Teacher’s Guide
Trees, Energy, and the Environment
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Global Climate Change

“Human activities, such as the release of greenhouse gases from burning fossil fuels are major factors in the current rise in Earth’s mean surface temperature [global warming]. Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depends on the understanding of climate science, engineering capabilities, and other kinds of knowledge such as understanding of human behavior and on applying this knowledge wisely in decisions and activities.”

— MS-ESS3 Earth and Human Activity, Grade Six

From: Next Generation Science Standards (NGSS) for California Public Schools, Kindergarten–Grade Twelve (adopted by California State Board of Education, September, 2013).
Introduction

This teacher’s guide provides the background, lessons, and activities to help teach your students more about trees (the oldest living plants on earth) and how important trees are to each person and the environment.

Meeting Many Human Needs

Trees are seen through many different lenses including those of children who know them as a source of apples, nuts or a place to escape during a game of hide and seek. The activities in this educational program will help students identify and explore many of the numerous benefits of trees to individuals and to the overall environment.

Students will study many things about trees and how they not only provide oxygen to breathe, but food to eat, a myriad of products, and a habitat for birds and other animals. In addition students will discover that trees help clean the air and capture the greenhouse gas emissions that contribute to global climate change. They will learn that trees can also cool the air and provide shade to make homes and buildings more energy efficient.

Global Climate Change

Daily activities, from cooking, showering, checking email, watching television to playing video games, all use electrical energy (electricity). Most of this energy comes from power plants that burn fossil fuels that emit greenhouse gases such as carbon dioxide (CO₂). Greenhouse gases trap heat near the surface of the Earth and contribute to global climate change.

Taking Actions

The final lesson includes information on the safe planting of trees at school or at home and ideas on how to get involved in community tree planting and other conservation efforts. The message is plant the right tree
in the right place. This lesson also focuses on how by following the three R’s (reducing, reusing, and recycling) we can help protect trees and conserve other natural resources.

Throughout this guide and the student activity book are listings of websites for community, national, and international organizations supporting the protection and conservation of trees.

Grow Global

A colorful poster, Grow Global — What Trees Do for the Environment, is given to each student at the end of the study. This poster is designed as a take-home material for parents and guardians. The poster helps review what students have learned in the class, offers energy saving tips, and provides some actions that family members can take for the environment.

Connecting to the Content Standards

Lessons in this teachers guide have been correlated to Common Core State Standards (CCSS)* and the Next Generation Science Standards (NGSS)** for grades four to six.

The four lessons in this guide, along with the accompanying 28-page activity book, an Energenius Career Supplement for Trees, Energy, and the Environment, and suggested extension activities, provide many exciting and challenging learning opportunities for students.

*California Common Core State Standards for English-Language Arts & Literacy in History/Social Studies, Science and Technical Subjects (Adopted by the California State Board of Education August, 2010 and modified March, 2013)

**Next Generation Science Standards (NGSS) for California Public Schools, Kindergarten–Grade Twelve (adopted by California State Board of Education, September, 2013),
A World of Abbreviations

Teachers decipher and use many abbreviations in their daily work life. Abbreviations of late include CCSS for Common Core State Standards, NGSS for Next Generation Science Standards, and the acronym STEM. STEM has become an abbreviated way for educators, journalists, politicians, and parents to discuss and emphasize the teaching of science, technology, engineering, and mathematics.

The Utility World

In the energy utilities world there are also many abbreviations and right up front is DSM (Demand Side Management). DSM is something that affects more than utility workers in the energy sector because it involves anyone who is a consumer of energy. DSM covers actions that influence the amount of energy used and the time of day it is used. DSM also covers households and businesses that are generating their own electricity and often have a surplus to return to the electric grid.

DSM is an overarching idea that is made up of three main parts. These parts are energy efficiency (EE), demand response (DR), and distributed generation (DG). The California Public Utilities Commission (CPUC) refers to these three parts as Integrated Demand Side Management (IDSM).*

Demand Side Management (DSM)

DSM gives the consumer programs designed to both change the level and patterns of energy they demand. Utilities (the supply side) now offer incentives, real-time data, and messages related to shifting time of use, along with familiar energy efficiency tips.

Demand side management (DSM) programs have energy efficiency (EE) as a primary goal. Energy efficiency (EE) is also a major component in all of the PG&E Energenius materials beginning with the preschool child up through the middle school student. Students using the Energenius materials, are also introduced, as age appropriate, to demand response (DR) and distributed generation (DG).

