

GROW YOUR PALS PROGRAM GUIDE



THE NATIONAL FFA MENTORING PROGRAM

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LESSON 8

The story of renewable energy

Unit:
RENEWABLE ENERGY

PRECEPTS

- F. Continuous Improvement
 - F5. Acquire new knowledge
- J. Mental Growth
 - J1. Think critically



Lesson Type:
Large Group

NATIONAL STANDARDS

- NSS-EC.K-4.1 Productive Resources
- NL-ENG.k-12.3 Evaluation Strategies

STUDENT LEARNING OBJECTIVES

As a result of this lesson, the student will ...

1. Identify who utilizes renewable energy in five different ways.
2. Identify four ways renewable energy can be put to use in homes.





TIME

Instruction time for this lesson: **45 minutes.**



RESOURCES

Energy Kid's Page – Energy Information Administration

<http://www.eia.doe.gov/kids/energyfacts/sources/renewable/renewable.html>

Alliant Energy Kids

http://www.alliantenergykids.com/stellent2/groups/public/documents/pub/phk_ee_re_001501_hcsp



TOOLS, EQUIPMENT AND SUPPLIES

- ✓ **copy of Dr. Seuss' "The Lorax"**
- ✓ **writing surface**
- ✓ **PALS.8.AS.A** – 1 per student
- ✓ **PALS.8.TM.A** – 1 per mentor/group
- ✓ **PALS.8.AS.C** – 1 per each small group, on different colors of paper, cut into pieces and placed throughout the room before the lesson
- ✓ **PALS.8.AS.D** – 1 per small group
- ✓ **PALS.8.TM.A** -- transparency copy
- ✓ **tape** (enough for each small group in Objective 2)
- ✓ **scissors**
- ✓ **overhead projector or LCD projector**



KEY TERMS

The following terms are presented in this lesson and appear in bold italics:

renewable energy

biomass

water

geothermal

wind

solar

INTEREST APPROACH

*The purpose of the interest approach is to get the students thinking about what **renewable energy** is and who can and should use sources of **renewable energy**. Start by reading "The Lorax" and then discuss how the story of the Lorax relates to **renewable energy**.*



Today we are going to read a story. This is the story of "The Lorax." Please sit quietly and listen carefully to the story because there will be a few important questions to follow.

Read “The Lorax.”



As we read the story, what did it make you think about?

Allow time for student responses.



Thank you for sharing! Would you like to know what it made me think about? The story made me think about what can happen to the environment if we are not responsible in how we use the Earth’s resources. Our topic today is **renewable energy**—*who* uses **renewable energy** and *how* we can use **renewable energy** in our homes. As we participate in activities today, think about how the story of the Lorax would change if more **renewable energy** were used in the story.

SUMMARY OF CONTENT AND TEACHING STRATEGIES

OBJECTIVE 1. | Identify who utilizes renewable energy in five different ways.



*For this objective, mentors will break students up into small groups. The purpose of this objective is to help students understand how people use **renewable energy**. Mentors will read stories from PALS.8.AS.A to students in small groups of three to five. Groups can be predetermined, counted off or divided using another such exercise.*

- *Examples of people who use and/or create **renewable energy***
 - ⊙ **Biomass**
 - Farmers grow corn and soybeans for ethanol and biodiesel.
 - People who drive automobiles use ethanol or biodiesel instead of regular gasoline and diesel.
 - ⊙ **Water – hydropower**
 - Businesses and homes use the electricity produced by hydropower energy.
 - ⊙ **Geothermal**
 - *Businesses and homes use the heat and electricity produced by **geothermal** energy.*
 - ⊙ **Wind**
 - *Farmers and land owners can place **wind** turbines on their land to create electricity.*
 - *Businesses and homes use the electricity produced by **wind** energy from **wind** turbines.*

☉ **Solar**

- *Businesses and homes can place **solar** panels on buildings to generate heat and electricity.*

Split students up into groups of three to five and make sure students have a writing utensil.



There are a lot of people who use **renewable energy**. Let's identify the types of **renewable energy**:

Repeat after me.

*Write the **renewable energy** sources on the writing surface, repeat aloud the energy source after you write it.*

Biomass

Water

Geothermal

Wind

Solar



To find out how different people use **renewable energy**, we are going to hear some stories of who uses **renewable energy**.

