



National Farmers Union *“Planet Stewardship”*

Section 3: Grades 6-8

Contents:

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Lesson 2: Waste No Water* ~ 1 hour

Lesson 3: Three Cheers for Trees* ~ 1 hour

Lesson 4: Climate Change: A Hot Topic ~ 1 hour

Optional Activities

** Lesson contains a cooperative education component.*

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Lesson Plan 1: How the Earth Slices Up

- Unit Objective:** Students will learn how much of the Earth is available for producing food and how food producers work to protect natural resources.
- Grades:** 6-8
- Length:** 1 hour: 20 min. for background information and “Earth: The Apple of Our Eye,” 20 min. for “Discussion Questions,” 20 min. for “Your Slice”
- Materials Needed:** Pencils, colored pencils, an apple, a knife and a cutting board
- Preparation Needed:** Make copies of “Your Slice.”

Background:

With a limited amount of arable land and food-producing waters and a growing number of people to feed worldwide, protecting our land and sea resources is of great importance. We can do our part by cutting pollution significantly and not building on **arable land**. Within the next 30 years, the United States is expected to add 100 million people to its population, bringing the total to 400 million. In the meantime, we’re losing two acres of farm land a minute. How we use the remaining land in that growth will become an issue.

Family farmers, ranchers and fishermen are stewards of the land and sea who work to maintain **sustainable** food production practices that support a healthy environment. They realize that when they are good to the Earth, the Earth responds with better food and fiber production.

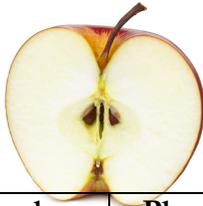
For example, soil **erosion** harms the potential for crops to grow since it removes the fertile topsoil. Therefore, farmers and ranchers often plant trees for windbreaks, grassed waterways and high-density crops to prevent water and wind erosion. Many farmers rotate their crops so their soils can renew 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 Union supports **conservation** plans that decrease soil erosion. They support state efforts to create cost-share programs for soil conservation as well as **stewardship** payments for farmers who have achieved a high level of soil protection on their farms through existing and innovative conservation practices.

Teaching Strategy:

1. Present “Earth: The Apple of Our Eye” as a visual demonstration of the limited resources available through which to produce our food supply.
2. *Did any of these statistics surprise you? Which ones?*
3. Introduce the background information above.
4. Divide the group into two discussion teams and hand out “Discussion Questions.” 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 change positions and roles. Each group has a 10-minute time limit. 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.
5. Hand out “Your Slice” and make colored pencils available. *It’s your turn now to put your ideas to the test. If you inherited a quarter section of land tomorrow, what would you decide to do with it?* Give 10-15 minutes for students to fill in their own quarter-sections of land.
6. Ask for volunteers to share their plans with the group. *What do you think the toughest decisions for farmers are today? Does this exercise make you think differently about any of the discussion questions?*

Sources: Lesson adapted from PopulationConnection.org’s “Earth: The Apple of Our Eye” and 2008 National Farmers Union Policy Book, www.nfu.org.



Earth: The Apple of Our Eye

A visual demonstration of the limited resources available through which to produce our food supply.