* A California Public Utilities Commission IDSM Program Summary Fact Sheet can be downloaded at www.cpuc.ca.gov.
Trees, Energy, and the Environment
Within the Energenius teacher guides there are **EE, DR, and DG** icons that denote opportunities to introduce and/or review these topics, as age appropriate, for your students.
Lesson at a Glance

Students will discover the many ways trees help us, every day. Each student will be given a *Trees, Energy, and the Environment* student activity book. A chart about trees helps students recall and organize what they already know about the many gifts trees provide. Students will label the parts of a tree and learn the difference between evergreen trees and deciduous trees.

Teacher Background

“The wonder is that we can see these trees and not wonder more.”

— Ralph Waldo Emerson, American poet and essayist (1803–1882)

We live with trees every day. They are all around us. From medicines to food to shelter, trees help us. Experts say that as many as 5,000 products come from trees. However, we do not often think of the many gifts trees provide.

Children may know trees as a source of apples, nuts, or a place to escape during a game of hide and seek. The activities in Lesson 1 will help students identify and explore the numerous benefits of trees. Students' knowledge of the parts of a tree will be reinforced by completing a tree diagram.

For further discovery, several Branching Out extension activities engage students through observing and writing about trees.
Vocabulary

branch
A woody limb growing from a trunk or another secondary limb of a tree.

crown
The upper part of a tree, which includes the branches and leaves.

deciduous
A tree that sheds its foliage at the end of the growing season.

evergreen
A tree or plant having leaves that remain green throughout the year.

foliage
The leaves or needle of a tree.

lateral roots
Roots which extend horizontally from the primary root and serve to anchor the tree securely into the soil. These roots also contribute to water uptake and facilitate the extraction of nutrients from the soil.

leaf
Any flattened, green outgrowth from the stem of a vascular plant. Or an above ground plant organ specialized for photosynthesis.

root hair
Root hairs are hair-like extensions of the other roots. Root hairs increase the capacity of a tree to absorb water and nutrients.

tap root
A straight tapering root that grows vertically down. It forms a center from which other roots sprout.

trunk
The main stem of a tree, usually covered with bark.
Procedures

1. Write the following quote on the board:

"The wonder is that we can see these trees and not wonder more."
— Ralph Waldo Emerson, American Poet and Essayist (1803–1882)

Place five or more items on a table. Ask, what do all these objects have in common? (Answer: Made from things that come from trees.) Experts say that as many as 5,000 products come from trees. From medicines to food to shelter, trees help us in many ways. For example, there is a great variety of products that are created from wood, as well as a variety of fruits and nuts and medicines. Discuss that trees make something called cellulose which is used as a thickener in products like shampoo and ice cream. Tree products can be found in football helmets, ping pong balls, hockey sticks, and even piano keys.

2. Lungs of the Earth

Ask students to stand up and take a big breath and another deep breath. Ask, what does this breathing exercise have to do with trees? (Answer: Trees provide the oxygen we need to breathe. Trees act like lungs of the earth.)

Tell students that beyond the products that trees provide they also give something that we need to live. Trees give off the oxygen we need to breathe. They take in carbon dioxide (CO₂) through their leaves and give off oxygen. Tell students that they will be learning more about this in this study.

Ask, do you see why Ralph Waldo Emerson said, “The wonder is that we can see these trees and not wonder more?”


Explain that these books will be used throughout the study of trees. Instruct them to write their names and their school name in the space provided at the top of the contents page.

Review the table of contents and ask students to follow along as you read the Welcome to the Energenius Trees, Energy, and Environment Program page aloud (page 1).

4. Show students photos or pictures of trees or have students look outside at trees. Ask if students have ever thought about how many things trees give us every day.
Challenge students to think of as many things as they can. Have students turn to pages 2-3, *All About Trees and Me*.

In the first column, ask them to write down examples of foods they eat and drink that come from trees. (Answers will vary, but a sample list would be: apples, oranges, pears, blackberries, walnuts, maple syrup, and apple juice.)

In the second column, ask them to write down examples of animals that live in trees. (Answers will vary, but a sample list would be: squirrels, chipmunks, birds, worms, bugs, and even monkeys.) In the third column, ask them to write down things at school that come from trees. (Answers will vary, but a sample list would be: paper, pencils, workbooks, crayons, desks, and chairs.) In the fourth column, ask them to write down things at their homes that come from trees. (Answers will vary, but a sample list would be: paper towels, walls, floors, furniture, newspapers, and notepads.)

