Observations with Leopold

Grades: 6-8, Biology, Environmental Systems

TEKS:
6: 1A-G, 2A-C, 4A, 5F-G, 11B, 12A
7: 1A-G, 3A-C, 4A, 5F-G
8: 1A-G, 3A-C, 4A, 5F-G, 12C
BIO: 1A-G, 3A-C, 4A-B, 13D
ES: 1A-G, 3A-C, 4A-B, 11B

Topics:
Biodiversity
Biotic (living) /Abiotic (nonliving)
Habitats and Ecosystems
Human Activity/Environmental Impacts
Natural Resources
Plants
Scientists/Naturalists
Wildlife

Methodologies:
Critical Thinking
Journaling
Measurement
Observations/Qualitative/Quantitative

Setting: Classroom and Outdoors

Activity Time: 30-45 minutes

Additional Subjects: Art

Objective:
Students will recognize Aldo Leopold as a famous conservationist as they distinguish between observations he used to collect data, including both qualitative and quantitative information.

Materials:

Provided	Not Provided
Activity Page	Journals
C.A.R.E. Acronym	Pencils
	Hand lenses
	Metric rulers

Vocabulary:
abiotic, biodiversity, biotic, conservation, environment, ecosystem, natural resources, observations, wildlife

Observations with Leopold

Background:

Scientists use observations to collect information needed for learning. Qualitative observations are made to observe objects and describe them using one or all five senses. Quantitative observations are made by collecting data using numbers through measuring or counting. Aldo Leopold, a famous scientist, conservationist, and writer was born in 1887 and used both types of observations as he observed the natural world. To many, he is considered the father of wildlife management and is known for taking his time to discover the wonder of the world around him. Leopold believed in keeping accurate records of his observations (quantitative) and relied on the use of his senses (qualitative). He wanted people to discover the beauty of nature, including in places such as a schoolyard or a playground. This lesson is based upon one of his essays, Great Possessions, which is included in his book, *A Sand County Almanac*. Leopold believed that life's greatest possessions were those things found in nature. One of his many quotes referring to nature is as follows.

"Teach the student to see the land, to understand what he sees and enjoy what he understands."

Throughout this lesson, stress the importance of stewardship as taking care of living (biotic) and nonliving (abiotic) things, such as keeping water free of pollutants so that it will remain healthy for wildlife to drink. Post and review the following acronym with students.

C Care for the protection of wildlife and their habitats.
A Act to become a caretaker or steward of water, land, and animals.
R Represent stewardship by being a positive role model for others.
E Educate others about stewardship and conservation.

Activity Preparation:

- Make copies of the activity page, for each student, or project on the screen for students to reference if writing the data in their journals.
- Identify an outside area on the school grounds that students can visit with limited distractions as a class during the activity.

Procedure:

Discussion

1. Engage students by showing the following YouTube video about the life and legacy of Aldo Leopold, *Aldo Leopold Nature Center - Foxfires & Fireflies*, KelleyVanEgeren (3:25)

2. Ask students the following questions, and have them share their answers with the class.
   - Why do you think Aldo Leopold cared about the world around him?
   - When you hear the term "natural resources," what do you think about? *plants, animals, trees, rocks, metal, oil, water, gas, etc.*
   - Why do you think Leopold made sure his children experienced nature just as he had?
   - Do you care about the world, including its wildlife, around you? Why?

3. Introduce or review the term "biodiversity" as the variety of life in the world or in a particular habitat or ecosystem. Refer back to the C.A.R.E. acronym. *How does it relate to biodiversity?*

4. Arrange students in groups.

5. Ask students how scientists, such as Aldo Leopold, gather information about an object. Allow time for students to share their thoughts with their group and then direct them to take turns sharing with the class.

6. Guide students to an understanding that scientists use observations to collect information to learn about the ecosystems of the natural world. If needed, review the term "ecosystem" as all of the living (biotic) and nonliving (abiotic) things living in an area and functioning as an ecological unit. Explain that Aldo Leopold was a famous scientist who used observations to help him to answer questions. Two basic types of observations were used by Leopold and are still used today:
   - Qualitative observations are made using one or all of the five senses.
   - Quantitative observations are made by collecting data using numbers by measuring or counting.