Apple	Planet Earth	Explanation
Whole apple	Planet Earth	Hold the apple out for the group to see. <i>This apple represents our planet.</i>
$\frac{3}{4}$	Water	Cut the apple into quarters. Hold out $\frac{3}{4}$ in one hand. <i>What do these $\frac{3}{4}$ represent? (Water.)</i>
$\frac{1}{4}$	Land	Set the three “water sections” aside and hold out the remaining quarter. <i>What fraction of the apple remains? ($\frac{1}{4}$) This represents the total land surface.</i>
$\frac{1}{8}$	Uninhabitable & Non-Arable Land	Slice the remaining $\frac{1}{4}$ in half, lengthwise. Hold out one of the pieces. <i>What fraction of the apple is this? ($\frac{1}{8}$) This $\frac{1}{8}$ represents the half of the Earth’s surface that is inhospitable to people and crops: the polar regions, deserts, swamps, and high or rocky mountains.</i>
$\frac{1}{8}$	Habitable Land	Set that $\frac{1}{8}$ aside and hold out the other. <i>This $\frac{1}{8}$ represents the other half of the Earth’s surface. These are the areas on which people can live, but cannot necessarily grow food.</i>
$\frac{3}{32}$	Habitable, but Non-Arable, Land	Slice this $\frac{1}{8}$ crosswise into four equal pieces. Hold out 3 in one hand. <i>These $\frac{3}{32}$ represent land on which people can live, but cannot grow food. Some of it was never arable because it’s too rocky, wet, cold, steep or has soil too poor to produce food. Some of it used to be arable but isn’t any longer because it’s been developed into cities, suburbs, highways, etc., so it can no longer be farmed. Governments have earmarked other areas, such as parks, nature preserves and other public lands to remain undeveloped forever.</i>
$\frac{1}{32}$	Arable land	Set the $\frac{3}{32}$ aside and hold out the $\frac{1}{32}$. <i>Only $\frac{1}{32}$ of the Earth’s surface has the potential to grow the food needed for all people of the Earth.</i>
$\frac{1}{32}$ peel	Topsoil	Carefully peel the $\frac{1}{32}$ slice of Earth and hold up the peel. <i>This tiny bit of peel represents topsoil – the dark, nutrient-rich soil that holds moisture and feeds us by feeding our crops. Currently 90 percent of U.S. croplands lose soil above the sustainable rate.</i>
$\frac{3}{4}$	Water	Return to the $\frac{3}{4}$ of the original apple that represents water. <i>Some of our food comes from the sea. Nearly one billion people, mostly in Asia, rely on fish as their primary source of protein. The oceans in many regions of the world are unproductive due to a lack of life-supporting nutrients.</i>
$\frac{1}{8}$	Food-productive water areas	Set aside two of the three quarters. Cut the remaining $\frac{1}{4}$ in half. Set $\frac{1}{8}$ aside and hold out the other $\frac{1}{8}$. <i>This $\frac{1}{8}$ represents the productive zones of the ocean. Currents in these areas cause nutrients to rise to the surface and support large numbers of marine plants and animals.</i>
$\frac{1}{8}$ peel	Photic Zone	Carefully peel the $\frac{1}{8}$ slice of Earth. Hold out the peel. <i>This peel represents the photic zone, the top 330 feet of the ocean which light can penetrate, supporting photosynthesis. Since the marine food chain depends on algae and photosynthesizing plants, almost all ocean life depends on this narrow photic zone.</i>

Source: PopulationConnection.org

Discussion Questions

1. What does “Planet Stewardship” mean to you?
2. Who is responsible for the well-being of the land? Water? Air?
3. What should the role of government be in soil and water conservation?
4. Do you agree that farmers and ranchers should get financial assistance or rewards for carrying out conservation practices on their land?
5. As the population grows, how do you propose balancing suburban development with preservation of agricultural lands?
6. Do you think that you will see food shortages in the United States in your lifetime? Why or why not?

Your Slice

You have just inherited one quarter-section (160 acres) of highly productive land from a distant relative! It is 20 miles outside the nearest metro area and you are getting lots of interest from developers, local farmers, hunters and others. It is ultimately your responsibility to decide how you will utilize the land.

Each block represents eight acres. Draw your plan of what you will do with the land in the boxes below. Here are some things to consider before you begin:

- 1 to 5 acres is a nice-sized lot for a home, you could build, or sell to the developer who is offering \$10,000 an acre*
- The land could be rented out to a local farmer for about \$100/ mo. per acre*
- Hunting rights could be rented out for around \$20/ mo. per acre if you maintain good wildlife habitat*
- 1 heavily forested acre could hold about 125 trees to create blocks from wind erosion*
- 1 acre of custom-harvested corn or soybeans could earn \$200 in profit*
- A pond could provide wonderful habitat for birds and other animals*

Lesson Plan 2: Waste No Water

Unit Objective: Students will learn the importance of working individually and cooperatively to conserve water.

Grades: 6-8

Length: 1 hour: 5 min. for “Waste No Water Cooperative Races,” 5 min. for introduction of background information, 20 min. for “Drought Threatens Lake Mead” reading and small group discussion, 20 min. for “Whater We Using Water For?” exercise and discussion, 10 min. for discussion of final water scenario

Materials Needed: Several clean, open-topped, non-breakable, recycled containers of the exact same size filled to the brim with water (one for each team), cones or other markers for each team, pencils, calculators, “Whater We Using Water For?” and “Drought Threatens Lake Mead” hand-outs for each student

Preparation Needed: Fill the containers with water. Make double-sided copies of “Whater We Using Water For?” and “Drought Threatens Lake Mead” hand-outs. Secure enough calculators that students can efficiently share.

Background:

The amount of water on Earth is constant due to the water cycle. There will never be any more or less water than there is right now. However, human activity can create an imbalance in the supply of usable water. Increasing population, standard of living, and industrial activities all put greater demands on the supply of usable water.