In the fifth column, ask them to write down words to describe trees. (Answers will vary, but a sample list would be: golden, shimmering, green, shady, majestic, or tall.)

Review their responses and see whether there were any surprises in the lists of things trees provide. Invite students to share their surprises.

Instruct students to turn to page 4, *Know a Tree* and take notes while you describe the various parts of a tree. An alternative is to have students research and report back on the structure of trees. To review:

- A crown is the upper part of a tree, including the branches and leaves.
- A leaf is any flattened, green outgrowth from the stem of a vascular plant.
- Foliage is the leaves or needles of a tree.
- A trunk is the main stem of a tree, usually covered with bark.
- A branch is a woody limb growing from a trunk or another secondary limb of a tree.
- Lateral roots are roots which extend horizontally from the primary root and serve to anchor the plant securely into the soil. This branching of roots also contributes to water uptake, and facilitates the extraction of nutrients from the soil required for the growth and development of the plant.
- Tap roots are straight tapering roots that grow vertically down. They form a center from which other roots sprout.
- Root hair zones are hair-like extensions of the other roots. Root hairs increase the capacity of a tree to absorb water and nutrients.

Next, instruct students to use their notes to label the tree parts on page 4.
6 Have students turn to page 5, A Look at the Trunk. Read the directions and the Tree Fact.

**Tree Fact:**
Trees drink water too! Trees take in water from the ground through their roots. This water is sent up inside the trunk to the leaves.

7 Direct students to read Leaves and More Leaves on page 6.

Read:

**Have you ever walked through a large pile of leaves? Did you ever help rake the fallen leaves? Did you know that some trees shed all their leaves while other trees do not?**

Trees are often categorized by types that lose their leaves in the fall months and those that keep most of their leaves all year-round.

Trees that keep their leaves throughout the year are called evergreen. Trees that lose their leaves in fall are called deciduous.

After reading about deciduous and evergreen leaves, ask students: How might planting trees near houses and schools help save energy? (Answer: Trees provide shade in the summer and can help keep schools or houses cool. If a school or house is cool, less air conditioning can be used, which saves energy.)

Read aloud the Tree Food Fact on page 6:

**Trees and green plants make their own food. How to they do this? They use minerals found in the soil, water and carbon dioxide, a gas found in the air.**

Ask them, how do trees and green plants make their own food?

8 Write “**evergreen**” and “**deciduous.**” on the board,

Ask students to look at page 6, Leaves and More Leaves. Challenge students to decide which word (“evergreen” or “deciduous”) will answer the question at the bottom of the page. Read:

**If you wanted to have sunlight during winter, what type of trees would you plant at your school?**

Instruct them to write their answers on page 6 in the space provided. (Answer: A deciduous tree sheds its leaves in the fall, allowing the sun in winter to shine through.)
Instruct students to open their activity books to page 7, Investigate How Leaves Help Clean Our Air. Tell students that they are going to complete the first two steps of the investigation. Review the following directions:

1. Ask an adult family member to take a leaf-collecting walk with you. Collect a few leaves from trees growing near streets traveled by cars and other vehicles.

2. Place the leaves in a bag and bring to class.

Share with students they will finish their investigation after the leaves are brought to class.

**Note:** Other options are for the teacher to bring the leaves to class or take students on a leaf-collecting walk.

Summarize this lesson by asking questions such as:

a) Why are trees important to humans and to the entire natural world? (Answer: Food, shelter, oxygen we breathe)

b) What are some of the foods or products that trees give us. (Answer: apples, maple syrup, pencils, paper, nuts. Also refer to items on chart on pages 2-3.)

Recap with students why naturalist Ralph Waldo Emerson said, “The wonder is that we can see these trees and not wonder more.” (Answers may vary, but could include that when you “know” a tree, you find out the abundance of gifts a tree provides.)
Branching Out

❖ My Tree Journal — Observing and Recording
Students select one tree (at home, the school, or in the neighborhood) that they will observe over an extended time. Students can make and keep a tree journal with notes on what they observe as the seasons change, as birds or other animals make it their habitat, or as they discover seeds or seedlings from their tree. Students might also work together to develop a video journal to document “their trees” over a period of time. For some students this assignment could focus on their personal feelings about this tree over the time period of observing it.

❖ Trees Up Close
Plan a field trip to an arboretum (if available) or a park where students can see and identify a range of tree species. Prepare students to take field notes on their visit and/or draw and photograph various trees.

