National Farmers Union
"Planet Stewardship"

Section 4: Grades 9-12

Contents:

**** Lesson contains a cooperative education component.***

For more information contact:
National Farmers Union
education@nfu.org
202.554.1600
www.nfu.org

Lesson Plan 1: Conversation About Conservation

Unit Objective: Students will explore the costs and benefits of conservation of farmland.
Grades: 9-12
Length: 1 hour: 15 min. for "Deep Thoughts," 20 min. for introduction of background information and "Conservation Discussion Questions," 20 min. for guest speaker, 15 min. for "Common Conservation Practices" posters
Materials Needed: Markers and posterboard for each pair and pencils and copies of "Deep Thoughts," "Conservation Discussion Questions," and "Common Conservation Practices" for each student
Preparation Needed: Make double-sided copies of "Deep Thoughts" and "Conservation Discussion Questions" as well as copies of "Common Conservation Practices" for each student. Invite someone from the local conservation district to speak to the group about local or state conservation projects.

Background:

Family farmers and ranchers have historically been our best soil and water **conservationists**, especially when given the economic incentives and flexibility necessary to do so. They realize that when they are good to the land, the land responds with better food and fiber production.

For example, soil **erosion** harms the potential for crops to grow since it removes the fertile topsoil. Therefore, farmers and ranchers often implement **conservation** plans by planting trees for windbreaks, grassing waterways and planting high-density crops to prevent water and wind erosion. Many farmers rotate their crops so their soils can renew themselves. Many also employ soil-friendly minimal tillage or no-till practices to prepare their fields. Most ranchers work hard to prevent over-grazing of livestock.

Farmers and ranchers' actions benefit the environment and society as a whole as they produce the country's food and fiber. Besides producing healthy food, rural land provides many other amenities such as open space, scenic views, wildlife habitat and recreation. Therefore, Farmers Union supports **stewardship** payments for farmers who implement conservation plans that achieve a high level of resource protection on their farms through existing and innovative conservation practices. Farmers Union also supports state efforts to create cost-share programs for conservation efforts. In the Food, Conservation and Energy Act of 2008 (often referred to as the "farm bill"), $24 billion is earmarked for conservation programs over five years.

Teaching Strategy:

1. Divide up into five small groups and pass out "Deep Thoughts." Have students work in pairs to discuss these quotes, paraphrase them in their own words and come up with at least one real-life example for each quote. Afterward, ask for volunteers to share their paraphrase and example for one of the quotes.
2. Introduce the background information above.
3. Have the pairs from the first activity join with another pair to answer "Conservation Discussion Questions."
4. Invite a guest speaker from the local conservation district to talk about local conservation projects.
5. Have the groups of four pair off with a person from their group that they didn't pair with in the first exercise. Hand out the "Common Conservation Practices" sheet with markers and posterboard, which represents a 160-acre quarter-section of land. The partners are to plan together how they will take advantage of opportunities in the 2008 farm bill to employ better conservation methods on their land. They are to draw a picture of how their land will be and label the sections with the names of the farm bill programs for which they will apply for each improvement. Invite volunteers to explain their posters to the group after the activity.

Sources: Lesson adapted from information on NFU.org and nrcs.usda.gov.

Deep Thoughts

Paraphrase these quotes in your own words and come up with examples that illustrate these quotes.

"When one tugs at a single thing in nature,
he finds it attached to the world." ~ *John Muir*

"We abuse the land because we regard it as a commodity belonging to us.
When we see land as a community to which we belong,
we may begin to use it with love and respect." ~ *Aldo Leopold*

"What a country chooses to save is
what a country chooses to say about itself."
~ *Mollie Beattie*

"Man shapes himself through
decisions that shape his environment."
~ *Rene Dubos*

"The purpose of conservation:
The greatest good to the greatest number of people for the longest time."
~ *Gifford Pinchot*

Conservation Discussion Questions

1. What is the benefit to society when farmers and ranchers take the best possible care of the land they own?

2. Why do you suppose the federal government decided to increase budget authority for conservation programs by $7.9 billion in the latest farm bill?