For this next activity we will need to form groups. When I say DOUBLE, you will have 10 seconds to find a partner.

DOUBLE!

Thank you! Now when I say QUADRUPLE, you will need to pair up with another group and focus your attention back the front of the class.
What questions are there?

QUADRUPLE!

Each group (of four) should have a mentor at this time also.



In this activity we will need to listen to the stories in our groups and try to figure out which of these five **renewable energy** sources is being discussed. After hearing each story, we will write down a guess as to which **renewable energy** source is discussed. Take out your writing utensil while the mentors pass out your guess sheet.

Mentors pass out PALS.8.AS.A (guess sheet).



OK everyone, make sure you have a writing utensil and a guess sheet. Remember to listen carefully and try to guess on your sheet which **renewable energy** is being discussed in the story. Mentors, please begin.

*Mentors will read each story from PALS.8.TM.A to students in small groups. After each story, mentors will ask students to write down a guess as to which **renewable energy** source they think was being used. After all groups are finished, gather them together as one large group to discuss each story. Display a copy of PALS.8.TM.A, so the class can view the stories.*



Great job listening to each story and making guesses! Let's take a look at the stories again and our guesses and see what we came up with. We are going to read through each story again and pick out clues to help us make sure we have chosen the correct **renewable energy** source. As we do this, we will write down the answer on our guess sheet for each story, so be sure you have your writing utensil handy.

Read through each story and ask students questions to help pick out clues as to which energy source is being discussed. Then ask the students to provide their guesses to come up with an answer for each.

Read Story #1 from PALS.8.TM.A.



Let's think about some of the clues from this story. Who can tell us some of the clues you used to help you decide which **renewable energy** source is being used?

Allow time for student responses.



Some of the clues I used to help me determine the **renewable energy** source were that the panels were on the outside of the house and that they gathered heat to keep the house warm. Let's see what some of the guesses are. Raise your hand to tell us your guess.

Call on students.



These are all great answers. The best choice from our list for this story is **solar**. In order to use **solar** energy, we must attach to buildings outside panels that collect energy from the sun that can be used to heat the building or even generate its electricity. Next to the answer for Story #1, write **solar**.



Now let's look at Story #2.

Read Story #2 from PALS.8.TM.A.



Who can tell us what some of the clues are from Story #2?

Allow time for student responses.



One of the clues I used to help me guess which **renewable energy** source was being used was the fact that a river was mentioned. Because a river is a body of **water**, I chose **water**. **Water**, or hydropower, is used in many places to generate electricity. Next to the answer for Story #2, write **water**.

Next is Story #3.

Read Story #3 from PALS.8.TM.A.



What are some of the clues from Story #3?

Allow time for student responses.



One of the words I read in this story sounded like another word from the list of **renewable energy** sources – biodiesel. Biodiesel starts with the same letters as **biomass**. **Biomass** can be used a number of ways to generate energy. In this case, soybeans are used to make fuel for tractors. Let's write **biomass** next to the answer for Story #3 on the guess sheet.

Now we will look at Story #4.

Read Story #4 from PALS.8.TM.A.



Who can tell us the clues you picked for Story #4?

Allow time for student responses.



Great guesses! This one was a little tricky. Some of the clues I picked were that warm **water** is being used to heat something. Heat and the word thermal are similar. Also, the warm **water** is coming from the ground and ground and geo start with the same letter, so I chose **geothermal**. **Geothermal** energy can be used to heat buildings, like an office building. Let's write **geothermal** next to the answer for Story #4.



Finally, let's look again at Story #5.

Read Story #5 from PALS.8.TM.A.



We can probably figure out which **renewable energy** source this is from the process of elimination, but let's think about some of the clues in this story. What are some of the clues you found?

Allow time for student responses.



The clue that was most helpful to me was that the new structures it talked about looked a lot like old-fashioned windmills, which led me to **wind** energy. Go ahead and write **wind** next to the answer for Story #5.



Now that we have a good idea of how different people use sources of **renewable energy**, let's use our knowledge to see what a house that uses all of these **renewable energy** sources might look like and what each source would be used for.

OBJECTIVE 2. | Identify how four renewable energy sources can be put to use in homes.