❖ If I Were a Tree
Ask students to imagine if they were a tree, what kind of tree would they be? Students can write a poem, write a few paragraphs, or make a collage or drawing to describe the kind of tree they would be. This assignment can also become a “guessing activity,” by having students provide five or more clues about the kind of tree they are. This guessing activity should be based on things that might distinguish one tree from another.
“Students may use published materials and Internet resources [consistent with Internet-use policies in effect at the school] to research, evaluate, and report on the environmental consequences. In this way they can develop a clearer understanding of the nonmonetary costs of energy in relation to environmental protection [conservation]. Students can rate the environmental advantages and disadvantages of heating a home with electricity, natural gas (or propane), solar power, oil, or coal.”

— Science Framework for California Public Schools, Kindergarten Through Grade Twelve, Sacramento, 2003
LESSON 2

Trees Save Energy and Help the Environment!

Lesson at a Glance

Students will learn more on how trees help the environment and discover how trees can help save energy. Through an investigation they focus on how leaves help clean our air. Another experiment will help them understand the greenhouse effect. Students work together to develop a KWL chart to learn more about global climate change.

Teacher Background

Students will delve deeper to learn how trees both save energy and help the environment.

As trees grow, they remove carbon dioxide (CO₂), a greenhouse gas, from the atmosphere. Trees store CO₂ as carbon, which reduces greenhouse gas emissions and helps prevent global climate change.

Students will also learn that trees are energy-savers. If trees are planted near a house, they make things cooler, which can reduce the use of air conditioning. That’s a saving of energy!

Trees also act as filters of pollutants and dust in the air.

Student Objectives

- Students consult the glossary and informational text to write their own definitions of domain-specific vocabulary (e.g., fossil fuels, greenhouse gas emissions).
- Students integrate informational text, a flow chart, and a web-based resource to understand the process of photosynthesis.
- Students utilize a KWL chart to identify and discuss what they want to know and what they have learned about global climate change and global warming.
- Students integrate visual and print information with a web-based resource to write how a parked car can illustrate the greenhouse effect.
- Students conduct a scientific experiment with their teacher to write and explain how the greenhouse effect is created.

Materials

Provided:

Needed for Leaf Investigation (page 7):
- Magnifying glass and/or microscopes
- Bag of leaves (collected near where cars travel)

Needed for Experiment (page 13)
- Two glass jars of the same size
- Four cups of cold water
- Ten ice cubes
- Two thermometers
- One clear sealable plastic bag

Time Needed

Two class periods
## Vocabulary

**atmosphere**
The whole mass of air surrounding the earth.

**carbon dioxide (CO₂)**
A colorless, odorless gas absorbed from the air by trees (photosynthesis) and released back into during the decay of plant matter.

**carbon sequestration**
The process by which trees remove carbon dioxide from the atmosphere.

**energy efficiency**
The use of energy without waste. Energy efficiency refers to work done using the smallest amount of energy needed.

**environment**
Everything that makes up our surroundings. The natural environment includes land, air, water, and other features of nature.

**fossil fuels**
Fuels formed from the remains of plants and animals that lived over 70 million years ago. Fossil fuels include coal, natural gas, and oil.

**greenhouse effect**
When heat from the sun becomes trapped in the Earth’s atmosphere.

**greenhouse gases**
Gases such as carbon dioxide (CO₂), methane and others that trap the heat of the sun in the atmosphere.

**photosynthesis**
The process trees use to make their food by using water, carbon dioxide (CO₂) and sunlight to make sugar. The sugar is used as food and the oxygen is released into the atmosphere.

**pollution**
The contamination of an area with substances that can harm living things. When fossil fuels are burned, they release gases into the air, resulting in air pollution.

**power plant**
A place where electricity is generated.
**Procedures**

1. Review with students some of the many “gifts” trees provide. Call on students to contribute their ideas from the All About Trees and Me chart (pages 2–3 in student activity book). Introduce any of the new vocabulary on page 14 that students could need in Lesson 2.

2. Discuss how trees help the environment by removing carbon dioxide (CO₂) from the atmosphere. Trees store carbon in the woody parts of the tree and help to counter the effects of global climate change.

   Another gift that trees give is energy saving. If trees are planted near a house, they can make the house cooler on hot days. Because of the shade, a family wouldn’t have to use as much air conditioning. That’s saving energy! And money.

   Trees also act as filters, by trapping pollutants and dust. Trees give us food, drinks, medicines, and shelter.

