Unit 6: Service Learning Project

Unit Objectives

At the end of this unit the students will be able to:

- Evaluate natural processes and human activities that affect global environmental change and suggest and evaluate possible solutions to problems. **(Science Standard)**

- Define a problem that addresses a need and identify constraints that may be related to possible solutions. **(Science Standard)**

- Identify and give examples of how groups and organizations can influence the actions of government. **(Social Studies Standard)**

- Understand how citizens can make their voices heard in the political process. **(Social Studies Standard)**

- Clarify key aspects of an event, issue, or problem through inquiry and research. **(Social Studies Standard)**

- Consider two or more outcomes, responses, or solutions, identify their strengths and weaknesses, then conclude and justify which is the best. **(Social Studies Standard)**

Unit Background

Lesson 6A

Project Development (time frame is variable depending on your resources and the amount of available time.)

Unit Background

This final unit provides an opportunity for students to work with classmates on a service learning project intended to culminate in real world emission reductions. The project serves as an authentic assessment of students' new-found knowledge about the causes of and solutions to climate change and tests their ability to apply concepts learned in the classroom to their community. Another value of the unit is that it provides students with the tangible experience of making a difference on an issue so vast that it often leaves us feeling helpless.

Service learning projects engage students in active learning that has been shown to positively influence their motivation, attendance, academic learning, interpersonal and personal development, sense of civic and social responsibility, lifestyle choices, appreciation for cultural diversity, and career aspirations. Research also shows service learning to enhance students' leadership and moral development and problem solving skills.

Learning through experiential experiences can be enhanced by reflection on the process, successes and challenges throughout. Evaluating the experience based on multiple criteria enhances opportunities for success along the way. Consider whether you will allow your students to fail in any realms and, if so, how to deal with those failures.

Sources:

Bilig, Shelley H, 2000. "Research on K-12 School-Based Service-Learning: The Evidence Builds." Phi Delta Kappan, v81 n9 p658-64

Lester, Scott et Al, 2005. "Does Service Learning add Value? Examining Perspectives of Multiple Stakeholders." Academy of Management Learning & Education, Vol. 4, No. 3, 278 –294.

Eugene C. Roehlkepartain, 2007. Learn and Serve Clearninghouse. "Benefits of Community Based Service Learning," http://www.servicelearning.org/instant_info/fact_sheets/cb_facts/benefits_cbosl/

Unit 6

Lesson 6A—Project Development

Objectives

- Students will practice engaging in solutions to climate change.
- Students will be empowered to address a global problem on a local scale.
- Students will learn new skills like project development, implementation and evaluation

Suggested Timeframe

- 10 minutes—Introduce the project
- 20 minutes—Lesson (Part 1)
- 30-60 minutes—Lesson (Part 2)
- 1-3 days—Lesson (Part 3) and Evaluation

Materials

- Materials will vary depending on the project

Teacher Information

The intent of this lesson is for the students to plan and implement a project that, if successful, will lead to actual emission reductions. The project is designed to introduce the students to the challenges and rewards of taking action. Not only will the students put their newly learned climate change knowledge to use, but they will also recognize the steps necessary to plan, implement, and evaluate a project. The aim is not to merely inform by transmission of information, but to engage both students and the audience in activities that promote understanding of climate change, (its causes, effects and solutions) and that lead to actual emission reductions.

In small groups, students will go through the process of planning a project. They will choose **what** the goals will be, **who** will be involved (audience), **when** the goals will be met, **where** the project will occur and **how** to evaluate and sustain the project. Each group will present their proposal to the class and the class will choose one project to pursue. (Concentrating on just one class-wide project will be more manageable for the teacher and will increase the sustainability of the project.) At this point the class (or you) will choose project coordinators and finalize the plans. Next, the plan will be implemented with the cooperation of the entire class. Finally, the plan will be evaluated for its impact on climate change and the possibilities of sustaining the project in the future.

As the teacher you will be called upon to guide the students, so it is important that you can anticipate obstacles they will encounter. Appendix 2 has an extensive list of projects students have done in other schools. Use this as a resource for any students who may be struggling for ideas.

It may be possible that you do not have time to run a complete project or go through the brainstorming session. If not, we have included a pre-designed project to do a food waste audit for your school. The directions are highly structured and will work on a fixed schedule (60-90 minutes.) See Supplemental Lesson, S9, for these instructions.