While the supply of water seems limitless, water is not an infinite resource. Usable fresh water is actually quite limited. The availability of fresh water may not be a problem in most of the United States today, but it is a problem in some parts of the country and other parts of the world, such as the Middle East and northern Africa. It is projected that by the year 2025, one-fourth of the world’s population will be in need of more water.

Teaching Strategy:

1. Divide the group into teams for the “Waste No Water Cooperative Race.” Have one same-sized container for each group waiting outside, filled to the brim with water. Explain that these recyclable containers are filled to the brim with precious water. The goal is to conserve the most water. Have the groups space out at the starting line. At the signal, the first runner heads for the cone, circles it, turns around and heads back to his or her team, and passes the container to the next person in line. At the end of the race, the team with the most water still in the container wins.
2. Introduce the background information. *Just like in our opening activity, we must cooperatively work to conserve water for the future. How does human activity affect the balance in the supply of usable water?*
3. Distribute the hand-out “Drought Threatens Lake Mead.” Have students take turns reading each paragraph aloud.
4. Break into discussion groups to answer the following questions: *How would your life be affected if you turned the faucet on and no water came out? What would be the impact if your community’s water source ran dry? How would people in your community compete for this resource? Would other communities be willing to share their water? Brainstorm ways that the community could cooperatively work together to reduce its freshwater consumption.* Have the small group elect a reporter to share some of their thoughts on the issue with the entire group.
5. *How many gallons of water do you think your family uses in one week?* Hand out calculators to groups, along with pencils and the “What’re We Using Water For?” hand-out. Allow time for each individual to fill out the exercise sheets.
6. Start discussion on the outcomes of the exercise sheets. You may want to appoint someone to collect all the numbers as they are discussed and add them all up to come up with the

collective numbers. *Does your family use more water in a week than you thought? How much water would all of our households in this room use together in a week? How much water would that be in a year? What category shows the most water usage?* (Most data show that flushing the toilet uses the most water per day, followed by showers and baths.)

7. *What are some of the ideas for saving water that you came up with? Calculate how much water we could collectively save if we, as individuals, put into practice the three ideas each of us had?*
8. Describe the following scenario: *You live in northern Africa, and your country is classified as having a water shortage because demand has exceeded the supply due to population growth and drought. Agriculture uses 85 percent of the region's water. Countries in the region are using more water every year than is available to them, mainly by over-pumping aquifers. Due to restrictions on water use, you are permitted to use only one gallon of water per day for personal use. Since there is no plumbing in your village, you must walk a mile every day to get your gallon of fresh water.*
9. Open the floor to discussion: *Realizing how many gallons you normally use in a day, how would you use the water allotted to you? What would you give up or change in order to deal with this kind of restriction? As climate change makes the planet hotter and drier, what should be done now to make sure this doesn't happen in other places around the world?*

Sources: Lesson adapted from resources on EducationWorld.com, LessonPlanet.com and Worldbank.org.

Drought Threatens Lake Mead



The picture clearly shows the white “bathtub ring” that marks Lake Mead’s former water level. This white ring is the result of mineral deposits from the water on the lake’s bedrock walls. The lake’s current elevation is approximately 118 feet below its maximum elevation.

Since 1935, millions of people have enjoyed fishing, boating and swimming in the huge man-made Lake Mead. But, long droughts and high demand for water are causing water levels to drop in the 250-square-mile lake. Some scientists worry that if Lake Mead’s water level keeps dropping, the lake could dry up in as few as 12 years.

Lake Mead was created when the Hoover Dam was built and part of the Colorado River was dammed. Part of the lake is in Nevada and part of it is in Arizona. It is the largest man-made lake and reservoir in the United States.

Lake Mead is called a reservoir because it stores water for homes, farms and businesses in Nevada, Arizona and California. Also, water from the lake is used to create electric power for many people in Nevada and Arizona.

About 96 percent of the water in Lake Mead comes from melted snow that falls each year in Colorado, Utah, New Mexico and Wyoming. Most of that melted snow flows into the Colorado River and then into Lake Mead. In the past few years, though, there has been less water flowing into Lake Mead. Some scientists think that is because our climate is growing warmer.

But towns still need the same amount of water they have always needed. Some areas need more water because their populations are growing. So, too much water is coming out of Lake Mead and not enough is flowing in.