3. Ask students to read page 8.

   - **Trees give us shade on hot days and make it cooler.**
   - **If planted in the right place trees can reduce the amount of energy used to run an air conditioning unit. Trees are energy savers!**
   - **Trees help the global environment by absorbing large amounts of carbon dioxide (CO₂) to counter the effects of global climate change. This is called carbon sequestration.**
   - **Leaves on trees also filter out pollutants and dust in the air.**

   Have students take turns reading aloud the many ways trees help us save energy, as well as the following **Energy Story** (from page 9):

   **The energy used to heat and cool your home comes from power plants that produce it. Most of the electricity that is produced comes from the burning of fossil fuels. Power plants give off greenhouse gas emissions that pollute and affect air quality. Carbon dioxide (CO₂) is one of these emissions.**

   **Saving Money Too**

   **When families use less energy they save money. They also help the environment by reducing the amount of carbon dioxide (CO₂) and other pollutants going into the atmosphere.**
Thank You Trees

So thanks to trees planted in the right place, less energy could be needed during hot weather to run air conditioning units. Less energy could also be needed to heat a home in cold weather. Trees planted to allow the sun to shine through during winter months can mean using less heating.

Assign students to use the glossary on pages 24-26 to look up the underlined words from the Energy Story. In the spaces provided on page 9 or on separate paper, have them write the definitions in their own words.

If there is time, assign the bonus activity (bottom of page 8), that will help students learn more about how energy moves from a power plant to their schools. The diagram on page 26 of their books can assist.

An Investigation: How Leaves Clean Our Air

Place a large table in front of you and cover with butcher paper. On top of the table, place several magnifying glasses and/or microscopes.

Take out the bags of leaves you (or students) have brought to the class. Say, we live with trees and these leaves are all around us. In this investigation, students will discover how leaves help clean the air as they observe the amount of dust and particles on the leaves.

Discuss how leaves were collected from trees that were near roads where many cars and other vehicles travel.

Ask students to take turns observing the leaves. They should compare these leaves with others found not close to heavily traveled roads.

Summarize how leaves help clean the air. They act as filters and protection from pollutants and dust.

Ask students to write in the magnifying glass (on page 7) how they could do this investigation in another way. One solution could be to use tissues to wipe the leaves and compare those collected from various locations (e.g., how do the tissues vary?).

Introduce or reintroduce photosynthesis to students by using the Photosynthesis Flow Chart on page 10. One option is to have students view the Environmental Protection Agency (EPA) carbon cycle animation at [www.epa.gov/climatechange/kids/carbon_cycle_version2.html](http://www.epa.gov/climatechange/kids/carbon_cycle_version2.html).

Another option is for students to work in small groups to develop creative ways to illustrate and explain photosynthesis.
Direct students to page 11, where there is a KWL activity. Ask, have you ever heard the words global warming or climate change? Read the definitions for climate change and global warming (these definitions are found at [www.epa.gov/climatechangebasicinfo.html](http://www.epa.gov/climatechangebasicinfo.html)).

**Climate Change (or Global Climate Change)**

Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period of time (decades or longer).

**Global Warming**

Global warming is an average increase in the temperature of the atmosphere near the Earth’s surface and in the troposphere, which can contribute to changes in global climate patterns. Global warming can occur from a variety of causes, both natural and human induced. In common usage, “global warming” often refers to the warming that can occur as a result of increased greenhouse gases from human activities.

As a class (using a white board or butcher paper), complete the K and W portions of the KWL Environmental Chart on this page. What do they know and what do they want to know? Students should be given time to complete other activities in Lesson 2 and further research (online or print). At the end of this lesson, students will discuss what they have learned (see procedure 12, page 19).

7 Write the words “Greenhouse Effect” on the board. Ask, have you ever heard of the greenhouse effect? What do you think it is? Instruct them to turn to page 12, The Greenhouse Effect, and look at the illustrations on that page.

**What can this car illustrate about the greenhouse effect?**

This parked car has all the windows closed. The sun is beating down on the windows. This energy (heat) from the sun is being trapped inside the car.

Read the activity directions:

**Directions:** Visit the Web site below. Describe how a parked car can illustrate what is happening on the Earth.

8 Direct students to turn to page 13, Hands-On Experiment.

**NOTE:** Teachers might want to skip this experiment and have students read the text on page 13 and visit: [www.epa.gov/climatechange/kids/greenhouse.html](http://www.epa.gov/climatechange/kids/greenhouse.html) to learn more about the greenhouse effect.
Text, page 13:

- Try to imagine a giant greenhouse made up of the Earth and its atmosphere. Like the glass windows of the greenhouse, the atmosphere lets in the sunshine to heat the Earth.
- The heat that radiates from the Earth is trapped by the atmosphere. This is called the greenhouse effect.
- Earth would be much too cold to live on without the greenhouse effect.

