

Treecology by Monica Russo

Grade Band: 2-3	Literature: Treecology by Monica Russo	Posted: Maureen Foelkl http://straubenvironmentalcenter.org/
Brief Lesson Description: Students will investigate organisms and the habitats that make up a system, discovering that different species are dependent on each other to survive. They will analyze and interpret data for evidence of organisms within a given area. As they collect habitat characteristics, the students will draw an understanding of why a particular plant or animal is located in an environment and how organisms are not exactly alike.		
Essential Questions: What methods do scientists use to learn about living organisms? How do observations provide evidence for patterns of plant and animal diversity across habitats? What are some of the differences in traits in a group of similar organisms?		
Core Vocabulary: Life Cycle Habitat Plants Animals Reproduction Inherited Characteristics Diversity Biodiversity Traits		
NGSS Standards		
NGSS: Standard: 2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats. Standard: 3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.		
Skills, Reasoning and Claims:		
Standard: 2-LS4-1. Identifying the phenomenon under investigation: Students identify and describe the phenomenon and purpose of the investigation, which includes comparisons of plant and animal diversity of life in different habitats. Identifying the evidence to address the purpose of the investigation: Based on the given plan for the investigation, students describe the following evidence to be collected: i. Descriptions based on observations (firsthand or from media) of habitats, including land habitats (e.g., playground, garden, forest, parking lot) and water habitats (e.g., pond, stream, lake). ii. Descriptions based on observations (firsthand or from media) of different types of living things in each habitat (e.g., trees, grasses, bushes, flowering plants, lizards, squirrels, ants, fish, clams). iii. Comparisons of the different types of living things that can be found in different habitats. Students describe how these observations provide evidence for patterns of plant and animal diversity across habitats. Planning the investigation: Based on the given investigation plan, students describe how the different plants and animals in the habitats will be observed, recorded, and organized. Collecting the data: Students collect, record, and organize data on different types of plants and animals in the habitats.		
Standard: 3-LS3-1 Organizing data: Students organize the data (e.g., from students' previous work, grade-appropriate existing datasets) using graphical displays (e.g., table, chart, graph). The organized data include: i. Traits of plant and animal parents. ii. Traits of plant and animal offspring. iii. Variations in similar traits in a grouping of similar organisms. Identifying relationships: Students identify and describe patterns in the data, including: i. Similarities in the traits of a parent and the traits of an offspring (e.g., tall plants typically have tall offspring). ii. Similarities in traits among siblings (e.g., siblings often resemble each other). iii. Differences in traits in a group of similar organisms (e.g., dogs come in many shapes and sizes,		

a field of corn plants have plants of different heights). iv. Differences in traits of parents and offspring (e.g., offspring do not look exactly like their parents). v. Differences in traits among siblings (e.g., kittens from the same mother may not look exactly like their mother). Interpreting data: Students describe that the pattern of similarities in traits between parents and offspring, and between siblings, provides evidence that traits are inherited. Students describe that the pattern of differences in traits between parents and offspring, and between siblings, provides evidence that inherited traits can vary. Students describe that the variation in inherited traits results in a pattern of variation in traits in groups of organisms that are of a similar type.

Science & Engineering Practices:

LS4.D: Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. Develop a simple model based on evidence to represent a proposed object or tool.
 LS4.C: Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. Analyze and interpret data to make sense of phenomena using logical reasoning.

Disciplinary Core Ideas:

LS4.D: Biodiversity and Humans There are many different kinds of living things in any area, and they exist in different places on land and in water. Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats. Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats. Explanation:
 LS3.A: Inheritance of Traits Many characteristics of organisms are inherited from their parents. LS3.B: Variation of Traits Different organisms vary in how they look and function because they have different inherited information. Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans. Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits.

Crosscutting Concepts:

LS3.A: Patterns
 Similarities and differences in patterns can be used to sort and classify natural phenomena.

Common Core Standards

ELA/Literacy —

W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-LS4-1)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-LS4-1)

Grade 3 ELA/Literacy Reinforcements: RI.3.1), (RI.3.2), (RI.3.3), (W.3.2), (SL.3.4)

Mathematics —

MP.2 Reason abstractly and quantitatively. (2-LS4-1)

MP.4 Model with mathematics. (2-LS4-1)

2.MD.D Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories.

.10 Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (2-LS4-1)

Materials:

- *Treecology*: 30 Activities and Observations for Exploring the World of Trees and Forests by Monica Russo
- science notebook
- hand lenses
- measuring tools
- cups
- paintbrushes
- brown sugar or fruit juices
- Woodland Community chart
- Walk in a Habitat probe
- tablets if available

LESSON PLAN – 5-E Model

ENGAGE:

Begin the lesson with showing the cover of the book, *Treecology, 30 Activities and Observations for Exploring the World of Trees and Forests* by Monica Russo. Take a picture walk of the photos on the cover. Ask the students why the photographer, Kevin Byron might have chosen these photos. Have students turn and talk, encouraging connections to at least one of the photos.

From *Treecology*, read page 37. What do you believe a springtail might be? Why would they also call them snow fleas? What size might they be? What evidence in the passage supports your thinking? The passage makes reference to springtails living in leaf litter. What is leaf litter? Why would this habitat support the survival of a springtail?