*The purpose of this objective is to help students understand some of the ways that **renewable energy** sources can be incorporated into the home. Students will work through a modified Go-Get-It e-Moment as part of an activity to achieve this objective. As with the first objective, students will work in small groups of three to five for the activity. Copies of PALS.8.AS.B should be made in advance and on different colored paper, so that each group has a different color paper for PALS.8.AS.B. The activity sheet should be cut into five pieces and placed around the room before the class starts, so that students can find the pieces when directed to do so. Additionally, a copy of PALS.8.AS.D should be made for each group.*

- ⊙ *How **renewable energy** can be put to use in homes:*
 - *Use **solar** panels to generate heat and electricity.*
 - *Use **wind** turbines to generate electricity.*
 - *Use **geothermal** wells to generate heat.*
 - *Burn biofuels (ethanol and biodiesel) in automobiles.*



While considering some ways that we can incorporate **renewable energy** sources into our homes, let's get back into our groups.

Have mentors help students get back into groups. Mentors will need to tell groups what color they will be looking for in the following activity.

Go-Get-It e-Moment

The Go-Get-It e-Moment is a brain-based activity that allows students to seek out information by kinesthetic or cognitive means. The teacher provides the information in various ways for students to seek. In this case, students will physically move around the room to gather information.



In a moment, we are going to get up and look around the room for pieces of paper that represent sources of **renewable energy**. Each group will be looking for four pieces that match the color that your mentor just told (or shortly will tell) you. When I say GO GET IT, you will look for these pieces and bring them back to your group. You have 30 seconds to find all of your pieces! What questions are there?

OK, GO GET IT!

Mentors should help groups find pieces and bring their groups back together. Each mentor should have a copy of PALS.8.AS.D. The following dialogue will take place within each small group:



Now that we have all of our pieces, let's figure out first what each represents. The piece that looks like a windmill is a **wind** turbine and generates electricity. The piece that is a narrow square represents a **solar** panel that generates heat. The piece that looks like a bunch of tubes represents a set of **geothermal** wells that can be used to generate heat and the gas pump that says Ethanol is a type of **biomass** energy. Ethanol is renewable fuel made from corn or other plants or even animal by-products.



Our task now is to determine where each of these pieces should be placed on or around the house and be able to describe how each of these energy sources will be used in the home. Then, we will share with the rest of the class what we came up with. Who will be the first to share where they believe renewable fuels can be used around the home?

Mentors should work with students to place elements around the home and to determine what each piece will be used for. Refer to content above (for Objective 2.) to help determine what each piece will be used for. Pieces can be taped to PALS.8.AS.D. Mentors should also work with the group to determine how they will present their model to the class. Mentors should attempt for each student to have a speaking part. Students might say something like: "We placed our windmill near the house so it can generate renewable electricity."

After groups have had time to work on the activity, one mentor should get the attention of the entire class to prepare for groups to share.



Let's come back together as a class so we can share our **renewable energy** homes. As we listen to each group, think about how they are similar and different to your own groups.



Have groups share. Clap briefly between each group to show appreciation.



We did an awesome job of designing homes that create **renewable energy**.



REVIEW / SUMMARY

The purpose of the review is to help students recall information to prepare for the evaluation. This will be conducted as an entire class, as opposed to small groups.



Let's think back to what we learned today. Think for a moment about one important thing you learned today about **renewable energy**. When ready to share, raise your hand.

Call on students to share responses. Validate their responses with praise, such as, "Great thinking!" Then, wrap up with major points.



We have discovered today that a number of different people use **renewable energy** for different purposes. For example, from our stories, Ashton's grandparents use biodiesel on their farm, a type of **biomass renewable energy**. Also, Katie's parents are placing **wind** turbines on their land to generate electricity for the people who live around them. We also learned today about different ways that **renewable energy** can be used in the home. Learning this information today helps us understand who can use **renewable energy** sources. Remember the story of "The Lorax" from the beginning? If you were to re-write the story, you would know what sources of **renewable energy** to include. Someday, we will be able to make decisions about **renewable energy** when we drive cars and live in our own homes. Now, let's see what we remember from today.

Have students complete the evaluation, PALS.8.Assess.A, individually and then review the answers in class.