**Materials Needed for the Experiment**

- Two glass jars of the same size
- Four cups of cold water
- 10 ice cubes
- Two thermometers
- One clear sealable plastic bag

Students should observe and/or assist as you complete the experiment.

**Directions for the experiment:**

1. Pour two cups (16 ounces) of cold water into each jar. (Use the ice cubes to chill the water.)
2. Place one jar in the plastic bag.
3. Place both jars in the sun for one hour or more.
4. Measure and record the temperature in both jars.
5. Record your findings.
6. How did this experiment help you understand more about the greenhouse effect?

Explain that when the jars have been in the sun for a full hour, they will measure and record the temperatures in both jars. (Be sure to use a different thermometer for each jar.) Write your findings on the board.

**Homework Assignment**

Bring to class some unwanted catalogues you or your family have received in the last month (cut off mailing labels first).

**Summarize this lesson by referring back to the KWL activity on page 11. Review what students knew (K) and wanted to know (W) about global climate change and global warming.**

Complete the L (What I Have Learned) as a large group activity. Discuss the sources they used to complete the L part of their charts.
Branching Out

✦ Press and Present Leaves
Create an art project using the leaves that students have brought to class. A simple project is to press leaves between newspaper, and frame by mounting them on heavy card stock or cardboard and holding in place with contact paper.

✦ Energy Patrol
Students can volunteer as monitors for a school wide energy patrol. Patrol members monitor where energy is being wasted in the classroom and throughout the school buildings. The monitoring includes lights left on in empty rooms, computers not set in energy-saving mode, leaking water, windows open when air conditioners or heaters are working, lack of recycling, as well as paper that is being wasted. Monitors also identify good energy-saving actions taking place in the school. Information on forming an energy patrol can be searched at www.energyquest.ca.gov

✦ Party With Solar
Plan a school picnic or party using the “sun” to cook and/or warm the food. The U.S. Department of Energy has easy-to-follow instructions to build a pizza box solar oven at www1.eere.energy.gov/education/pdfs/solar_pizza_oven_box.pdf.

✦ Renewables and Distributed Generation
Students can research how businesses, homes, and some schools are generating their own electricity using renewable energy sources like solar and wind. As part of their research they should identify examples of distributed energy generation in their own city or geographic region.
“I never saw a discontented tree”
— John Muir (1838-1914)
(naturalist, writer, and scientist)
Lesson at a Glance

Students will observe and categorize the characteristics and qualities of trees. A how-to page helps educate students about tree-planting, including how to safely plant a tree. A 3-R’s writing activity challenges students to reduce, reuse, and recycle. Students focus on their own reliance on paper and discuss ways to reduce their use.

Another activity with unwanted catalogues helps students understand how wasteful uses of paper can be avoided.

Teacher Background

“I never saw a discontented tree.”
— John Muir, American naturalist (1838–1914)

This lesson deepens students’ familiarity with trees by surveying the trees at their school or in their neighborhood. Students observe and categorize the species and characteristics of trees, and how trees affect their surroundings.

In this lesson, students discover what they can do to conserve, preserve and grow trees. Students learn how to plant a tree, and are reminded that planting trees in the right place can save energy. They discover that trees help cool a house when it is hot, thus using less energy to run the air conditioning. Deciduous trees planted in the right place can also allow the sun to help warm a house in the winter. Students become aware of how trees can help save energy.

Student Objectives

• Students utilize a chart to observe tree species, identify their characteristics, and write how trees affect their surroundings.
• Students analyze informational text and a diagram to write questions one should ask before safely planting a tree (e.g., are power lines nearby).
• Students utilize a chart to discuss and write ways of reducing the amount of paper they use at home and school.
• Students discuss what they can personally do for trees and the environment.

Materials

Provided:

Needed:
• Use a map of your school downloaded from Google, Yahoo, MapQuest, or a similar mapping Web site. Students can also draw a map of an area near their school or home.
• Catalogues
• Books to help identify trees (optional)
• Scale

Time Needed

One to two class periods
Hands-on activities in this lesson help students reflect on their own use of paper and what they can do to reduce the amount they use each day. Through an analysis of wasteful situations, students are shown yet another way they can help trees and the environment.

