



Making Observations: Educator Handout

OVERVIEW

This activity complements Snapshot Wisconsin, a volunteer-based wildlife monitoring project involving a statewide network of trail cameras. In this activity, students will use the trail camera photos to make observations and ask scientific questions. Students gain experience with the scientific process by making detailed observations and using these observations to pose questions that can be answered by further observations and/or experiments to gain insights into important ecological processes.

Students are first introduced to the practice of making observations and posing questions using a single trail camera photo taken at a unique place and time. Students then make observations based on groups of photos taken at various locations or during different time periods to identify trends across space and time. This lesson plan includes an optional activity that takes students outside to make observations.

KEY CONCEPTS

- The process of scientific inquiry begins by making detailed observations of the natural world and posing questions
- Questions lead to hypotheses that can be tested with further observations or carefully designed experiments
- Interactions among living and nonliving factors in an ecosystem can influence the distribution and behavior of organisms across space and time

LEARNING OBJECTIVES

Students will be able to:

- Make detailed observations and pose scientific questions that can be answered with further research
- Analyze data and describe observational trends related to the animals, their behaviors, and the environments in which they live
- Describe how to test scientific questions by collecting field data

CURRICULUM CONNECTIONS

Curriculum	Standards
NGSS (April 2013)	HS-LS2-1, HS-LS2-2, HS-LS2-8 Practice 1
Common Core (2010)	RST.9-12.7, WHST.9-12.7, HSS.IC.B.5, HSS.ID.B.5
AP Biology (2012-2013)	2.C.2, 2.D.1, 2.E.3
IB Biology (2016)	4.1, 5.3, C1, C2, C4, C5
AP Environmental Science (2013)	II.A, II.D
IB Environmental Systems & Societies (2010)	2.2, 2.3, 3.1, 4.1-4.3
Wisconsin's Standards for Science	SCI.SEP1.A.m;A.h, SCI.LS2.A.m;A.h, SCI.LS2.C.m

Snapshot Wisconsin was granted rights to adapt this classroom resource from the hhmi Biointeractive activity "Gorongosa: Making Observations." To view original lesson plan, follow [this link](#).

Feedback is always welcomed! Any questions or improvements? Contact us at DNRSnapshotWisconsin@Wisconsin.gov



Making Observations: Educator Handout

KEY TERMS

Observation, hypothesis, scientific inquiry, vegetation, ecosystem, adaptation, behavior, biodiversity, ecoregion, Northern Lakes and Forest ecoregion, Southern Wisconsin Till Plains ecoregion, nocturnal (active during the night), diurnal (active during the day), crepuscular (active during dawn and dusk)

TIME REQUIREMENTS

This activity can be completed in approximately two 50-minute class periods. The first period can be used to do the “single photo” observation activity and observations across space (Parts 1 and 2). The second class period can be used to do the observations across time section and discuss the importance of making observations in science (Parts 3 and 4). Part 4 may also be assigned as homework.

SUGGESTED AUDIENCE

This activity is appropriate for middle school life science, high school biology (all levels including AP and IB), high school environmental science (all levels including AP and IB), and introductory college biology or ecology.

PRIOR KNOWLEDGE

Students may benefit from spending some time on Zooniverse (Snapshot Wisconsin’s crowdsourcing platform – www.SnapshotWisconsin.org) to familiarize themselves with Wisconsin species and habitats.

MATERIALS

- Projector to display photo slideshow
- Student Handout (one per student)
- Ecoregion Appendix (students can share copies to read over, or display on projector)

TEACHING TIPS

- Consider using a timer when the students make their observations
- Prior to implementing the observation activity, it would be helpful for you to view the photo sets and develop exemplar observations, trends, and research question questions to better probe students during the lesson
- Making observations and developing questions is a subjective and open-ended task. Students may feel unsure or uncomfortable about the observations they are making and/or the questions to ask. Before students share their initial observations, it may be beneficial to share the example observation to familiarize them with the idea. Similarly, you may model how to ask a scientific question based on an observation.
- Encourage students to make connections between the observations from the photo sets and the information about the vegetation and location of the camera to develop trends in the data.

Snapshot Wisconsin was granted rights to adapt this classroom resource from the hhmi Biointeractive activity “Gorongosa: Making Observations.” To view original lesson plan, follow [this link](#).

Feedback is always welcomed! Any questions or improvements? Contact us at DNRSnapshotWisconsin@Wisconsin.gov



Making Observations: Educator Handout

- Consider probing students for brief explanations of how they could answer the questions they generated. This could help the students distinguish between scientific and nonscientific questions.
- When transitioning to Parts 2 and 3 of the observation activity, be sure to explicitly inform students that rather than making detailed observations about each photo, they will be looking for trends across the photo sets and similarities and differences between the sets. Provide an example if this is unclear.
- If you host a Snapshot Wisconsin trail camera, consider swapping out some of the photos in the presentation for your own camera's photos.