Today, Lake Mead contains about 9 trillion gallons of water, but that is only 52 percent of the water it can hold. The residents of Nevada and Arizona, the two U.S. states with the fastest-growing populations, must take measures to conserve water and better plan their growth. Las Vegas, which gets about 90 percent of its water from Lake Mead, has already employed strict water restrictions, and citizens of Las Vegas face fines for wasting water.

If the demand for water around the world continues to grow, while the usable water supply shrinks, it is increasingly important to conserve water so there is enough for everyone.

Adapted from EducationWorld.com

“What’re We Using Water For?”

Use the averages below to determine how much water your family uses in one week.



Water Activity water used

Average gallons of

Taking a bath	25 gallons
Taking a shower	5 gallons per minute
Brushing teeth (<i>letting water run</i>)	3 gallons
Cleaning the house	8 gallons
Running dishwasher	14 gallons
Hand-wash dishes (<i>3 times/day</i>)	10 gallons
Flushing toilet	5 gallons per flush
Watering lawn	10 gallons per minute
Letting faucet drip	15 gallons per day

Running washing machine 40 gallons per load

1. Calculate how much water your family used for showers in one week.

$$\frac{\text{Number of showers per week}}{\text{Number of showers per week}} \times \frac{\text{Average number of minutes per shower}}{\text{Average number of minutes per shower}} = \frac{\text{Showering minutes per week}}{\text{Showering minutes per week}}$$

$$\frac{\text{Showering minutes per week}}{\text{Showering minutes per week}} \times \frac{\text{Gallons per minute}}{\text{Gallons per minute}} = \frac{\text{Total gallons used per week}}{\text{Total gallons used per week}}$$

2. Calculate the number of gallons your family uses per week for the following activities:

<u>Activity</u>	<u>Times per week</u>	<u>Gallons per activity</u>	<u>Gallons used per week</u>
Taking showers		(Transfer number from step 1.) =	=
Brushing teeth	X	=	=
Cleaning house	X	=	=
Running dishwasher	X	=	=
Flushing toilet	X	=	=
Taking bath	X	=	=
Watering lawn	X	=	=
Doing laundry	X	=	=
Leaking faucet	X	=	=
TOTAL GALLONS USED	<i>(add all numbers in the last column)</i>	=	=

3. Assume water costs \$0.01 per gallon. How much money does your family spend for water in one week?

$$\frac{\text{Total gallons used}}{\text{Total gallons used}} \times \$0.01 = \frac{\text{Cost of water for one week}}{\text{Cost of water for one week}}$$

4. What are three ways you could reduce the amount of water you use?

- 1.
- 2.
- 3.

5. How much water would you save if you practiced these three conservation measures for one week?

Lesson Plan 3: Three Cheers for Trees!

- Unit Objective:** Students will learn the important role of trees in the environment and explore the cooperative business model related to trees.
- Grades:** 6-8
- Length:** 1 hour: 15 min. for opening activity, background information and discussion, 10 min. for group art project, 5 min. for “Discover What Trees Can Do” word scramble, 20 min. for “Co-op Case Study” and discussion, 10 min. for information on the Farmers Union emblem and creative activity
- Materials Needed:** Pencils, markers, flip chart or poster paper, tape, copies of “Discover What Trees Can Do” and “Co-op Case Study” for each student and one copy of “Co-op Case Study Discussion Questions”
- Preparation Needed:** Make copies of “Discover What Trees Can Do” and “Co-op Case Study” for each student. Print and cut copy of “Case Study Discussion Questions.”

Background:

The benefits of trees might be categorized in three ways: beauty, environment and products. Picture your community without trees. If all the trees were gone, would you still want to live there? Trees create recreation, beauty and shade that we can enjoy. Trees also keep the air clean by removing pollution and creating oxygen.

Each American uses enough wood products per year to make a tree 100 feet high and 18 inches in diameter. The good news is, trees are a **renewable resource** and many landowners and timber companies replant when they cut. Although they are renewable, it takes time and resources for new tree growth, so we should be conservation-minded.

Farmers Union hosts **farm forestry** workshops around the country to teach landowners ways to best manage the trees on their land to increase their farm profits and **sustainability**. Better management techniques help landowners increase production, financial returns and environmental quality. Farmers Union also helps **woodlot owners** work together to form **cooperatives**.

Even if you don't own forested land, you can do your part to keep forests alive and well by recycling paper products, planting trees and reducing air pollution and herbicide use.