**Vocabulary**

<table>
<thead>
<tr>
<th>deciduous</th>
<th>evergreen</th>
</tr>
</thead>
<tbody>
<tr>
<td>A tree that sheds its foliage at the end of the growing season.</td>
<td>A tree or plant having leaves that remains green throughout the year.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>energy efficiency</th>
<th>habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>The use of energy without waste. Energy efficiency refers to work done using the smallest amount of energy needed.</td>
<td>A place where a plant or animal normally lives.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Everything that makes up our surroundings. The natural environment includes land, air, water, and other features of nature.</td>
</tr>
</tbody>
</table>
### Procedures

1. (Before the lesson, print maps of your local school area downloaded from Google, Yahoo, MapQuest, or a similar mapping Web site. You can also draw a map of an area near your school or home.)

Open the lesson by explaining to students that today, they are going to get to know the trees near their school and/or their neighborhoods. Tell students that the class is going to walk around the school, and use a survey to record information.

Instruct students to turn to page 14-15, *Your Neighbors, The Trees*. Discuss the headings (tree, deciduous or evergreen, height and shape, special characteristics, habitat or wildlife, how this tree affects my neighborhood).

Mark on the map you have printed of your school area all the trees able to be seen from the sidewalks. For the survey, pick two or three of the most interesting trees. Spend time in front of each tree. Ask, does anyone know the name of this tree? (Answers: birch, oak, douglas fir, etc.) Name the tree. Challenge students to try to classify the tree as either evergreen or deciduous. Have them write down the approximate size and shape, make notes of special characteristics of the tree (such as leaves or needles, fruit, nuts, cones), and whether it is a habitat for wildlife. Ask, how does this tree affect the neighborhood? (Answers may vary, but could be: provides shade, protection from a busy street, is a wind block, blooms pink flowers.)

2. Back in the classroom, ask, how would the area surveyed be different without the trees growing there? (Answers will vary, but could include, nothing to duck under when it rains, no windbreak, no color, no sounds of birds, or smell of flowers.) How are the trees providing a habitat for birds and other animals? (Answers will vary, but could include the branches are flat and good for building nests in, the branches are thick and so it is easy for animals to hide there.)

3. Direct students to turn to page 16, *Go Ahead, Plant a Tree*. Invite students to take turns reading aloud the five steps to planting trees. If possible in the school setting, follow the steps, and plan to plant a tree.

Tell students that planting trees can help their family use less energy at home and save money. Direct students to turn to page 17, *Right tree. Right Place. Not Near Power Lines*.

Have students read the six sentences (A to F):

- a. Plant small trees (less than 25 feet tall) under power lines.
- b. Plant only deciduous trees on the south side of your home to let in the winter sun.
c. Trees planted on the west side of your home help counteract the hot afternoon sun.
d. Planting deciduous trees can give you privacy and shade.
e. Shade outdoor air conditioning units so they can run more efficiently.
f. Planting trees in the front yard frame your home and provide privacy.

Power lines are important to our daily lives. Power lines bring electricity to our homes and our school to keep lights and computers and appliances working. Trees can knock down power lines and cause outages, shock hazards, and even fires.

Read the directions to students:

Write three questions you would ask before you safely planted a tree.

1. ______________________________
2. ______________________________
3. ______________________________

(Sample questions could include: How tall will this tree grow? Are there underground utility lines where I am planting?)

Have students turn to page 18, Paper Recycling Saves Trees. Ask students to think about all the ways they use paper every day and if they ever think that all this paper comes from trees. Brainstorm with students examples of ways they use paper on a typical day. (A sample list would be: workbooks, text books, notepads, napkins, paper towels, newspapers, paper plates, magazines, paper bags, and paper cups.)

In the space provided, instruct students to write down five ways that they use paper on a typical day. Ask students to share their lists with the class.

Read aloud the two questions on the bottom of page 18:

What could you do to reduce the amount of paper you use in a typical day?

(Possible answers: use both sides of paper, bring lunch in a reusable container, recycle paper and cardboard.)

What would you include in a plan to reduce the amount of paper used at your school?
Tell students to turn to page 19, Catalogues, Catalogues, Catalogues.

Read and discuss the following:

Each day millions of catalogues from various companies are sent out to homes in the United States. Some of these catalogues are NOT wanted or even read. They often just end up in the recycling bin or the landfill.

Recycling these catalogues is a good idea. A better idea is to stop those you do not want from coming at all. The fewer catalogues printed and sent to people who do not want them the fewer trees that are used.