PROCEDURES

Part 1: Making Observations

1. Distribute the Student Handout. Ask your students to read the introduction and Part 1 of the worksheet.
2. Pull up the *Making Observations: Photo Slideshow* on the projector for students to view.
3. Optional: display the *Example Observations* slide and discuss as a group potential scientific observations that can be made from viewing photos.
4. Display the *Single Photo Observations* slide, give your students 3 to 5 minutes to look at the photo and write down as many observations as they can.
5. Lead a class discussion about their observations.
 - a. **Example observations: There are three bucks. The buck on the right has their mouth open. The habitat is a grassy field close to a source of water.**
6. Give your students a few minutes to write down some questions that were inspired by their observations
7. Lead a discussion with your class about the questions they came up with and what makes a good scientific question.
 - a. **Example questions: Why might these bucks be in closer proximity to each other? Are the bucks about to fight, if so what resources would they be competing for? What is influencing this resource?**

Part 2: Observations Across Time

1. Ask your students to read Part 2 of their handout.
2. Ask your students to observe the two sets of photos you are about to show them: 6 photos taken during the day and 6 photos taken during the night. Instruct your students to write down observations about trends that they notice in the two time periods as you display the sets of photos in sequence.
3. Display the set of 6 "day" photos, pausing for about 10 seconds on each photo. When you are finished with the set, give your students several minutes to write their observations in the "day" box of step 1.

Snapshot Wisconsin was granted rights to adapt this classroom resource from the hhmi Biointeractive activity "Gorongosa: Making Observations." To view original lesson plan, follow [this link](#).

Feedback is always welcomed! Any questions or improvements? Contact us at DNRSnapshotWisconsin@Wisconsin.gov



Making Observations: Educator Handout

4. Display the set of 6 “night” photos, pausing for about 10 seconds on each photo. When you are finished with the set, give your students several minutes to write their observations in the “night” box of step 1.
5. Give your students several minutes to think about similarities and differences between the time periods and write their notes in the comparison box of step 1.
6. In step 2, instruct your students to write down several questions that were inspired by their observations.
7. Lead a class discussion about the observations and questions that your students came up with.
 - a. **Example observations:** Some animals are only found at night (like raccoon, porcupine and skunk). Some are found both during the “day” and “night” like deer and elk. Deer and elk look like they are closely related, and both active at the same time. Birds have good eyesight and are active during the day
 - b. **Example questions:** What influences animals to be active at certain times of day, lower risk of predation? Methods of catching prey?
8. Repeat the process for summer and winter photos.
 - a. **Example observations:** The snowshoe hare is a different color in summer than it is winter. The deer’s coat is thicker/plusher in the winter. There are no bear photos in the winter. There are young in the summer photos. In the winter there is less green for the animals to eat.
 - b. **Example questions:** Do the bear hibernate during the winter? Do they do this throughout their entire range, if so why? Do snowshoe hare change color throughout their entire range, even where there is less snow?

Part 3: Observations Across Space

1. Ask your students to read Part 3 of their worksheet and the two site descriptions in the Ecoregion Appendix.
2. Prompt your students to observe the two sets of photos you are about to show them: 6 photos from the Northern Lakes and Forest (NLF) ecoregion and 6 photos from the Southern Wisconsin Till Plains (SWTP) ecoregion. Instruct your students to write down observations about each photo and identify trends for each site and across the two sites.
3. Display the set of Northern Lakes and Forest photos, pausing for about 10 seconds on each photo. When you are finished with this set, give your students several minutes to write their observations in the Northern Lakes and Forest box of step 1.
4. Display the set of 6 Southern Wisconsin Till Plains photos, pausing for about 10 seconds on each photo. When you are finished with the set, give your students several minutes to write their observations in the Southern Wisconsin Till Plains box of step 1.
5. Give your students several minutes to think about similarities and differences between the two sites and write their notes in the comparison box of step 1.
6. In step 2, instruct your students to write down several questions that were inspired by their observations across space.

Snapshot Wisconsin was granted rights to adapt this classroom resource from the hhmi Biointeractive activity “Gorongosa: Making Observations.” To view original lesson plan, follow [this link](#).

Feedback is always welcomed! Any questions or improvements? Contact us at DNRSnapshotWisconsin@Wisconsin.gov



Making Observations: Educator Handout

7. Lead a class discussion about the observations and questions that your students came up with.
 - a. Example observations: There are different species between the two ecoregions. Some species are in both locations, like deer and coyote. The NLF ecoregion is more forested, the SWTP is more open and grassy.
 - b. Example questions: Why are some species found only in one ecoregion, and not the other? Does this have to do with habitat, predation, or limits to their dispersal? What do animals have in common that succeed in the NLF ecoregion, what about the SWTP ecoregion?

Part 4: Making Observations in Science

1. Prompt your students to answer the questions in Part 4 of their worksheet. You may choose to have them answer the questions on paper and then share with the class, or lead a class discussion about using these questions. If class time is limited, you may assign this section as homework.

OPTIONAL ACTIVITY

- Go outside to make direct observations of nature. Have the students bring along a notebook or journal and document what they see. Ask students to compare their observation and develop potential research questions.
- Share the Research Scientist Observations handout with your students (either by printing copies or reading the information out loud). This handout was written by a Research Scientist on the Snapshot Wisconsin project and details how observations are being used for wildlife management decision support at the WDNR.