3. Do you agree that taxpayers should reward farmers for implementing conservation plans that do a good job of protecting our natural resources? What are arguments for and against this case?

4. What are the costs and benefits to farmers and ranchers who employ conservation measures on their land?

5. Why might the added monetary reward for good stewardship be important to an agricultural producer?

Common Conservation Practices

Abandoned mined land reclamation
Brush management
Composting facility
Conservation crop rotation
Constructed wetland
Contour orchard/fruit area
Diversion dam
Direct seeding
Forest stand improvement
Grassed waterway
Irrigation canal
Monitoring well
Mulching
Multi-story cropping
No-till farming
Nutrient management
Pasture and hay planting
Pest management
Pond
Prescribed burning
Prescribed grazing
Recreation trail and walkway
Riparian forest buffer
Rock barrier
Runoff management system
Seasonal residue management
Solid/liquid waste separation
Soil spreading
Stream bank protection
Stream habitat improvement
Tree/shrub establishment
Vegetative barriers
Waste treatment
Water well
Wetland creation
Wetland wildlife habitat management
Windbreak establishment

The Food, Conservation and Energy Act of 2008 Title II: Conservation Programs

Agricultural Management Assistance Program: provides payments to agricultural producers to voluntarily address issues such as water management, water quality and erosion by incorporating conservation practices into their farming operations. Producers may construct or improve water management structures; plant trees for windbreaks or to improve water quality, and mitigate risk through diversification or resource conservation practices including soil erosion control, integrated pest management or transition to organic.

Cooperative Conservation Partnership Initiative: targeted assistance to producers for enhancing conservation outcomes on agricultural and nonindustrial private forest land. Assistance is selected competitively through applications of eligible partners including state, local and tribal governments, producer associations and cooperatives, institutions of higher education and nongovernmental organizations. CCPI encourages cooperation in conservation.

Conservation of Private Grazing Land Program: ensures technical and educational assistance for things such as erosion control, energy efficiency, water conservation, carbon sequestration, habitat preservation, etc., is provided to those who own private grazing lands.

Conservation Stewardship Program: encourages producers to address resource concerns in a comprehensive manner by undertaking additional conservation activities and improving, maintaining and managing existing activities. To be eligible, applicants must demonstrate they are meeting the stewardship threshold for at least one resource concern and address at least one additional priority resource concern by the end of the conservation stewardship contract.

Environmental Quality Incentives Program: financial and technical assistance to farmers and ranchers facing threats to soil, water, air and related natural resources on their land, promoting agricultural production and environmental quality as compatible goals, optimizing environmental benefits and meeting regulations.

Conservation Innovation Grants: stimulate the development and adoption of innovative conservation approaches and technologies while leveraging federal investment in environmental enhancement and protection in conjunction with agricultural production.

Farm and Ranch Lands Protection Program: helps farmers and ranchers keep their land in agriculture by purchasing conservation easements and reducing development pressures.

Grassland Reserve Program: supports working grazing operations, enhancement of plant and animal biodiversity and protection of grassland and land containing shrubs and forbs under threat of conversion.

Socially Disadvantaged Ranchers and Beginning Farmers: offers incentives and equity in accessing USDA programs and services to socially disadvantaged, beginning and limited resource farmers and ranchers.

Wetlands Reserve Program: restoring, protecting and enhancing wetlands in exchange for retiring eligible land from agriculture production.

Wildlife Habitat Incentives Program: develop and improve high-quality habitat that supports wildlife.

Lesson Plan 2: What're Our Water Rights?

