

Grade 4 Unit 3 Week 1- Observing Nature

Citizen Science Project: eBird

Benchmark Lesson	NGSS/Garden Connection	Sense Making (takeaways)
Lesson 1- Unit Opener Lesson 2- “A Bird’s Free Lunch” *Lesson 3- Analyzing a guiding research question*	-Nature walks, having discussions about what animals Ss are noticing on our campus “ I Notice, I Wonder , making observations	Ss start to see that their observations are scientific research like John Muir and John Burroughs <i>Teacher Focus: Highlight multiple perspectives of Ss takeaways. Begin to focus class discussions on how plants and animals are able to survive and thrive in the same space</i>
Lesson 4- Identifying Genre Lesson 5- Determine and Clarify Meaning of Vocabulary *Lesson 6- Evaluate Print Sources*	- All About Bird identification videos -Nature walks Possible Reader’s Workshop Stations: “ Watching and Working with Birds ” Draw a Scientist , “ Meet a Scientist ”	Birds can be identified based on color, size, shape, beak differences, how to ID birds based on beak (structure and function) Ss start to why observations are important to scientific inquiry but also how to be accurate in their observations before considering it “data” <i>Teacher focus: Ss will be the experts on the plants and animals on their campus. Focus on how there is no research on our campus YET</i>
Lesson 7- “The Shimeradas” Identify and Summarize Key Events Lesson 8- Word Study *Lesson 9- Evaluating Online Sources*	-Nature walks - Open Ended Card sorting activity -eBird and Hotspots	As Ss go on more nature walks, they may start to see that identifying birds is difficult. Open Ended Card sorting activity using the Discussion Diamond will provide an opportunity for Ss to categorize birds based on structure as well as communicate with others. Exploring eBird will show actual people who are doing Citizen Science, hopefully inspiring Ss to get better at identification <i>Teacher Focus: Allowing Ss to reflect and share after Nature walks so they see different ways we connect with nature. Help Ss grapple with the unknown- you will not always get a positive ID and that is okay.</i>

<p>Lesson 10- “The Shimeradas”: Read with Accuracy, Appropriate Rate, and Expression Lesson 11- Word Story *Lesson 12- Use Keywords to Search for Relevant Sources*</p>	<p>-Analyzing scientific notebooks -Analyzing common birds in the area and eBird -Garden time- structures and functions of plants in the garden</p>	<p>Ss will have real life opportunities to analyze structure and function in plants, applying what they discussed about structures and functions of birds <i>Teacher Focus: While looking at eBird data, challenge the Ss to consider why some areas have sightings but not others</i></p>
<p>Lesson 13- “The Shimeradas” Analyzing Figurative Language Lesson 14- Compare and Contrast First Person Narrative Point of View *Lesson 15- Take Notes on Index Cards* -Modify questions to be in the Central Valley</p>	<p>-Nature walks to continue identifying birds -look at common birds -Research common birds that are not native to our area Beak/Feet matching focusing on structure and function</p>	<p>As Ss develop their ID-ing skills, having them consider what birds are invasive species deepens their understanding of the campus/ area as a system <i>Teacher Focus: By coupling Beak/Feet activity help Ss to see that because of certain structure and function specific birds will survive and thrive in an area</i></p>

Connecting Benchmark- Grade 4 Unit 3 Observing Nature with NGSS/Community and Citizen Science

Phenomenon to be Observed/Studied: Phenomena are used to engage students with the world around them, piquing their interest which will then lead to generating questions they want to investigate further through inquiry or research.

If students have been outside doing nature walks or spending time in the garden, the question you pose might be “What have you noticed about the animals that share our campus?” If not, you may want to show a short video to engage students in the question generation process.

<https://ww2.kqed.org/quest/2010/05/05/the-great-migration/>

Framing the Project:

For this project, students will be making observations on campus and recording what they see to help them better understand the campus ecosystem and help contribute data to the scientific community. Those observations and data sets will then be used to make decisions and effect change on their campus.

When we make observations of the world around us, we are being scientists, whether or not we know it. Making observations helps us make sense of the world around us. People like John Burroughs and John Muir were not trained scientists, they were citizen scientists. They saw that their own observations could help explain the world not just to themselves, but to others as well.

- [Citizen Science Introduction Lesson PPT](#)

From Unit Opener of Benchmark Grade 4 Unit 3:

“We do not see nature with our eyes, but with our understanding with our hearts.” William Hazletts (British artist)

Makes us think about the world around us in a new way. How do we respond to nature?