Discussion

1. Purpose of project
   a. Practice engaging in solutions to climate change.
   b. Empowerment to address a global problem on a local scale.
   c. Learn new skills like project development, implementation and evaluation.
2. Process planning
   a. What
   b. Who
   c. When
   d. Where
   e. How
3. Evaluation
   a. Process evaluation—how did the process go?
   b. Product evaluation—Did the project reach the expected results?
   c. Prepare the students for the possibility of frustration and even failure. This process can be difficult, but oftentimes goals are met only after overcoming obstacles.

Unit 6

Lesson (Part 1)

1. This lesson has wide parameters and is open to interpretations by you and your students.

2. Take a few minutes and review the main topics covered in the Climate Change Curriculum (see Appendix 1).

3. Ask students to brainstorm their concerns about climate change and record these concerns on the board.

4. Ask students, either working in groups or as an entire class, to express their vision of a future where human impact on climate is no longer an issue. This vision should include the types of energy we would use, how we would care for the environment, how we would conserve and so on. They might suggest things like:

   - Creating ways to use cleaner, renewable sources of energy

   - Driving less, using more public transportation

   - Using more electric vehicles

   - Lowering idling in school parking lots

   - Reducing consumption of materials which are non-recyclable or non-reusable etc.

5. The students' ideas can be recorded on the board as a brainstorming activity or visually as an art or mixed-media exercise (combining words and pictures).

6. To bridge the gap between the students' visualization of an ideal future and what needs to be done to create this vision, it is necessary to **take action**. Students need to know that being passive will not bring about the future that that they desire.

7. Ask the students what can be done to move closer to that ideal future (with the understanding that it will take many positive actions over time to reach that ideal), and try to encourage realistic responses while emphasizing a proactive approach.

8. Break the class up into small groups so they can brainstorm what type of projects they could organize and implement in their school, community, or homes.

9. Some suggestions are:

- Tree planting

   - Starting or improving a recycling or composting program

   - A no-idling campaign

   - A carpooling signup

   - A biking and walking campaign

   - Compact fluorescent lights/lights out at the end of the day campaigns

   - Other campaigns

   - Meetings with and/or writing letters to leaders to encourage climate solutions

10. Ask students to conduct Internet searches to discover what other students around the world have done as similar projects. Each student (or small group) should find and record at least three different projects.

11. As a large group, share their findings and create one master list of possible projects.

Lesson (Part 2)

1. As students begin deciding on their own possible projects, gather the group together and discuss these criteria with the entire class:

   a. Who is your audience? Is this achievable?

   b. What will be the goals of your project? What will your audience do?

   c. When will you hold your event?

   d. Where will this take place?

   e. How will you achieve your goals? What resources will you need? How might could the project be sustained over time?

   f. What impact will the successful completion of your project have? This could include not only fewer GHGs, but also more school or community awareness, providing an example or pilot that could be expanded, etc.

2. Students will return to their small group and complete Student Worksheet: Project Details.

3. When students have completed their worksheet, they will present it to their teacher for approval.

4. Once all student projects have been approved, the small groups should present their proposal to the class.

5. During this process, the class will decide on one project to begin as an entire class. At this point, the class or teacher should choose project coordinators to act in a leadership role.

6. With teacher assistance, the project coordinators should stand before the class and expand their project detail worksheet to include every member of the class:

   a. **What?** Define 2-3 achievable goals for your project (If needed, visit http://www.goal-setting-guide.com/smart-goals.html to learn about "SMART" goal setting)

   b. **Who?** Define a role for everyone in the class (can be done last).

   c. **Who?** Define your audience.

   d. **When?** Define a timeline for the goals you set.

   e. **Where?** Define the location of your project.

   f. **How?** Define a plan to achieve your goals.

   g. **How?** Define the resources needed to achieve your goals.

   h. **How?** Define a plan to sustain your project over time, if desired.

7. When step #6 is complete, the project plan should be typed up for review.

8. Once the plan is approved by the class, all students should sign the plan to show their commitment to the project.

9. Evaluation—the students will need to develop criteria with which to evaluate their project. Some suggestions include:

   a. Did the project stay on the timeline proposed by the class?

   b. Did the project reach the intended audience?

   c. Did the project achieve its goals?

   d. Were GHG emissions reduced?

   e. Was the location appropriate?

   f. Is the project sustainable? Can it be carried out in the future? Is it a one-time event?