Unit Objective: Students will think critically about issues surrounding water rights.
Grades: 9-12
Length: 1 hour: 10 min. for pantomime relay, 10 min. for introduction, illustration and discussion of background information, 10 min. for analysis of NFU policy on water rights and distribution, 10 min. for environmental versus citizen rights debate preparation, 20 min. for debate
Materials Needed: Pencils, bowl, scissors, a gallon jug of water, 6 Tbsp. salt, blue food coloring, two clear measuring containers (one that will hold at least 50 mL (1/5 cup), another container that will hold up to 35 mL), copies of the "Debate Worksheet" and "Water Rights & Distribution" for each individual and a single copy of the "Pantomime Relay Words & Phrases"
Preparation Needed: Make copies of "Debate Worksheet" and "Water Rights & Distribution" for each individual. Copy the "Pantomime Relay Words & Phrases," cut each phrase out, fold them and place them in a bowl.

Background:

Only 1 percent of the world's water is usable. The rest is either too salty, polluted or tied up in glaciers and ice caps. Without a supply of fresh, clean, non-polluted water, the **sustainability** of farms, forests, fisheries and life itself is impossible.

Local, state and federal governments play significant roles in managing and protecting water resources. Regulations, incentives and voluntary efforts help conserve and protect the usable water supply. The world's water supply is for everyone's use, but the usage of **natural resources**, such as water, must be considered in terms of their cost and benefit trade-offs.

National Farmers Union policy, developed by its farmer-members, states that laws impacting water distribution should not favor industrial, wildlife and recreational uses over those of farms and ranches that produce our food. NFU believes the order of preference for water distribution should be domestic and municipal consumption first and foremost; followed by farming, including groundwater recharge; hydroelectric uses; navigation; industrial consumption and finally wildlife and recreation.

Teaching Strategy:

1. Divide the group into three or four teams, standing along a single-file line in columns facing the leader. The first person from each line goes to the leader to receive an action related to water. (See "Pantomime Relay Words & Phrases" for a list of words that may be cut up and placed in a bowl. Make sure there are enough words or phrases for everyone.) The person must run back to their line and pantomime their word or phrase without sound. As soon as someone on their team correctly guesses the word, the actor moves to the back of the line and the person in front runs back to the leader to get a new word. The game continues until all the teams have rotated through completely. Then the first person brings the suggestion of what all the words and phrases had in common back to the leader. If they incorrectly guess the first time, they must go back in line and send the next person in line with a different answer. The first team with the correct topic wins.
2. *We obviously use water for a variety of activities. Do you think any of the activities related to water are more important than others or should all be considered equally important?*
3. Next, illustrate the amount of usable water by filling a clear, plastic gallon jug with water, and add a little blue food coloring. Tell students that this represents all the water on the Earth.
4. Pour 50 mL (1/5 cup) of the water into the measuring container, and then add 6 Tbsp. salt to the water left in the jug. Tell students that the water remaining in the jug represents all the ocean water on Earth, which is undrinkable because it is salty. Set the jug aside.

5. Hold up the measuring container with 50 mL in it and point out that the water in it represents all the freshwater on Earth. Of this amount, 70 percent is inaccessible to us because it is trapped in glaciers or is too deep in the ground to recover. Pour out 35 mL, which is 70 percent of the 50 mL in the measuring container.
6. Now show students the amount left, and point out that this amount represents less than 1 percent of the total amount of water on Earth. This freshwater is all there is to support human needs for agriculture, drinking, and washing, as well as the needs of lakes, rivers, streams, and other freshwater ecosystems.
7. *Who owns water? Should water use be limited to certain categories of activities? What are our water rights as individuals? Homeowners? Business owners? Land owners? Environmentalists?* Introduce the background information above.
8. Divide students into two groups: one representing a citizen rights group and the other representing a group of environmentalists. Have the environmentalists propose a federal law that would make it a crime to use fertilizer on crops or lawns because it could run off into the ground or surface water. Students must prepare justifications for the law and penalties for breaking it. Have the citizen rights group prepare arguments against the law, contending that the law restricts their private property rights. Have the two groups debate the issue using the "Debate Worksheet" as an outline for preparing their arguments. Urge groups to work together so that all members of the team have an equal say and adequate background of all arguments that they will be proposing.
9. After 15 minutes of group discussion on the issue, flip a coin to see which side opens first. Following is a suggested order and timeline for the debate:
    a. Group 1 opening argument = 2 min.
    b. Group 2 opening argument = 2 min.
    c. Group 2 questions Group 1 = 1 min.
    d. Group 1 answers question #1 and poses question to Group 2 = 3 min.
    e. Group 2 answers question #1 and poses question #2 to Group 1 = 3 min.
    f. Group 1 answers question #2 and poses next question to Group 2 = 3 min.
    g. Group 2 answers question #2 = 2 min.
    h. Group 1 provides closing argument = 2 min.
    i. Group 2 provides closing argument = 2 min.
10. Discuss the outcomes afterward. Have each group analyze the arguments of the other team. *What were the most compelling arguments of the opposing team? What consensus could be made? What should be the role of the government in water quality and quantity? What conservation efforts are currently in place at the local, state and national levels? What are appropriate laws for government to put into place?*