Benchmark ELA Essential Question:

How do we respond to nature?

Science Guiding Questions:

What types of observations can we make about nature? How can we use that information to understand our campus and inform our decisions? How are so many plants and animals able to share the same space?

ELA CCSS:

SL4.1a Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.

SL4.1b Follow agreed-upon rules for discussions and carry out assigned roles.

SL4.1c Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.

SL4.1d Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.

RI4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

RI4.2 Determine the main idea of a text and explain how it is supported by key details; summarize the text.

RI4.10 By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 4-5 text complexity band proficiently, with scaffolding as needed at the high end of the range.

RF4.4a Read grade-level text with purpose and understanding.

W4.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

NGSS **Performance Expectation:** 4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lungs, brain, and skin.] [Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.]

Three Dimensions of NGSS

Science & Engineering Practice/s (SEP): Engaging in Argument from Evidence Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). Construct an argument with evidence, data, and/or a model. (4-LS1-1)

Disciplinary Core Idea/s (DCI): LS1.A: Structure and Function Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1)

Crosscutting Concept/s (CCC): Systems and System Models A system can be described in terms of its components and their interactions. (4-LS1-1), (4-LS1)

3-5 ETS1-1 Define a simple design problem reflecting a need or want that includes specified criteria for success and constraints on materials, time, or cost.

EP&C: Principle II The long-term functioning and health of terrestrial, freshwater, coastal and marine ecosystems are influenced by their relationships with human societies

Social Studies Connections:

Physical and Human Geographic Features That Define California: How do climate and geography vary throughout the state? How do these features affect how people live? How do natural resources, climate, and landforms affect how plants, animals, and people live?

Regions of California

<https://www.calrecycle.ca.gov/eei/unitdocs/maps/habitats.pdf>

Time Frame: 3 weeks as written in Benchmark. Could be lengthened as needed based on classroom focus.

Additional Resources:

The Cornell Lab of Ornithology Guide-

Investigating Evidence Curriculum

http://www.birds.cornell.edu/k12/investigating_evidence/

<https://www.sciencenewsforstudents.org/article/kids-make-great-citizen-scientists>

Resources:

<https://californiaeei.org/curriculum/unit?unitid=22>

<https://www.cde.ca.gov/ci/sc/cf/ch4.asp#link8>

<https://www.allaboutbirds.org/>

https://education.ucdavis.edu/sites/main/files/file-attachments/dialogue_toolkit_4-6.pdf

<http://stemteachingtools.org/brief/61>

https://vault.sierraclub.org/john_muir_exhibit/people/burroughs.aspx

Week One Lessons 1-3

Lesson 1- Unit Opener

SL4.1a-dELD.PII 4.3 Using verbs and phrases. ELD PII 4.4 Using nouns and noun phrases.

“We do not see nature with our eyes, but with our understanding with our hearts.” William Hazletts (British artist) Makes us think about the world around us in a new way. How do we respond to nature?

Guiding Questions:

What types of observations can we make about nature?

What can we learn from observing nature?

How does nature affect each of us?

Lesson 2- “A Bird’s Free Lunch” Identify Key Details and Determine the Main Idea

“The Wit of a Duck and Other Papers”

RI4.1-4.2 and RI4.10, RF4.4a, W4.10, SL4.1a-d

ELD.PI.4.1 Exchanging information and ideas with others through oral collaborative discussions on a range of social and academic topics ELD.PI 4.6 Reading closely literary and informational

text and viewing multimedia to determine how meaning is conveyed explicitly and implicitly through language

-Annotating Text (Main Idea and Detail add T-chart in spiral notebook)

-Write a short summary of text, as well as how Burroughs feels about the birds

Lesson 3- Analyzing a guiding research question.

W.4.7-9b, SL4.1a-d ELD.PI.4.1 Exchanging information and ideas with others through oral collaborative discussions on a range of social and academic topics ELD.PI 4.4 Adapting language choices to various context based on task, purpose, audience, and text type. ELD.PI 4.5 Listening actively to spoken English in a range of social and academic contexts.

