**Sixth Grade Lesson:**

**What is a Producer? *Understanding Trees and their Role in Maintaining a Balanced Ecosystem***

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| Students who demonstrate understanding can:   |  |  | | --- | --- | | **MS-LS2-1.** | **Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem** | | | |
| The performance expectation above was developed using [the following elements from the NRC document *A Framework for K-12 Science Education*](https://www.nextgenscience.org/pe/ms-ls2-1-ecosystems-interactions-energy-and-dynamics##framework): | | |
| **Science and Engineering Practices**  **[Analyzing and Interpreting Data](http://www.nap.edu/openbook.php?record_id=13165&page=61)**  [Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.](http://www.nap.edu/openbook.php?record_id=13165&page=61)   * [Analyze and interpret data to provide evidence for phenomena.](http://www.nap.edu/openbook.php?record_id=13165&page=61) | **Disciplinary Core Ideas**  [**LS2.A: Interdependent Relationships in Ecosystems**](http://www.nap.edu/openbook.php?record_id=13165&page=150)   * [Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors.](http://www.nap.edu/openbook.php?record_id=13165&page=150) * [In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction.](http://www.nap.edu/openbook.php?record_id=13165&page=150) * [Growth of organisms and population increases are limited by access to resources.](http://www.nap.edu/openbook.php?record_id=13165&page=150) | **Crosscutting Concepts**  **[Cause and Effect](http://www.nap.edu/openbook.php?record_id=13165&page=87)**   * [Cause and effect relationships may be used to predict phenomena in natural or designed systems.](http://www.nap.edu/openbook.php?record_id=13165&page=87) |

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| Students who demonstrate understanding can:   |  |  | | --- | --- | | **MS-LS2-3.** | **Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem** | | | |
| The performance expectation above was developed using [the following elements from the NRC document *A Framework for K-12 Science Education*](https://www.nextgenscience.org/pe/ms-ls2-3-ecosystems-interactions-energy-and-dynamics##framework): | | |
| **Science and Engineering Practices**  [**Developing and Using Models**](http://www.nap.edu/openbook.php?record_id=13165&page=56)  [Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.](http://www.nap.edu/openbook.php?record_id=13165&page=56)   * [Develop a model to describe phenomena.](http://www.nap.edu/openbook.php?record_id=13165&page=56) | **Disciplinary Core Ideas**  [**LS2.B: Cycle of Matter and Energy Transfer in Ecosystems**](http://www.nap.edu/openbook.php?record_id=13165&page=152)   * [Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem.](http://www.nap.edu/openbook.php?record_id=13165&page=152) | **Crosscutting Concepts**  **[Energy and Matter](http://www.nap.edu/openbook.php?record_id=13165&page=94)**   * [The transfer of energy can be tracked as energy flows through a natural system.](http://www.nap.edu/openbook.php?record_id=13165&page=94)   - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -  ***Connections to Nature of Science***    **Scientific Knowledge Assumes an Order and Consistency in Natural Systems**   * Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. |

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| Students who demonstrate understanding can:   |  |  | | --- | --- | | **MS-LS2-4.** | **Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations** | | | |
| The performance expectation above was developed using [the following elements from the NRC document *A Framework for K-12 Science Education*](https://www.nextgenscience.org/pe/ms-ls2-4-ecosystems-interactions-energy-and-dynamics##framework): | | |
| **Science and Engineering Practices**  [**Engaging in Argument from Evidence**](http://www.nap.edu/openbook.php?record_id=13165&page=71)  [Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).](http://www.nap.edu/openbook.php?record_id=13165&page=71)   * [Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.](http://www.nap.edu/openbook.php?record_id=13165&page=71)   - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -  ***Connections to Nature of Science***    **Scientific Knowledge is Based on Empirical Evidence**   * Science disciplines share common rules of obtaining and evaluating empirical evidence. | **Disciplinary Core Ideas**  [**LS2.C: Ecosystem Dynamics, Functioning, and Resilience**](http://www.nap.edu/openbook.php?record_id=13165&page=154)   * [Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.](http://www.nap.edu/openbook.php?record_id=13165&page=154) | **Crosscutting Concepts**  [**Stability and Change**](http://www.nap.edu/openbook.php?record_id=13165&page=98)   * [Small changes in one part of a system might cause large changes in another part.](http://www.nap.edu/openbook.php?record_id=13165&page=98) |

**Objectives:**

Know the difference between a producer and a consumer and how they are interconnected in the ecosystem.