Sources: Lesson adapted from 2008 National Farmers Union Policy Book, www.nfu.org

Pantomime Relay Words & Phrases

Use these words or phrases or create your own for the water pantomime relay game.

Swimming
Drinking
Bathing
Showering
Brushing your teeth
Washing the dishes
Water balloon fight
Washing clothes
Watering flowers
Irrigation
Water-skiing
Fire-fighting
Boating
Ice cubes
Snorkeling
Surfing
Sailing
Scuba-diving
Washing your hands
Cooking
Fishing
Heating
Rafting
Diving
Cooling
Mixing cement
Water Slide
Energy
Gardening
Flushing the toilet
Washing the car
Livestock
Pets
Forests
Exercising
Canoeing
Making paper
Fish tank
Jet-skiing

"Among these treasures of our land is water – fast becoming our most valuable, most prized, most critical resource. A blessing where properly used -- but it can bring devastation and ruin when left uncontrolled." ~ Dwight D. Eisenhower

Water Rights & Distribution

The following is an excerpt from the 2008 National Farmers Union Policy, decided upon by members attending its national convention. Underline concepts with which you agree. Strike through any statements you may not agree with. Add your own thoughts on water rights and distribution at the bottom of the page.

NFU Policy Says:

Laws impacting water distribution should not favor industrial, wildlife and recreational uses over those of agricultural producers. NFU believes the order of preference for water distribution should be domestic and municipal consumption; farming, including groundwater recharge; hydroelectric uses; navigation; industrial consumption; and wildlife and recreation.

NFU supports:

a) The use of water storage through impoundment structures and conservation measures as a primary tool for water development;
b) Adoption of legislation to protect agricultural water rights through state water rights in order to prevent future power and energy plants from consuming water to the detriment of agriculture;
c) Requiring new energy plants to return water to a level of quality capable of use by agriculture;
d) Subjecting new large enterprises that will use a significant quantity of water to a permitting process that will assess the environmental and community impact of the proposed use;
e) Enforcement of the limitations on the size of farm operations eligible for federally subsidized irrigation water;
f) Deferred implementation of the U.S. Bureau of Reclamation regulation on the use of federally developed water supplies and facilities and the practice known as "water spreading." The economic impact of any policy changes on family farmers and rural communities should be completed before implementation; and
g) Water leasing instead of buy and dry policies.

NFU opposes:

a) The movement of any water for the purpose of a coal slurry pipeline or similar venture, unless a method can be developed to return water of equal quantity and quality to the original area from which it was taken. Prior to the exportation of any water, an environmental and economic impact statement should be completed to determine its effect on agriculture;
b) Any efforts by the federal government through the usage of a national water policy to usurp the rights and prerogatives of the individual states;
c) An outright ban on "water spreading," as currently defined which would have devastating impacts on agricultural producers in the Columbia Basin and other Bureau of Reclamation irrigation projects throughout the West;
d) Producers bearing the cost of inventorying irrigated lands and any mandated renegotiation of bureau contracts through their irrigation district. We believe that in most cases, it is the development of new equipment, technologies and methods which have dramatically increased the efficiency of irrigation systems and provided a situation in which more acres can be irrigated with the use of the same or smaller amount of water. Agricultural producers should be credited, and not penalized, for these increased efficiencies; and
e) The condemnation of agricultural water rights.