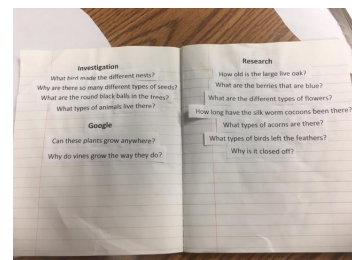
Model: Imagine you are going to write a story about someone who moves from Virginia to a farm in Nebraska. One of your research questions is what plants and animals live on the Great Plains of Nebraska. **(possibly change locations to focus on California regions)**

Building Research Skills- Narrative- Pretend you are going to write a narrative story about someone who observes nature in (New York's Catskills Mountains) **Central Valley Sierra Nevada Mountains**. One of your guiding research questions is: What plants and animals are commonly seen in the **Valley Sierras** (Catskills)? Read and take notes from two sources to find facts and details to help you answer this question. List the sources for your information.

1. What is the main topic of my research?
 2. What information will I need to find?
 3. What decisions will I need to make about my research?
 4. What am I asked to present based on my research?
- Students plan their own research topic (as stated in Benchmark). Beginning a research project may be premature on day one. Students may not yet be ready to determine the focus of the research they will be conducting during this unit. See below.

Connections to NGSS/Citizen Science Project

After a nature walk on campus or viewing of the bird migration video, have students share what questions these phenomena generate. These questions will be used to drive your classroom inquiry and research projects. In this unit of the Benchmark ELA instruction, students are learning how to be specific in their searches when using online resources. As students generate questions, resist the urge to edit or "correct" questions. Simply record them as they are shared. It is important to honor all questions that arise. Questions can be recorded in a journal as they are being refined, or on a "[I Notice, I Wonder](#)" board in a more public fashion. Not all questions will be answered during the investigation, but all questions should be represented and recognized. Categorising and clarifying questions will come later. Having a conversation with It



helps to practice improving questions with a protocol such as the Question Formulation Technique:

<http://media.rightquestion.org/resources/Overview-of-the-Question-Formulation-Technique.pdf>

After questions have been generated, have students sort them into categories reflecting **how** they would go about answering the question. Often, students think that they are able to “Google” any question. By showing that not all questions have been answered, and that their own observations may be able to help them answer many of their questions, they are understanding more deeply the [Nature of Science](#).

As the unit progresses, take time to reflect on the question board. Are there questions we have answered? Are there new questions we need to add?

Sense-Making- Take-aways from class discussion:

- Our observations are scientific research and can be used (like John Burroughs and [John Muir](#))
- Students look at whole class questions, start to look at what they want to research.

Possible Workshop Stations:

- Reflection- What observations have you already made around campus?
- Exploration of possible research materials.

Key Youth Practice:

- Take ownership of data quality.

Key Educator Practice:

- Position Youth as people who do science.

Description of how students will make observations and collect data:

Students will be collecting data on what bird species they notice on their campus. Initially, leaving the directions as to how they record observations more open ended can allow students to discover which data sets are critical in their recordings (time, date, etc.). Once they have been outside to make observations and collect data, as small groups have them organize their data into a meaningful format. Students realize, as they attempt to compile their data, that consistency and accuracy are important.

Week One- Lessons 4-6

Lesson 4- Identifying Genre Teachers.

RL.4.10, RI4.6, SL4.1a-d ELD.PI.4.1, ELD.PI 4.4

Using graphic organizer to identify genre. “A Bird’s Free Lunch”.

Lesson 5- Determine and Clarify Meaning of Vocabulary and Idioms

RI4.4, RF4.4c, SL1a-d, L4.4c, L4.5b (need idiom lesson) ELD.PI. 4.1, ELD.PI.4.5, ELD.PI. 4.6

Graphic organizer Word, Context Clues, Our Definition, Revised Definition Using References
Lesson 6- Evaluate Print Sources-
W.4.7-9b, SI4.1a-d ELD.PI.4.1

- Pre-search chart Model Prompt- teacher does model prompt as a sample. Change locations to a farm in the Central Valley from the Mojave Desert
- Potential writing connection to social studies. Differences in ecosystems, climate, plant and animal populations, Regions of CA.
- Productive Engagement: Peer group. Pass out [text](#) on all regions of CA. Students need to select ones that are appropriate and why. Complete sample chart. Get at what sources were used and WHY.

Connections to NGSS/Citizen Science Project

NGSS focus: Structure and Function. Introduce students to the basics of bird identification with this video from Cornell's [All About Birds](#) identification videos.

Before taking kids outside to begin doing observations, it is helpful to [practice categorizing based on size and shape](#). Students will naturally look at size and color. It is important to focus attention on the structure of beak and feet, as well as the proportion of those two structures as well.