Know about parts of a plant, how it survives, how it changes and/or adapts due to different environmental changes. Students will know the difference between a native plant species and a non-native plant species.

**Be able to do:** Students will be able to label different parts of a plant. They will then be able to write down information supporting the different parts of a tree. Students will be able to look for invasive species and label why they are invasive and how they change habitats surrounding them.

**Understand:** Students will understand that consumers cannot survive without producers. The food that we can consume either comes directly from a producer or the food source needs a producer to survive. That plants adapt to different environmental changes. Some plants survive better than others and the difference causes ecosystem changes and misbalances of wildlife habitats distribution in a given area. Students will understand that different parts of a plant are evident in different seasons and depending on the temperature, the time and date of these features change from year to year.

**Important Vocabulary terms:** Botany, Invasive, Consumer, Producer, Photosynthesis, Chlorophyll, Decomposer, Native, Non-native, Habitats, Ecosystem, Environment

**Guiding Questions:** What are the different ways we need producers to survive?

Why are producers important to the environment?

What community action projects can we do to help create better and more habitats for producers?

**Procedure:** Classroom Visit: 1 Hour

(30 minutes) Students will get their notebooks out and write down and define Botany as an entire class. They then will define the words Consumer, Producer, Decomposer. This will go fast as students have been familiarized with these terms. After writing down definitions, students will break into groups of three and be handed different cards. Students will discuss as a group what the card is and whether it is a “producer or consumer or decomposer”. Students will then present their card/s to the large group with two students walking up to the front holding their groups cards. They will be added to the chain of life activity.

Students will report their understandings of this activity that demonstrates that consumers need producers to survive.

**Producers: Looking at Trees:**

(30 minutes) Students will work in their same groups and walk around to the three different stations as they learn about trees, making observations and recording data. When all three groups have visited each station and discussed what they wrote down they will return to their tables. The producers group will present about the leaves. The consumers group will report on the bark and the decomposers group will report about the roots. All information that students talk about will be added to the main board for discussion.

What to wear/bring on fieldtrip next week. Students will write a T in their notebook to get ready for trip to Whitfield the following week.

**Whitfield Visit:** Three Hours

Students will bring information from classroom visit to Whitfield in their journals. Students will be handed out phenology worksheet and learn about Nature’s notebook.

Students will walk down to the well by La Bonita Pond and measure the well water depth. Students will write down their predictions on whether the water level is going up or down with a warming climate. Students will write down based on their prediction, what will happen to plant habitat in the area

Students will walk to the pond and nature journal. Students will write down all the animals that use the resource that they wrote down. Students will then be told that what they drew no longer exist in the environment. They must now cross out every animal that they had labeled in their notebook.

Students will walk to first cottonwood tree and write down information about it. Students will also look at invasive and non-invasive plants in the area.

Students will eat lunch in the back.

Students will walk around the second cottonwood and make observations. Students will write down all the human impacts on the plants that they see in the area.

Students will walk around to the third cottonwood and write down observations for final list. Students will list all the different environmental factors that can harm the tree in its habitat. (human or natural)

Students will write in three ways they can help create a flourishing plant population into the future thinking about habitat, distribution, changing environment, etc.

**After visit extension:**

Begin observations of plants around the school to add to Nature’s Notebook. Have students observe plant changes throughout the year in their journals. Create a new place