Unit 6

Lesson (Part 3)

1. Implement the project. Keep in mind your criteria for success as you follow through with the project.

2. Project Evaluation—the students will need to determine ways of collecting data for evaluating their project. Suggestions include:

   a. Record when the project started and when it ended and the number of hours spent carrying out the project.

   b. Count the number of people involved in the project.

      i. Record the number of students.

      ii. Record the number of staff/teachers.

      iii. Record the number of parents or community members.

   c. Take photographs to record and share.

   d. Other means of evaluating the impacts depending on the project:

      i. Count—the amount of trash recycled/composted or number of trees planted

      ii. Survey—participants in an anti-idling campaign

      iii. Interview—people impacted by the project

      iv. Test—subjects from an educational project

   e. Estimate reductions in GHG emissions.

      i. Look back to past lessons for quantifications of GHG emissions of particular actions, like using an incandescent as compared to a compact fluorescent light.

      ii. Using the data collected on actions taken and the emission reductions from those actions, calculate the GHG emissions avoided as a result of the project.

Optional Activity—Secure Funding

You may choose to register your project with SOLV, receive free materials, and apply for a $100 grant to assist you meet your goals. Visit SOLV at: *http://www.solv.org/programs/k16_education.asp.*

Apply for a grant and download a planning guide from Project Learning Tree "Green Works!" at: *http://www.plt.org/cms/pages/21_22_18.html*

Student Worksheet: Project Details

As your small group discusses the details of your project, complete this worksheet. When it is completed, present it to your teacher for approval.

Name of the project: _____

Group members: _____ Role: _____

     _____ Role: _____

     _____ Role: _____

     _____ Role: _____

Project Details:

WHAT?	
WHO?	
WHEN?	
WHERE?	
HOW?	

Teacher suggestions/comments:

Teacher Approval: _____ Date: _____

Assessment

(Includes blanks to fill in depending on the chosen subject.)

Aspect	Expert (4)	Practitioner (3)	Apprentice (2)	Novice (1)	Score
Worksheet	Worksheet is complete with all entries showing thoughtfulness.	Worksheet is complete with most entries showing thoughtfulness.	Worksheet is incomplete and lacks thoughtfulness.	Worksheet is not attempted.	
Presentation: Content	Content shows thoughtfulness and creativity.	Content shows some thoughtfulness but lacks some creativity.	Content shows little thoughtfulness and lacks creativity.	Presentation lacks content.	
Presentation: Oral	Presentation is clear and is easy to understand. Tone is conversational or informational.	Presentation is good but sometimes difficult to follow.	Presentation is difficult to follow. Tone is not appropriate.	Presentation completely misses the assignment.	
Teamwork	Worked well as a team.	Worked well with some guidance.	Worked as a team with a great deal of guidance.	Did not work well together.	
Post Presentation Discussion	Participates fully during class discussion.	Participates somewhat during class discussion.	Demonstrates minimal contribution during class discussion.	Does not participate in class discussion.	
Optional Grading Aspect 1					
2					
3					
4					
5					
				Total Score	/

Climate Change Action Appendix 1

Unit Highlights

Unit 1 Highlights

- Human made carbon dioxide, methane, and nitrous oxide are all considered greenhouse gases (GHGs) because they contribute to the greenhouse effect.

- The changing climate due to the greenhouse effect is referred to as climate change, global warming, or global climate change.

- The concentrations of GHGs in the atmosphere are increasing due to fossil fuel use in homes, industry, agriculture, and transportation, deforestation, and fertilizer use.

- GHGs absorb and radiate heat back to the earth.

- The temperature of the earth has risen 1.4 degrees Fahrenheit over the last century.

- GHGs are emitted by all countries, with China and the United States producing the most.

- In the US, a sector by sector look at GHG emissions is as follows: Industry (30%), transportation (28%), commercial (17%), residential (17%) and agriculture (8%)

Unit 2 Highlights

- Electricity is the most common form of energy we use at home and at school.

- Most power plants convert mechanical energy into electrical energy. This can be done by heating water and creating stream to turn a turbine or using water or wind to turn the turbine.

- Many times the energy used to heat the water comes from burning fossil fuels and therefore produces GHGs.

- A region's energy profile dictates how many GHGs are emitted. In Oregon, with its abundance of hydroelectricity production, electricity generation accounts for fewer emissions than other, more fossil fuel dependent, states.

- Americans produce almost 9000 pounds of CO_2e per person per year in their homes (from energy use).