Your ideas on water rights and distribution: _____

_____

_____

_____

Debate Worksheet

1. We are representing _____ in this debate.

2. What are the main principles of our position?
   _____
   _____
   _____
   _____
   _____

3. What are some facts that support our position?
   _____
   _____
   _____

4. Our opening statement will be about 1 to 2 minutes long and will state our team's position and the arguments we will be proposing. Our opening statement will be delivered by:
   _____

5. The main points of our opening statement will be:
   _____
   _____
   _____
   _____

6. We should have at least two questions that can be asked of our opponents. They should be concise and clear and directed specifically to the opposition. Our questions will be delivered by: _____

7. Our two questions are:
   _____
   _____
   _____
   _____
   _____

8. We should be prepared for questions that our opposition may have of us. What are some questions they may ask? How will we respond and who will respond from our team?
   _____
   _____
   _____
   _____
   _____
   _____

9. We should have a final argument to deliver at the end of the debate that will be no longer than two minutes. Who will take notes during the debate and deliver our strongest concluding argument?
   _____

Lesson Plan 3: The Story of Stuff

Unit Objective: Students will analyze the environmental, social and economic impacts of current consumption trends.

Grades: 9-12

Length: 1 hour: 5 min. for introduction of background information and discussion, 25 min. for viewing "The Story of Stuff" video, 30 min. for spinner craft and discussion

Materials Needed: Pencils, two lids to plastic containers, cardboard, two utility knives or sharp scissors, two paper fasteners, computer, projector and screen, copies of "The Story of Stuff Discussion Questions" for all

Preparation Needed: Make copies of "The Story of Stuff Discussion Questions" for each student. Download "The Story of Stuff" movie onto your computer at http://www.storyofstuff.com/dvd.html.

Background:

"Planet Stewardship" means being environmentally, socially and economically responsible.

If everyone in the world lived an "American lifestyle," it would require at least four earths to sustain that level of **consumption**! While a certain level of consumption is inevitable, supporting local foods from family farmers, **fair trade**, fuels from the farm, recycling and the **cooperative** business model are some of the ways consumers can consume more **sustainably**.

"The Story of Stuff" is a 20-minute video that draws connections between a number of environmental and social issues and makes the case for a more sustainable world. While you may or may not believe or agree with all of the things this video proposes, it does raise interesting questions about production and consumption patterns that we will discuss after the video.

Teaching Strategy:

1. Introduce the background information and show "The Story of Stuff" movie.
2. Divide the group into two. Instruct the small groups to use the plastic lids, cardboard and paper fasteners to create a spinner. The lids are the base, an arrow may be cut from cardboard and the paper fastener attaches the spinner to the container. The spinner demonstrates creative reuse and gets everyone joining in the discussion. Each time a question from "The Story of Stuff Discussion Questions" is asked, someone in the group should hit the spinner. Whoever it points to gives their answer. The rest of the group then gets the chance to agree, disagree or further add to the discussion until the person who first answered the question ends the discussion by hitting the spinner again.

Sources: Lesson adapted from resources on storyofstuff.com.

The Story of Stuff Discussion Questions

1. Annie says "you can't run a linear system on a finite planet indefinitely." Another way to say this is you can't have unlimited economic growth with limited resources. What does this mean for the future of the U.S. economy?

2. Where along the system are the decision makers who can change the current patterns of production and consumption?

3. Whose behavior and decisions need to change to create the most positive change and how do we hasten that change?

4. Where are you in this system and what options do you have, from where you sit, to change the system to support sustainability and justice?

5. Annie says it is the government's job to take care of us. Do you agree? What is an appropriate leadership role for government, given the severity of the ecological crisis we are in?

