

Improving One System Within a School

by Susan Sanchez

Grade Level:

4th or 5th grade

Lesson Overview

Students are introduced to the ideas of stewardship and how to become stewards within their school system. They will examine the California tribe, Ohlone, and how one tribal system (a “midden” for discarded shell waste) was successful and what broke down. Students will use the information to find out what is working within their school community. Through interviews and data collection, students will decide on one area that needs to be improved. They will build a prototype to support the new system. The lesson’s activities are designed for students to become engaged in problem solving, brainstorming, questioning, research, data collection, speaking/listening skills, writing and presentation.

Lesson Objectives

Students will gain a sense of ownership for a system within the school, promoting stewardship. Students will design a more useful and functioning system.

The learning objectives center on the importance of stewardship and taking authentic ownership of one system that needs to be investigated. Students will look for more effective options and create positive outcomes. Students will research, interview, observe, build a prototype, and promote creative thinking to support the system with more successful strategies.

Students will:

- define stewardship.
- connect with the Ohlone Indians’ philosophy about stewardship.
- interview someone to gain understanding of a real-life example of stewardship.
- observe students and the system currently used.
- design a prototype of a new system and present to the adults they interviewed.

Standards

NGSS 3-5-ETS1-1: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

NGSS 3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

NGSS 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Preparation

Students should have some previous preparation or experience with investigation, scaffolding, questioning skills, interviewing, observation, and graphic organizers. Students should have some understanding of functioning systems. Students should have prior reading and evaluation about the California Indian tribe, Ohlone.

- Materials for Activity 4 should start to be collected as early as possible.
- Graphic organizer needs to be developed to support information that is collected. Venn Diagram or T-chart are suggestions.

Materials and Resources for all activities

- White boards, dry-erase markers (Activity 1)
- Empathy Map (Activity 1)
- Post-it pads, small and large (Activity 1 and 2)
- Video of California Indian midden:
<https://www.youtube.com/watch?v=DbFyCPIXO3U> (Activity 1)
- Pictures of communities and waste systems (Activity 1)
- Graphic Organizer for collection of data (Activity 3)
- Variety of prototyping materials. Students will use materials from home or school supplies provided. (Activity 4)

Activity 1: Stewardship (30 minutes)

Students are introduced to the concept of stewardship and develop understanding of empathy with California Indians.

Task 1: Connect to Social Studies and California Indians.

- Review the systems that worked for the California Indians through relevant readings. Find parts of the systems that worked and parts that broke down.
- Show video on the midden (refuse heap) and how it is a working system that supports stewardship of the community.
- Create an Empathy Map of California Indians relating to how their system works.
- Share information.

Task 2: Creating questions around the Empathy Map.

- Based on the Empathy Map information, guide students through how to make open-ended questions.
- Review the questions to confirm they are open-ended questions.

Task 3: Introduce Guiding Statement, and Question.

Guiding Statement: If a community has a strong and well-run system, and it is sustained, a sense of care takes place. This is called “stewardship.”

Guiding Question: What does stewardship mean to you?

- Students work in groups to create answers.
- Students share out all possible reasons
- Culminate with questioning about whether students can become stewards.
- Accept all ideas and guarantee that the class will come back to this at a later date to discuss.

Activity 2: Building Understanding Through Questions and Problem Solving (30 minutes)

Task 1: Quick Write and Share with a Partner

- Students write on Post-it notes a reflection on how the school can work towards stewardship.
- Students share their ideas and group similar ideas.

Task 2: Develop Interview Guide for guests

- Students are reminded of the guiding statement and question.
- Students look for what works in school systems and what breaks down.
- The concept of open-ended questions is reviewed, and students generate potential interview questions. Class agrees upon 5 to 8 questions to ask the guests.
- Questions are typed up for students to use as they interview.

Activity 3: Interview Adults, Collect Data and Review Information (70 minutes, which could be broken into two sessions)

Task 1.1: Interview people who are involved.

Students are broken into small groups of 4 to 5 to interview one adult from the guiding and generated questions.

Students say: “We are exploring our school system and how we can further support stewardship. We would like to interview you and ask some questions that will guide us to determine an area to work on. We will then gather data that will support understanding of what is working and what is not working. We will analyze the information that we collect and then would like to present the information to you. We appreciate you taking the time to do this.”

Sample questions:

- What does stewardship mean to you?
- What do you see as our best system? (Why?)
- What do think is our best stewardship at our school? (Why?)
- How could the school improve?
- Where are the breakdowns in this system?
- How does this breakdown affect our school community?
- What areas could we improve as a school community?

Students must agree on one area that needs to be observed and data collected within the school.

Task 1.2: Data collection:

Students break into small groups to observe students in the system.

- Students observe other groups of students engaged in the system for 20 minutes.
- Students are looking for patterns and details about what works and does not work in the system.
- Student partners discuss as observations occur.

Task 2: Review, and create graphic organizer:

- Students generate information about working areas of system.
- Students generate information about breakdowns of system.
- Students create a need statement for the school, based on the interviews and the observation.
- Teacher collects graphic organizers and compiles all information into one graphic organizer.

Activity 4: Prototyping (45 minutes)

Discussion must happen with the whole class for an agreement on one area for improvement.

Task 1: Design and build prototype for area of need.

- Students will find **one** thing to improve in the existing system based on the interview information.
- Students will build a prototype in groups of three.
- Each group will test out their prototype with the adults they interviewed.
- Students will share prototype and discuss successes and failures.
- Students will discuss how to improve on the area of failure.
- Students will agree upon the best of each prototype and plan to build one prototype that will be tested.

Troubleshooting

1. Students' questions may not be focused enough to generate fruitful responses. You might model good and bad questions, then ask groups to generate examples for group discussion.
2. There may not be a complete consensus on the information and directions to take. You might need to help resolve conflicts between multiple good ideas.
3. Students may not understand the importance of the interview and gain empathy. Try discussing the difference between designing a solution using expert knowledge alone and designing a solution by starting from empathy, and how these approaches might lead to different results. For example, if you assume the problem to be solved ahead of time based on expertise alone, you might miss an important insight that you would only get by gaining empathy with a user.