- Conserving energy is an excellent way to reduce your GHG emissions.

- Lighting accounts for 20 to 25% of the total energy use in a school.

- There are several sources of renewable or alternative energy: hydro, solar (PV), wind, geothermal, and biomass.

Unit 3 Highlights

- Transportation accounts for approximately 29 percent of total US GHG emissions.

- Transportation is the fastest-growing source of US GHGs.

- There are many alternative fuels to gasoline; however all result in GHG emissions.

- Transportation choices include zero emission methods like walking and biking, mass-transit such as buses and light rail, low emission solutions such as car-pooling and higher emission choices like driving in your car alone.

Unit 4 Highlights

- Food production accounts for one-third of global GHG production.

- There are five important actions we can take to reduce our contribution to GHG emissions:
  - Reduce the amount of beef and/or dairy that you consume.
  - Decrease food waste.
  - Eat more whole and unpackaged food.
  - Eat organically-grown food.
  - Eat local and in-season food.

Unit 6

Unit 5 Highlights

- GHG emissions are associated with material goods at nearly every phase of their life cycle.

- US residents generated an average of 4.6 pounds of waste per person per day in 2006.

- Although we are recycling more than we have in the past, we are producing even more total waste than previously.

- Waste prevention is the best option to reducing GHGs. After buying and throwing away less, reusing and recycling and composting are important steps in reducing GHGs.

- Life Cycle Analysis (LCA) is a tool used to evaluate the potential environmental impact of a product.

- There are two types of LCA, cradle to gate and cradle to grave.

- Cradle to cradle refers to the idea that materials from one product become the raw material for another product, or in some way are regenerative for the Earth.

- Proposed policy changes would make some producers responsible for their products throughout its life cycle, from raw material extraction to disposal of the product.

Climate Change Action Appendix 2

Student Project Examples

Below is a list of links to example projects and Oregon resources. A review of these projects will be helpful as you steer students toward success.

Climate Change

- Reduce school emissions with the Cool School Challenge toolkit: *http://www.coolschoolchallenge.org/resources.aspx*

- Get support in Lane County from Partners for Sustainable Schools at *iseesustains@live.com*

- "Climate Change: Youth Guide to Action" for policy engagement: *http://www.tigweb.org/action/guide/*

Waste

- Recycling, zero waste and composting links: *http://www.kidsrecycle.org/kids_links.php*

- Detailed overview of school composting project: *http://www.mansfieldct.org/schools/mms/compost/index.htm*

- Oregon Green Schools provides funding, technical assistance and resources: *http://www.oregongreenschools.org/*

Energy

- Local lightbulb exchange project: *http://lightitforward.org*

- Energy tracking project: *http://web3.unt.edu/news/story.cfm?story=11476*

Transportation

- "No Idling" campaign project: *http://www.ikecoalition.org/Schools/Smart_Schools/Index.htm*

Varied

- List of varied environment and climate projects: *http://servicewire.org/content/20090416/nsb/Young-Heroes/Featured-GYSD-Projects-Environment-Climate-Change*

Climate Change Action Appendix 3

Resource List

Basics of Climate Change

- Fourth Assessment Report of the Intergovernmental Panel on Climate Change *http://www.ipcc.ch/publications_and_ data/publications_ipcc_fourth_assessment_report_synthesis_report.htm*

- The Climate Leadership Initiative's site featuring our research, programs and curriculum. *http://climlead.uoregon.edu/*

- Pacific Northwest focused climate change research from the Climate Impact Group at the University of Washington. *http://cses.washington.edu/cig/*

- The EPA's fact filled site on climate change. *http://www.epa.gov/climatechange/*

- Climate science blog from climate scientists. *http://www.realclimate.org/*

- NASA's eyes on Earth. *http://climate.nasa.gov/*

- The Pew Center on Climate Change with national and global factsheets, policy briefs, and more. *http://www. pewclimate.org/*

Climate Change Newsfeeds

- Comprehensive climate change website and newsfeed from Environmental Health Sciences. *http://dailyclimate.org/*

- Policy focused climate change news from the Environmental and Energy Study Institute *http://www.eesi.ccn/*

Dealing with Climate Skeptics

- Responses to common challenges to climate science *http://climlead.uoregon.edu/pdfs/Setting_record_Straight.pdf*

- This article is has a step-by-step set of instructions for dealing with a climate skeptic. *http://www.grist.org/article/ series/skeptics/*