APPLICATION



Small Group Suggestion: *Mentors can lead small groups in identifying how **renewable energy** sources are used in the school and community or local area. Mentors can work with groups to develop a poster that can be displayed in the school or presented to the local board of education.*



One-on-One Session: *Mentors can work with students individually by developing stories on **renewable energy** similar to the stories found in PALS.8.TM.A. The stories could be about the student or a fictitious character. Stories should include aspects of how the characters are using **renewable energy** in their lives and how the characters are helping the environment while producing energy for people to use.*

PALS.8.ASSESS.1 | EVALUATION

Name _____

Match each of the sources of renewable energy on the left with the correct diagram on the right. Write the letter of the correct diagram next to the correct renewable energy source.

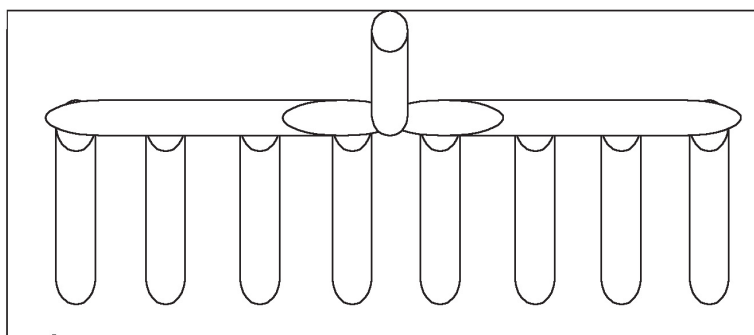
1. Biomass _____

2. Geothermal _____

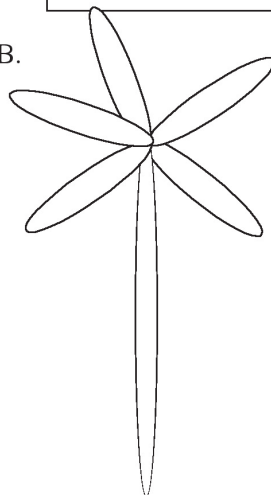
3. Solar _____

4. Wind _____

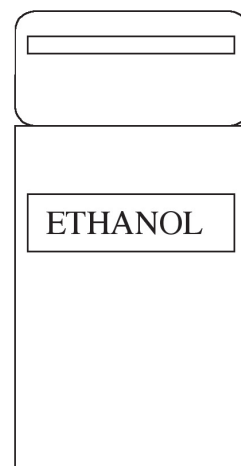
A.



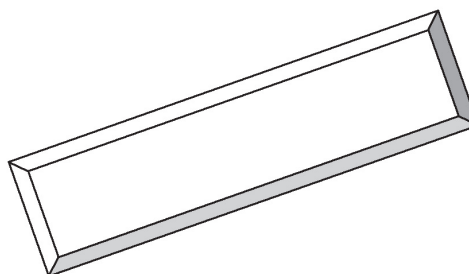
B.



C.



D.



PALS.8.AS.A

Guess Sheet

Story #1

Guess:

Answer:

Story #2

Guess:

Answer:

Story #3

Guess:

Answer:

Story #4

Guess:

Answer:

Story #5

Guess:

Answer:

PALS.8.TM.A / PALS.8.AS.B

Story #1

Elizabeth's parents are building a new house. In order to generate renewable heat instead of relying completely on the furnace, they will install panels on the outside of the house. These panels will collect energy that will be used to heat the new house. Looking at the five renewable energy sources, think about which source is being used in this story. Each energy source will only be used once. Write down your guess under Story #1 on your guess sheet.

Story #2

Connor's father works at a power plant where electricity is generated. The power plant sits next to a major river. The power plant provides electricity for many people around the area where Connor lives. Looking at the five renewable energy sources, think about which source is being used in this story. Write down your guess under Story #2 on your guess sheet.

Story #3

Ashton's grandparents operate a large grain farm. Recently they have decided to use biodiesel instead of regular diesel in their tractors. Biodiesel is made from soybeans and uses less petroleum than regular diesel. Looking at the five renewable energy sources, think about which source is being used in this story. Write down your guess under Story #3 on your guess sheet.