Teaching Strategy:

1. Give students two minutes to look around the room and write down everything they can see in the room that originated from a tree. See who found the most. Make a master list.
2. Introduce the background information above and open the floor for group discussion.
3. Have the class divide into six small groups. Make markers and flip chart paper available. Have groups work together to draw a tree incorporating words that come to mind when they think about trees. Make a group forest by hanging each tree on the wall.
4. Staying in their small groups, have them figure out how many acres of trees the group would need for their lifetime. *Knowing that each American uses enough wood products per year to make a tree 100 feet high and 18 inches in diameter, estimate out in your small groups how many trees you'd need for your lifetime. Assuming there are 125 of these trees per acre, how many acres of trees would your small group need in a lifetime? Now add them together to find out how many acres of trees we would need as a group.*
5. Hand out “Discover What Trees Can Do” with pencils for individual work.
6. Pass out “Co-op Case Study.” Have volunteers read the hand-out as others follow along.
7. Divide into four teams and assign each group a “Co-op Case Study Discussion Question.” Have each group prepare a presentation using flip-charts and markers and answering their question as though they were presenting to the Colorado Renewable Resources Cooperative board of directors. Have the group nominate leaders to present.

Key: Page 11: soil, smog, home, oxygen, acid, storm, noise, value, habitat, beauty, relaxation, fruits, nuts, shade, shelter, paper, lumber, renewable, reusable

Sources: Lesson adapted from www.lpb.org/programs/forest.html and www.crrconline.com

Discover What Trees Can Do!

Unscramble the words to reveal many of the contributions trees make to the environment.



Tree root systems hold _____ in place, preventing erosion. L O I S

Trees can lower _____ production. G O M S

A few well-placed trees around a _____ can lower air conditioning and heating bills. E O H M

One acre of trees provides enough _____ for 18 people. X G O Y N E

Trees remove sulfur dioxide and nitrogen oxide, two major components of _____ rain and ozone pollution from the air. D I A C

Trees absorb _____ water that would otherwise result in flash floods. R O M S T

Trees reduce _____ pollution by acting as a buffer to urban sounds. N S I O E

Trees can raise a property's _____ by up to 20 percent. E V A U L

Trees provide _____ for animals that would not be able to survive in a treeless environment. T H A I B T A

Trees add _____ and _____ to our every day lives. Y B E T A U X A L R E T A O N I

Trees can provide yummy _____ and _____. S F U R T I T S N U

Trees provide _____ and _____ from over-exposure to the sun. E S A H D R S H L E T E

_____ and _____ are created from trees. A R P P A U R L M B E

Trees are a _____ resource. E N R W E E L B A

When we recycle paper products, trees also become _____. B A E R S U L E

Co-op Case Study:

Cooperative Formed to Recycle Wood Waste

What is a Cooperative?

A co-op is an autonomous association of people united voluntarily to meet their common economic, social and cultural needs through a jointly owned and democratically controlled enterprise. They are governed by a few common principles. Cooperatives are open to all people able to use their services and willing to accept the responsibilities of membership. Members have equal voting rights and equal economic participation. Cooperatives provide education and training for members so that they can contribute effectively to the development of the cooperative. They also work for the sustainable development of their communities and collaborate with others in the cooperative movement.



What is CRRC?

The Colorado Renewable Resources Cooperative's (CRRC) mission is to “provide Colorado residents with renewable biomass products, decrease the risk of wildfire, and with responsible stewardship practices, restore the health of our forests.”

CRRC was founded in December 2006 through the assistance of National Farmers Union and the Rocky Mountain Farmers Union Cooperative and Economic Development Center. Since its inception, CRRC has been keenly aware of the potential value of woody biomass. In an unhealthy forest, responsible clearing is used to trim branches so that healthy growth and ample sunlight is allowed. Each of the founding members had experienced having to take chipped wood to a landfill and pay to dispose of it. They were aware of the wastefulness of these actions and the lost value of the product. They felt the need to help create meaningful markets for this otherwise wasted material.

Traditionally, forestry workers take most of the financial and physical risks yet do not share equally in the financial rewards derived from the harvest. CRRC is using the cooperative principles to develop facilities to recycle wood waste. Through the cooperative business model, they expect to be able to reduce overheads, bid competitively for forest maintenance contracts and improve their buying power for equipment.



The cooperative is currently working to establish a “Wood Village” through which all forest products can be processed. For example, large logs would be processed in a mill while smaller, normally unusable logs and wood could be chipped and used to create heat and electricity.

Co-op Case Study Discussion Questions

1. From what you have read in the case study, do you feel the Colorado Renewable Resources Cooperative has embraced each of the cooperative principles? What, if any, areas are not mentioned? In what other ways might they employ each of the cooperative principles?