6. How can we let our government know what we expect of it at this critical moment?

7. Annie says the United States has 5 percent of the world's population, but uses 30 percent of the resources and makes 30 percent of the waste and that this is a problem. Do you agree that this is a problem? What are steps that we in the United States can take to reduce the quantity and impact of our nation's consumption?

8. Pick something in the room you're in that may have come from a Third World country. What might have been involved in extracting the resources for the item and what are the steps that brought it to you?

9. Annie says that people in the United States have less leisure time now than we did in feudal times. Yet, on many levels, things are supposed to be getting better, not worse. Why do we have less leisure time? What are some ways that we could change our economy to work less and live more? How can we hasten those changes?

10. When you think about the leisure time activities that bring you the most joy and rejuvenation, what are they? Does your leisure time schedule match your priorities?

11. At the end of the movie, Annie describes a "new school" of thinking. She mentions green chemistry, zero waste, closed loop production, green jobs, renewable energy, fair trade and local living economies. Does anyone in the group know about any of these things?

12. What things have people seen or done lately that inspired hope surrounding these issues?

Lesson Plan 4: The Carbon Trade

Unit Objective: Students will learn how U.S. farmers are part of the global warming solution through carbon sequestration.

Grades: 9-12

Length: 1 hour: 5 min. for background and discussion, 15 min. for video or guest speaker on Farmers Union Carbon Credit Program, 20 min. for "Climate Change Discussion Questions," 20 min. for "Sustainability Challenge"

Materials Needed: Pencils, copies of "Sustainability Challenge" and "Climate Change Discussion Questions," computer with Internet, projector and screen

Preparation Needed: Make double-sided copies of "Sustainability Challenge" and "Climate Change Discussion Questions" for each student. Download Farmers Union Carbon Credit Program video (http://carboncredit.ndfu.org/carbonvideo.html) or invite a guest speaker to present on carbon sequestration and carbon credits.

Background:

Carbon is an element found in soils, rocks, oceans, air and all living things. Carbon appears in our atmosphere as carbon dioxide, one of the main gases linked to climate change. It can remain in the atmosphere for up to 200 years. The **greenhouse effect** keeps temperatures warm enough to support life. However, adding greenhouse gases, such as carbon dioxide and methane, into the atmosphere is thought to enhance the greenhouse effect and raise the Earth's surface temperatures to a point of concern.

There are a couple ways to reduce the amount of greenhouse gases in the atmosphere. The first is to prevent carbon from going into the atmosphere in the first place from burning fossil fuels, for example. The other way is to lock it into plants and soil through **carbon sequestration**.

National Farmers Union sees carbon sequestration is an innovative way to protect the environment and enhance income for U.S. agricultural producers. Farmers Union's Carbon Credit Program allows agriculture producers and landowners to earn income by storing carbon in their soil through **no-till** crop production, conversion of cropland to grass, sustainable management of rangelands and planting trees on previously non-forested or degraded land. In addition, the capture of methane from anaerobic manure digester systems can also earn carbon credits.

Farmers Union enrolls producer acreage into blocks of marketable offsets that are traded on the Chicago Climate Exchange, much like other agricultural commodities are sold. Companies with large carbon emissions can purchase the carbon credits to offset their **carbon footprint**. Proceeds from the sales are then forwarded to producers as each pool of carbon credits is marketed. NFU's Carbon Credit Program earned more than $8 million for producers in its first two years of operation.

Teaching Strategy:

1. *What have you heard about global warming? What is it and what causes it?* Introduce background.
2. Play Farmers Union Carbon Credit video (http://carboncredit.ndfu.org/carbonvideo.html) or introduce guest speaker to discuss carbon sequestration and carbon credits.
3. Divide the group into two discussion teams and hand out "Climate Change Discussion Questions" and pencils. Open group discussion using the fishbowl technique. The first group moves into a small circle in the middle of the room. The second group forms a circle on the outside. The inner group discusses the topic with the outside group listening. The groups then changes positions and roles. If it is a large group, divide them into four smaller groups. The outside circle should be reminded to be good listeners and the inner group should be encouraged to share their ideas. The inner circle may allow questions on the topic from the outside circle if they want to. Limit discussion on each question to five minutes.
4. Hand out the "Sustainability Challenge" and have students pick a brainstorming partner. After 10 minutes, have the pairs share their ideas for the land with the rest of the group.