Activity A – Introduction and Journal Observations

1. Instruct students to place their journals on their desks or tables. Provide students with hand lenses.

2. Tell students when they use one of all of their five senses, they are making qualitative observations, and write the term "qualitative" on the board.

3. Instruct students to make observations about their journals. Encourage students to use descriptive words, as if they were an artist painting a picture. *Example: The journal is black and white. Better Example: The journal is black with white speckles distributed throughout. It feels smooth. It is a solid.*

4. Remind students of necessary safety procedures for observing with their noses and mouth. When they smell any object, they should be "wafting." Demonstrate wafting by sweeping your hand towards your nose and explain that this is a safer way to smell unknown things. In addition, students are not to taste an object without permission from the teacher.

5. Next, provide students with metric rulers.

6. Tell students that making observations includes taking measurements of objects such as the length, width, height, volume, or mass, and write these words on the board.

7. These are known as quantitative observations and can be used to count a number of objects to achieve accuracy, just as Aldo Leopold did. Write the term, "quantitative" on the board.

8. Instruct students to use rulers to measure the length and width of their journals. If time allows, provide each group with a balance scale or triple beam balance to find the mass of one journal. Explain that all of these measurements are examples of quantitative observations.

Activity B – Outdoors Observations

1. After practicing the different methods of observation, tell students they are going outdoors for an observation hike. Explain that they will pretend they are students of Aldo Leopold.

2. Before taking the students outside, discuss safety issues related to the outdoor learning environment.

3. Take hand lenses and metric rulers to be distributed, and guide students outdoors with their journals.

4. Explain that Leopold kept a pace, known as a saunter, when making observations. To model Leopold's saunter, instruct students to walk in a slow, relaxed manner, without hurry or effort, at a pace that allows them to look around and observe nature. Allow students to make observations while they practice sauntering.

5. Next take the students to a location where they can spread out and sit. Allow students to sit very quietly and listen to noises made by nature for several minutes. Students can write in their journals the noises they heard, or after quiet time is over take turns sharing what they heard with the class. Encourage students to use descriptive words or adjectives.

6. While seated, ask students to locate either a living (biotic) or nonliving (abiotic) object such as a tree, flower, bush, or rock. Take turns letting students share observations of the object on which they have focused. Ask how many senses they used to observe the object. Ask how many of them made an observation using accuracy, such as counting.

7. Give each student a copy of the provided activity page.

8. Instruct students to use the activity page to record both qualitative and quantitative observations. Provide hand lenses and metric rulers as requested. Journals may be used as a notebook to make writing on the activity sheet easier. Activity sheets can be pasted into journals later.

9. Give students time to make their observations and record their data, just as Leopold once did. Ask students to draw and label the object in the journal or on the back of the activity sheet. Instruct older students to identify their objects as being a biotic or abiotic part of the environment.

Wrap-up

1. Review qualitative and quantitative observations and ask students to give examples of each.

2. Review the C.A.R.E. acronym and ask students to pretend that Aldo Leopold plans to visit their school. Would he approve of all parts of this acronym? Why?

3. How might the effects of human activity, such as building highways, housing developments, and shopping centers have caused changes in ecosystems regarding urban development and the future of native wildlife diversity?

4. To close the lesson, ask students what they can do to make their schoolyard a better place.

Extension:

1. Tell students there are government regulations in place designed to protect the environment and its resources, which Aldo Leopold would likely have appreciated. They are as follows:

Kyoto Protocol	National Park Service Act
Clean Air Act	Soil and Water Resources Act
Resources Conservation Act	Endangered Species Act
Antarctic Treaty System	Montreal Protocol

2. Assign one of the above regulations to each group of students.

3. Instruct groups to use their computers to research their assigned topic.

4. Allow time for each group to present their findings to the class. They may create a chart, poster, or multimedia presentation to achieve their goal.