Reread page 37, noting the organisms mentioned in the paragraphs. Have students discuss with partners any of the organisms listed. Create a class chart with woodland community categories. As students add responses, make sure they place their name in the corner of the cell. Have students add to the list as an ongoing reference, (sample attached).

Administer the pre-assessment probe, *Walk in a Habitat* (attached) to assess a student's knowledge and skills prior to the instruction.

EXPLORE:

Explain to the students that they are going to be scientists and look for evidence that birds, animals or other forest creatures have taken a walk in the woodlands. Read page 70 and discuss how scientists make observations from evidence. If possible, enlarge the photos on page 70 to engage conversation and hone in on observation skills prior to the field experience. What food do you notice on this page? What organism might have had lunch here? Why?

Take students outdoors with their notebooks. Pinpoint a location on school grounds or a nearby park that replicates a woodland habitat. Animals, birds, insects, etc. rely on trees to give them what they need such as shelter, food and protection. Stop frequently to ask probing questions. What sounds can you hear? Direction? What organism is creating that sound? What evidence do you spy? What type of trees are in the area? How is tree A different than tree B? How are they the same? Why did tree A grow well here? Tree B? Observe the leaf patterns in the trees. Are all the leaves the same size? Why or why not? How can you tell?

Follow the activity, *Forest Food for Animals* on page 69. Have students use their senses to discover evidence of woodland animals and record their findings. Have students ask questions about their discoveries. Give peers a chance to respond with, I believe that a _____ could have _____ because _____. Emphasize that the class will continue to add to the Woodland Community chart while including evidence of the discovery.

Next, have the students participate in the "Paint" Bark with a Recipe to Attract Woodland Moths on page 43. Students can add a variable by creating their own sugar mix from the "try this" inquiry. Make sure that students measure the distance from ground to the painted sugar spot and record distance in their notebook. Collect data frequently over the next two days, being sure to visit as early as possible. If students live close by, encourage them to visit with an adult to make observations.

When the data has been collected, return to the Woodland Community chart. Begin to make comparisons of organisms found. While comparing like organisms, are they exactly the same? If not, how are they different? Students will begin to draw understanding of why particular organisms are located in an environment. They will make connections that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.

If available, locate another habitat for students to repeat the activity, collecting data in a similar fashion. If possible, include a colleague to duplicate this lesson and have another group of students collect data from a different area. Compare and contrast data.

EXPLAIN:

Students have had an outdoor experience to note diversity in an area. Read Noticing Diversity on page 69. Ask students to think of the word diversity and biodiversity. Focusing in on the woodland habitat, was it diverse? How do we know?

The students will then create a mural of their outdoor area with a focus on biodiversity. Assign small cooperative groups a column from the class chart. Each group will draw all the organisms from their column and write some characteristics noted in the cell. When the task is completed, have the class place their cutout drawing and labels on a mural to create their woodland habitat. If you had a colleague's class share the lesson but in another habitat, have the students make comparisons of both areas. Ask probing questions as they exam the project. We found 3 Stellar Jays in the fir grove. Were the jays exactly the same? Explain your thinking. Could the oak tree live in the habitat will lots of water? What could happen to this bark beetle if it landed in habitat A? Could it survive? Clarify your thinking. Sample: The bark beetle could/could not survive in the _____ habitat because _____.

Have students generate questions about each habitat, while allowing peers to interject a response to kindle discussion.

In their notebook, have students write I wonder statements to generate further investigations and research. Share statements with the group.

ELABORATE:

- Invite entomologists, botanists, dendrologist, ecologists, arborists, foresters and profession landscapers to present their careers expanding student knowledge of STEM occupations.
- Students can research heritage trees in their community, their state, the United States or around the world. Conduct research to match social science standards at your grade and state level.
- Ask students to choose one of the organisms from the woodland habitat. Research that organism and create a class book about the experience. Use a publishing service such as Student Treasures so that each student would receive a copy of the book.

EVALUATE:

Formative Monitoring: Woodland probe pre assessment, notebooks, discussion

Summative Assessment :Woodland probe post assessment, inquiry on moth attraction from notebook

Sources:**Books:**

- American Forest Foundation, *Project Learning Tree: Environmental Education Pre K-8 Education Guide*, Washington DC; American Forest Foundation, 2003.
- In the Woods: Who's Been Here?, Lindsay Barrett George Mulberry Books, October 19, 1998.
- *Woodpecker*, Dee Phillips, Bearpoint Publishing Company, New York, 2014

Internet:

- http://oregonstate.edu/dept/nurspest/cinnabar_moth_clup1.html Pacific Northwest Insects
- <http://www.mothnight.info/www/> National Moth Night Out
- <http://learnforests.org/> Forestry in the Classroom

Phone Applications:

- <http://leafsnap.com/> Electrical Field guide for tree identification (free iPhone app)
- <http://merlin.allaboutbirds.org/> Electrical Field guide to bird identification (free app)
- https://play.google.com/store/apps/details?id=org.lucidcentral.mobile.insect_orders&hl=en Electrical Field Guide Insects (free app)

