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

- Observations with Leopold 6-12 activity sheet
- C.A.R.E. Acronym page

Not Provided

- Journals
- Pencils
- Hand lenses
- Metric rulers
- String or yarn
- Balance or triple beam balance scales

Vocabulary:

Please reference the Glossary for definitions.

abiotic, biotic, conservation, environment, land stewardship, observation, qualitative, quantitative, senses, wildlife, wafting

Activity Preparation:

- Make copies of the Observations with Leopold 6-12 activity sheet, for each student, or project the activity sheet on the screen for students to reference if writing the data in their journal.
- Identify an outside area on the school grounds that students can visit with limited distractions as a class during the activity.

Background:

Scientists use observations to collect information needed for learning. One type of observation is known as qualitative. These observations are made to observe objects closely to describe them using one (1) or all of the five (5) senses. Other observations are known as quantitative and 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 places such as a schoolyard or a playground. This lesson is based upon one of his essay writings known as, 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. Two of his many quotes referring to nature are as follows.

“Expanses unknown to deed or map are known to every dawn, and solitude, supposed no longer to exist in my county, extends on every hand as far as the dew can reach.”

“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 by taking care of living and nonliving 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 steward of water, land, and wildlife.
R Represent stewardship by being a positive role model for others.
E Educate others about stewardship and conservation.

Procedure and Activity:

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)

   Ask students the following questions, sharing their answers with the class.
   - Why do you think Aldo Leopold cared about the world around him?
   - 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?
   - Do you think you are capable of making and recording observations like Leopold?

2. Arrange students in groups.

3. 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.

4. Guide students to an understanding that scientists use observations to collect information to learn about the natural world. Explain that Aldo Leopold was a famous scientist that used observations to help him to answer questions. There are two basic types of observations used by Leopold and are still used today:

   - Qualitative observations are made using one (1) or all of the five (5) senses.
   - Quantitative observations are made by collecting data using numbers by measuring or by counting.

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

   - Ask students to recall the names of their five (5) senses.
   - Use the board to record each of the senses.
   - Tell students when they use their one (1) of all of their five (5) senses, they are making qualitative observations, and write the term “qualitative” on the board next to their responses.
   - Instruct students to make observations about their journal. 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. If feels smooth. It is a solid.*
   - Remind students of necessary safety procedures for observing with their nose and mouth. When they smell any object, they should be “wafting.” In addition, students are not to taste an object without permission from the teacher.

6. Provide students with metric rulers.

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

7. 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. Before taking the students outside, discuss safety issues related to the outdoor learning environment. Take hand lenses and metric rulers to be distributed, and guide students outdoors with their journals. 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.
• Once outside, take the students to a location where they can spread out and sit. Allow students to sit very quietly and listen for noises made by nature for several minutes. Students can write in their journal 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.
• While seated, ask students to locate either a living or nonliving an 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.
• Give each student a copy of the provided Observations with Leopold 6-12 activity sheet.
• Instruct students to use the activity sheet 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.
• 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 identify their objects as being a biotic or abiotic part of the environment.
• Tell students that Leopold once wrote an essay and entitled it, “Great Possessions.” The essay included the making of good observations. Ask students if they know what Leopold was referring to by naming it “Great Possessions.”

For older students, refer to the quotes in the Background Section of this lesson and ask students to interpret their meanings.

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

Extension for older students:
1. Arrange students in groups.

2. 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.
   Texas automobile emissions regulations  National Park Service Act
   Clean Air Act  Soil and Water Resources Act
   Resources Conservation Act  Endangered Species Act
   Antarctic Treaty System  Montreal Protocol
   Kyoto Protocol

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

4. Instruct groups to use their computers to research their assigned topic.
5. 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.