to or clarifies the written description.

Highest level achieved: 4

Strengths	Opportunities for improvement
A particularly interesting observation is… that there was an unusual cloud formation	*I recommend adding more information on… normal clouds other than contrails in the area*

Background information

The researcher...

Level 1	Level 2	Level 3	Level 4
includes background information about the observation	and includes background information that adds to the observation, referring to reliable information that is cited accurately	and explains what is interesting or noteworthy about the observation, based on background information	and explains how the observation builds on, contributes to, or addresses gaps in existing scientific knowledge.

Highest level achieved: 3

Strengths	Opportunities for improvement
You do a great job showing why your observation is interesting by connecting...the types of clouds that you considered.	*You could add background information about…how these clouds are different. …how the weather from the previous day can affect the formation of clouds.*

…background information about the main features of different types of clouds to guide your inquiry.	

Claim or question			
The researcher...			and proposes an investigation that would gather more information and lead to better understanding.
poses a question or makes a claim based on the observation	and identifies evidence in the observation that supports the claim or leads to the question	and uses background information to explain how the observation supports the claim or leads to the question	
Level 1	Level 2	Level 3	Level 4

Highest level achieved: 4

Strengths	Opportunities for improvement
Your question/claim is interesting because…it could explain interactions of clouds in the atmosphere.	*I am not sure about your question/claim because…it could be caused by something other than weather.*

Recommendation: Does this Nature Note achieve a Level 3 in each category? (Choose one)

NO - some level 1 or 2 = Encourage major revisions

YES - all level 3 or higher = Accept this with minor (or no) revisions

Appendix H: Guidelines for Running a Peer Review Conference

Directions on giving feedback (for the reviewer):

1. Greet the researcher.

2. Share one thing you liked about the Nature Note.
   I thought your Nature Note was really interesting because…
   You did a great job…

3. Go through each section of the rubric, starting with **Observation.**
   a. share the highest level achieved.
   b. read the strengths.
   c. read the opportunities for improvement.
   d. ask the researcher if he or she has any questions about your feedback.

4. Share a final thought about something you liked in the Nature Note and thank the researcher for sharing their work.
   Overall, I think this is a strong Nature Note because… Thanks for sharing your work!

5. Switch roles to receive feedback on your Nature Note.

Questions to ask for clarification (for the researcher)

- What did you mean by…
- Can you say more about that?
- Can you give an example?

Can you show me in the Nature Note?