Take kids outside to do observations. They should have a place to regularly record observations and reflect on what they are experiencing.

Sense-Making- Take-aways from class discussion:

- Birds can be identified based on color, size, shape, beak differences, how to ID birds based on beak (structure and function)
- Why are observations important to scientific inquiry?
- How to identify what you weren't sure about? How did you record that? Highlighting the importance that it is not only OK not to know, but important to be certain about an ID before you consider it "data".

Possible Reader's Workshop Stations:

- Readworks "[Watching and Working with Birds](#)" to use as a substitute for vocabulary lessons and to help looking at how birds are identified.
- [Draw a Scientist](#) (what does a scientist look like to you?)
- "[Meet a Scientist](#)" as a read aloud option or paired reading
- Reflection on first trips outside to the garden or exploration of campus.

Community and Citizen Science Core Activity:

- Develop Expertise

Key Youth Practices:

- Engage with Complex Social Ecological Systems

Key Educator Practice:

- Position youth as people who do science

Week One- Lessons 7-9

Lesson 7- “The Shimeradas” Identify and Summarize Key Events

RL.4.1-2, RL.4.10, RF.4.4a, W.4.10, SL.4.1a-d ELD.PI. 4.1, ELD.PI.4.6, ELD.PII.4.1 Understanding text structure.

- Preview the Genre- Realistic Fiction
- Model: Read to Identify Key Events to a Summary

Lesson 8- Word Study

RF.4.3A, SL.4.1a-d ELD.PI.4.1, ELD.PI.4.6, ELD.PI.4.12 Selecting and applying varied and precise vocabulary and other language resources to effectively convey ideas.

Lesson 9- Evaluating Online Sources

W.4.6-9b SL.4.1a-d ELD.PI.4.3 Offering and supporting opinions and negotiating with others in commutative exchanges., ELD.PI.4.4, ELD.PI.4.11 Supporting own opinions and evaluating others opinions in speaking and writing.

- Understanding web endings, evaluating sources

Connections to NGSS/Citizen Science Project

After students have been able to take one or two nature walks, they will notice that identifying birds is often more challenging than they had first thought. There are times where no birds will be seen, or different species than the day before. It helps to spend time looking at local images of unknown birds, analyzing photos based on size, beak, coloring, etc. to help identify birds in their area.

- [Open Ended Card sorting activity](#). (use bingo cards to cut up for open ended card sort) Open ended cards sorts are sorting activities where there is no one correct way to sort. Ask students to sort the cards, focusing on sorting by structure and function of beaks and feet. After sorting the cards in a group of two or three, have the students rotate to another group to reflect on how the other group chose to sort. You can use a template for dialogue such as the [Discussion Diamond](#) as a way for students to leave feedback (larger chart paper works well). It is important, when using an open ended card sort, to stress that there is not one way to sort. What is important is for students to be able to articulate their rationale behind how/why they sorted.

Sense-Making- Take-aways from class discussion:

- We will not always get a clear ID. How can we record observations if we are not sure? What information will be important to track?
- Introduce eBird. Explain that this is a way for people all over the world to submit data. Are they confident enough with their observations to submit data or do they need more

information/practice? By looking at data on eBird students will see that there are birds being observed in the area that they may not have seen on campus.

Possible Reader’s Workshop Stations:

- Say to students: As a way to jumpstart your research, I want you to search “Bird Identification”, look at the first sites and determine which sites will be most helpful for your research and why. Possible resources: eBird, Audubon Society, allaboutbirds.org
- When making outside observations, ask students to write not only what they see, but a stream of consciousness based on how they feel (see description of lady beetle in “The Shimeradas”)
- Reflection- How does spending time outside make you feel? Reflect on a time when you have felt connected to nature?