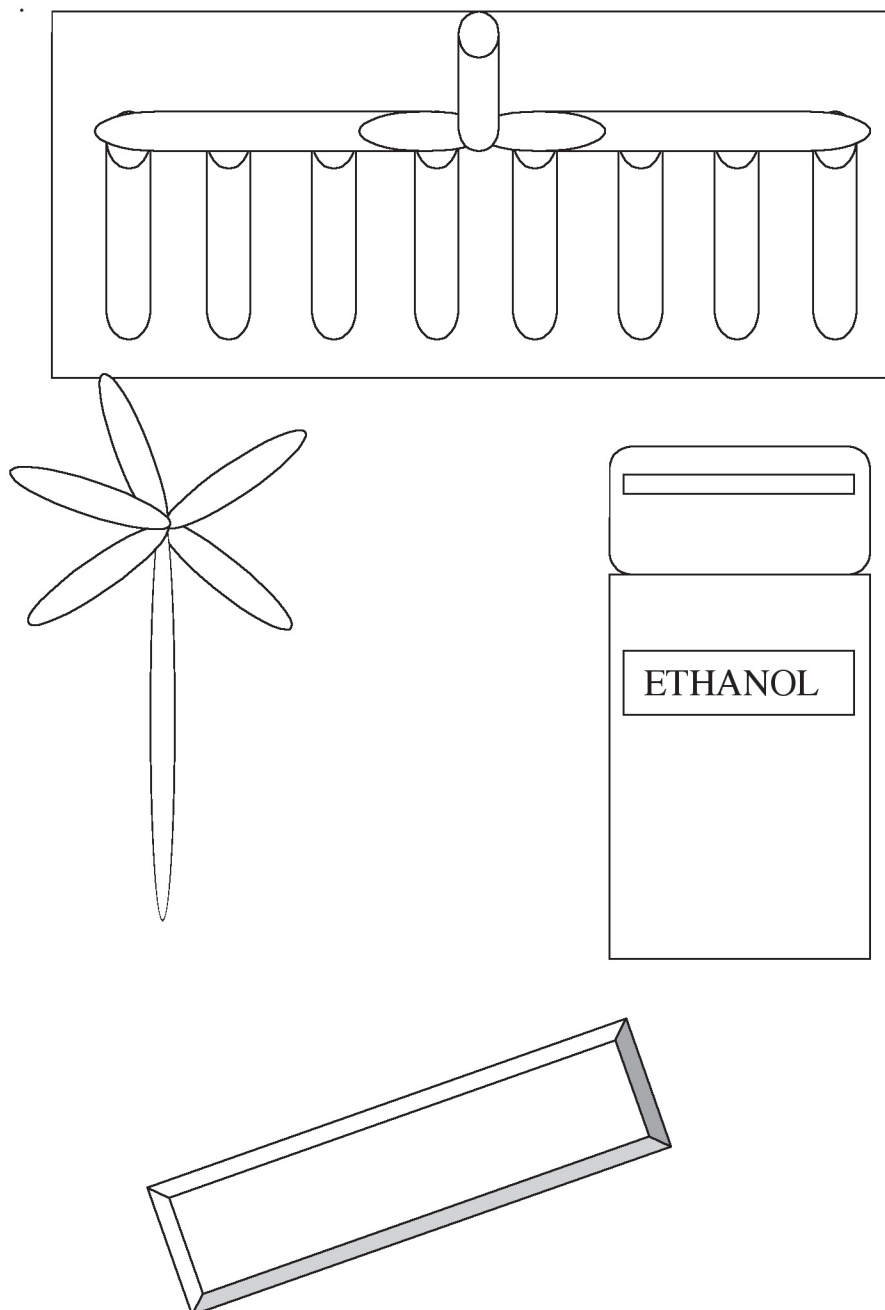
Story #4

Wyatt's parents are constructing a new office building for the business they own. They want to use more of the Earth's resources to heat the new office building. To do this, they are having wells put in the ground around the building, to bring warm water in from the ground to help heat the building. Looking at the five renewable energy sources, think about which source is being used in this story. Write down your guess under Story #4 on your guess sheet.

Story #5

Katie lives out in the country. Her parents own a lot of land and have decided to use the land to generate renewable energy. They want to generate electricity for people in the area to use. They are letting the electric company place large structures on their land that sort of look like old-fashioned windmills. These structures harness energy that can be used to generate electricity. Looking at the five renewable energy sources, think about which source is being used in this story. Write down your guess under Story #5 on your guess sheet.

PALS.8.AS.C



PALS.8.AS.D