Sources: Lesson adapted from resources on NFU.org and ChicagoClimateExchange.com

Climate Change Discussion Questions

1. Do you think global warming is a true threat to the planet? Why or why not?

2. Do you think farmers can play a significant role in climate change? In what ways?

3. Do you think carbon credits are a viable solution for global warming? Why or why not?

4. What other options are there for global warming?

5. Do you think your generation can play a significant role in climate change? If so, how? If not, why not?

Sustainability Challenge

Your great uncle has asked you to care for 1,000 acres of his land for the next 10 years while he takes an extended leave of absence. He has said that after he returns, you will receive all 1,000 acres as a gift on one condition: you must make a profit on the land while also helping the environment.

The problem is, your uncle has realized that his ways of farming over the past three decades has been detrimental to the soil, reducing the productive capacity of the land. The land has a good water source and has been cleared of most of the trees and brush to make way for farm land. No crops are currently planted.

Your challenge is to provide a 10-year plan of how you intend not only making a profit from the land, but regenerating the land to an environmentally sustainable level.

Use the information below and your own ideas to generate the best way to ensure you'll be the proud owner of 1,000 acres!

- Conventional tillage practices burn more fossil fuel than minimum- or zero-tillage practices. Field crops generate a higher overall revenue but are more risky as commodity markets fluctuate, resulting in higher input costs and possibly lower value for your harvested commodities.

- Minimum- or zero-tillage practices store carbon in the soil. This environmental benefit can be sold through the Farmers Union Carbon Credit Program on the Chicago Climate Exchange for approximately $5 per acre. (This would be roughly 0.15 tons of carbon per acre.) Although there is a reduction in fossil fuel costs, you will likely have to use more chemicals to ensure your crops are weed-free.

- Perennial forage crops such as alfalfa, clover or pasture grass all sequester carbon into the soil at higher rates than field-crop farming. The environmental benefit from this can be as much as $10 per acre. (This would be about double that of minimum- or zero-tillage or 0.3 tons of carbon per acre). There is a higher initial cost to planting a perennial forage crop. However, after the first year, input costs should be minimal with good management.

- Perennial forests such as hybrid poplars can be planted and harvested 10 or more years in the future for the pulp and paper industry. Since trees have more biomass than field crops or forage crops, these would sequester an even higher amount of carbon from the environment. (The average over the 10 years being approximately $35 per acre, about one ton per acre). Established forests that have been around for 90 or more years can sequester as much as 100 tons of carbon per acre. The downside is that you're left with limited to no other revenue and there is a high initial cost to plant all the trees.

- What ideas do you have for the land?

Optional Activities

The following activities could be incorporated at the end of any lesson to fill extra time.

1. Plan a group stewardship or conservation project in the community.

2. Create poetry magnets and include words from the lessons so youth can leave behind creative messages about the lesson topics for others to read. http://familycrafts.about.com/od/craftstechniques101/ig/Chapter-8--Educational-Crafts/Poetry-Magnets.htm Pre-made water poetry magnets are available for purchase at: http://www.groundwater.org/shop/proddetail.asp?prod=1034

3. Have senior youth create visual aides to use in teaching the younger age groups. Have the senior youth teach the lessons to the younger age groups for a leadership component.

4. Have students create posters, jingles, slogans, advertisements or other forms of promotion to convince others to be good stewards of natural resources.

5. Order Dripial Pursuit game, a set of 52 cards containing thought-provoking questions about water, natural resources and geography. The game sells for $7.95 at http://www.groundwater.org/shop/proddetail.asp?prod=1010.

6. Play charades or hangman with bold vocabulary words from each lesson.

7. Lead some Farmers Union songs.