2. According to the Rocky Mountain Farmers Union Cooperative and Economic Development Center, a well-constructed business plan includes a situation analysis component that discusses the strengths, weaknesses, opportunities and threats facing a cooperative business. What could be some of the potential weaknesses and threats facing CRRC today and in the future? How could its member-owners prepare to strengthen these potential areas of weakness?

3. What are some recommendations you have for other uses for the Wood Village they are planning to create?

4. What are some of the benefits of the foresters forming a cooperative rather than another type of business?



The Live Oak Tree: Farmers Union's Emblem

When forming the organization in Point, Texas, in 1902, the Farmers Union forefathers selected the live oak tree as its emblem. Why would they choose this tree as a symbol of the organization?

The live oak tree is predominantly found in the South where Farmers Union originated. Live oak trees do not lose all their leaves in the winter and their leaves stay green. Older leaves are dark green, and new leaves are a bright lime or spring green.

There is further symbolism in the Farmers Union emblem. The trunk of the tree represents National Farmers Union. The branches represent regional, state, district, county and local Farmers Union organizations, reaching out in a great network to form a pattern of protection and shelter. The leaves on the tree represent Farmers Union members, as there are always young and new members to regenerate the organization. Finally, Farmers Union's policy is rooted deep in rural America.

Farmers Union is like a strong, live oak tree. It is alive and growing, just as the organization's founders hoped Farmers Union always would be!



Get Creative!

Knowing what you have learned about trees and cooperative business, draw a co-op tree below and label the tree with what you believe each part of the tree might represent as a metaphor for a cooperative. Or, create your own emblem of what you feel best represents a cooperative.

Lesson Plan 4: Climate Change: A Hot Topic

- Unit Objective:** Students will learn about agriculture's role in curbing global warming.
- Grades:** 6-8
- Length:** 1 hour: 10 min. for background information and opening discussion, 15 min. for video or speaker on Farmers Union Carbon Credit Program, 20 min. for "Climate Change Discussion Questions," 15 min. for poster activity
- Materials Needed:** Pencils, a ball, poster board, markers, a copy of "Climate Change Discussion Questions," a computer with Internet access, projector and screen
- Preparation Needed:** Make one copy of "Climate Change Discussion Questions."

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 cause the Earth's surface temperatures to rise to a point of concern. Carbon can be released by burning fossil fuels and releasing carbon that is stored in trees, plants and the soil.

Farmers Union is concerned about the possible effects of climate change. Farmers Union believes farmers and ranchers have a lot at stake, but also a lot to contribute to the effort to slow global warming. For every ton of carbon stored in the soil or organic matter, 3.67 tons of carbon dioxide are removed from the atmosphere.

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, seeding grasses into a long-term rotation, sustainable management of rangelands and planting trees on previously non-forested or degraded land. Farmers Union enrolls producer acreage into blocks of marketable carbon credits 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, or reduce, 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. Ask students what they have heard about climate change. *What is it? What causes it?*
2. Introduce the background information above.
3. Play Farmers Union Carbon Credit video (<http://carboncredit.ndfu.org/carbonvideo.html>) or introduce guest speaker to discuss carbon sequestration and carbon credits.
4. Sit with the group in a circle. You will need one copy of the "Climate Change Discussion Questions" and a ball. Begin by reading a question aloud and tossing the ball to someone in the circle. Begin timing the discussion. The discussion will continue until the five minutes is up. Someone may raise their hands to have the discussion "tossed" to them. If no one raises their hand, the person who last discussed must toss it to someone that they choose. No one person can get the ball more than twice.
5. Divide into small groups and distribute two pieces of poster board and markers for each group. Have the groups create a poster with activities that they have done this week that produced carbon dioxide and another poster with activities that they have done that did not produce carbon dioxide. Have volunteers share their posters with the whole group.
6. Discuss further as time allows. *Some people call our total carbon emissions a "carbon footprint." Why do you think that is? Which category (transportation, home and school, what you eat, what you use, or what you throw away) do you think has the greatest effect on your carbon footprint? Why?*

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 solutions for global warming are there?
5. Do you think your generation can play a significant role in climate change? If so, how? If not, why not?

Optional Activities

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

1. Plan a group service project based on student suggestions from the lessons.
2. 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.
3. Charades or hangman with new vocabulary words.
4. Have students create posters, jingles, slogans, advertisements or other forms of promotion to convince others to be good stewards of natural resources.
5. Teach some Farmers Union songs.