Community and Citizen Science Core Activity:

- Develop Expertise

Key Youth Practices:

- Take Ownership of Data Quality

Key Educator Practice:

- Position youth as people who do science

Week One- Lessons 10-12

Lesson 10- “The Shimeradas”: Read with Accuracy, Appropriate Rate, and Expression
RF.4.4b, RF.4.4c, SL4.1a-d ELD.PI.4.1, ELD.PI.4.5

Lesson 11- Word Study RF4.3a, SL4.1a-d ELD.PI.4.1, ELD.P1.4.5, ELD PI.4.12a

Lesson 12- Use Keywords to Search for Relevant Sources

W4.6-9b, SL4.1a-d, L4.4c

- How to search online

Connections to NGSS/Citizen Science Project

During a visit to the garden, ask students to think about:

Why are the different species coming to the campus? What plant structures do they notice? What are the functions of those structures? How are they different from plant to plant? Recording observations by writing, drawing, note-taking, or a combination of all three. Clarify that scientific [notebooks](#) are meant to be a way for each individual to reflect on their own observations and learning. (Note [John Muir’s notebook](#))

Before or after the trip to the garden- review [common birds in the area](#) (images). Discuss what they think the birds that visit the campus have in common, what differences they might have.

- [Dialogue protocols](#) or [sentence frames](#) can be helpful as students practice how to have productive discourse when given open ended discussions.

Sense-Making- Take-aways from class discussion:

- Plants and animals have different structures that allow them to grow and thrive. Looking at beaks and feet can be a good opening to discussing the function of those structures. How are so many species of plants and animals able to share space?

Possible Reader's Workshop Stations:

- Explore eBird data, looking at hotspots and city in general to identify common species in the area. Reflection journal questions as they explore the site: Why are there data sets in one area and not another? Why is it important to record data in areas where there is less? What is the potential role they can play in data collection and scientific research? Why do researchers need their help?
- "[Meet a Scientist](#)" reading- an ornithologist
- Resorting Open Ended Card Sort based on a new structure or function. Reflect on the differences between peers.

Community and Citizen Science Core Activity:

- Make Meaning

Key Youth Practice:

- Engage with complex social ecological systems

Key Educator Practice:

- Frame the work globally and locally

Youth Learning//Environmental Science Agency:

- Self-identify as expert

Week One- Lessons 13-15

Lesson 13- "The Shimeradas": Analyzing Figurative Language

RL.4.1, RL.4.4, SL.4.1a-d, L.4.5a ELD.PI.4.1, ELD.PI 4.7 Evaluating how well writers and speakers use language to support ideas and opinions with details or reasons depending on modality, text type, purpose, audience, topic and content area., ELD.PI 4.8 Analyzing how writers and speakers use vocabulary and other language resources for specific purposes (to explain, persuade, entertain, etc.) depending on modality, text type, purpose, audience, topic and content area.

- Personification as a type of metaphor

Lesson 14- Compare and Contrast First Person Narrative Points of View

RL.4.6, RI.4.9, SL.4.1a-d ELD.PI.4.1, ELD.PI.4.12

- A Bird's Free Lunch compared to the Shimeradas, emotional connection to nature as the cross over

Lesson 15- Take Notes on Index Cards

W.4.6-8, SL.4.1a-d ELD.PI.4.1

- What plants and animals are [native to the Central Valley](#) (Nebraska)?

- What are invasive birds (plants and animals) found in the central valley (Nebraska)?
- Are any plants and animals of the central valley (Nebraska) in danger of extinction?

Connections to NGSS/Citizen Science Project

Students will continue to work on their skills in identifying birds seen on their campus. Having a matching game/card sort/etc. where they are [look at common birds](#) can be a fun way for them to review. By this point, students begin to recognize the connection between the food sources on campus and the types of birds that are attracted to the particular habitat. There are also birds who have adapted to the area that are not native to California. Identify common birds that are [not native](#) and discuss with students: How are some invasive plants and animals able to thrive and others do not?

Sense-Making- Take-aways from class discussion:

- Why are some invasive species able to thrive?
- Compare and contrast student observations outside with observations done by others in their area (looking at eBird data). Why do different people notice different birds?
- How will they use the data that they are collecting? Are there questions on the Wonder board that can be answered based on their observations?

Possible Reader's Workshop Stations:

- Researching native vs. non-native species. Which sources will be the most accurate?
- Looking at [John Muir's journal](#)
- Reflection- Observations, emotional connection to nature. How have you been using your scientific notebook?
- [Beak/Feet](#) matching focusing on structure and function. How do these birds survive and thrive. This page can be cut up before being given to students to create space for deeper dialogue around why they feel each beak/foot/descriptions should be paired.

Community and Citizen Science Core Activity:

- Make Meaning

Key Youth Practice:

- Engage with complex social ecological systems

Key Educator Practice:

- Frame the work globally and locally

Youth Learning//Environmental Science Agency:

- Develop science content and practice skills
-