Bring out the catalogues and spread them on a table. Ask, how many catalogues were brought to school? Write the number on the board and instruct students to write down the number in the space provided after Step 3. Ask, how many students participated? Instruct students to write down the number in the space provided.

For step 4, calculate the average number of catalogues per family.

For Step 5, use a scale to weigh the stack of catalogues. Teachers might also display and weigh a sampling of unwanted catalogues that have recently arrived at the school.

As part of Step 6, ask students, what natural resources besides trees were wasted? Instruct students to write down their answers in the space provided. For the final step, ask students for their ideas about stopping all the unwanted catalogues.

Use the Internet to learn about Recycle City, at www.epa.gov/recyclecity.

Read about The Three R’s Save Trees and other Natural Resources. Read:

Reduce, Reuse and Recycle

Reduce — When we reduce the number of things we use, we waste fewer natural resources.

Reuse — When you reuse items more than once you are showing that you are not wasting.

Recycle — When paper and materials like aluminum cans and glass bottles are recycled, they are used to make new products.
Explain that when paper is recycled it is used again to make a new product. A new product made out of recycled paper needs less energy to create. Recycling also conserves trees, since fewer trees are cut down. Discuss the amount of paper and other recycling that is done in the classroom, school or home.

Summarize Lesson 3 by telling students that not every school or every family can plant a tree, but everyone can take actions for trees and the environment.

Ask students to share what they can personally do for trees and the environment. List their responses on the board.

Branching Out

**Community Recycling**
Students can investigate the type and extent of recycling in their neighborhoods. They could compare, for example, curbside recycling versus recycling centers. Students could also research how items like batteries and cell phones could be safely recycled.

**Plant for the Planet**
The United Nations Environmental Program (UNEP) has a worldwide tree planting effort that hopes to plant a billion of trees. Students might want to learn how they can get involved in this tree planting for the planet effort. More information can be obtained at [www.unep.org/billiontreecampaign](http://www.unep.org/billiontreecampaign).

**The School or Neighborhood Tree Survey**
Compile into one survey the information from the students’ surveys. Group students in workgroups. Have them circle their favorite descriptions and discuss them. Review the survey as a class, putting the best or most accurate descriptions into the large class survey.

The survey could be copied and enlarged. Students can color or further design the survey. Post a copy of the class survey on the class or school bulletin board. Students can label the leaves of the particular trees described in the survey and post them beside the class survey.
LESSON 4

The Wonder of Trees

Lesson at a Glance

Using websites and print sources, students will research and learn more about trees and environmental topics. A 20-word crossword puzzle helps students review what they have learned in this unit. An art project challenges students to develop slogans or messages about trees and the environment. Each student will be given a Grow Global poster to take home and share with their parents or guardians. Students will summarize what they have learned and discuss ways they can keep on helping trees help the environment.

Student Objectives

• Students discuss eco-friendly green jobs, what this term “green” means, and imagine green jobs they might have in the future.
• Students utilize web-based research and write about topics related to this study of trees, energy, and the environment.
• Students refer to informational text in the the Grow Global Poster to write slogans or messages about the many ways trees help the environment.
• Students consult the glossary and informational text to solve a crossword puzzle that utilizes domain-specific vocabulary.

Teacher Background

I frequently tramped eight or ten miles through the deepest snow to keep an appointment with a beech-tree, or a yellow birch, or an old acquaintance among the pines.

— Henry David Thoreau
American poet and naturalist, 1817–1862

Trees are important to humans and the entire natural world. They are essential to the health of Planet Earth.

At this point in the study, students know that trees help clean the air we breathe by trapping dust and other pollutants. Students know trees can help save energy, if planted in the right place near a home. They have been introduced to a myriad of ways trees help us every day. They also understand why it is important to make it a habit to recycle paper products and conserve trees.

Materials

Provided:

• Grow Global Poster (one for each student to take home to parents/guardians)

Needed:

• Recycled materials, twigs, leaves, posters, crayons and/or pens, and any other materials needed to make posters

Time Needed

One to two class periods
In this lesson, students participate in enrichment activities to learn more about trees. Students can learn about Arbor Day, a national holiday which focuses on planting trees. They are challenged to create slogans or messages for posters that relate to trees, energy, and the environment, such as “trees help clean the air” or “trees help save energy.” Students will make their tree posters out of recyclable materials.

A Grow Global poster will also be given to each student, for them to take home and share with their families. Students are encouraged, whenever possible, to plant trees. The poster also reminds students about other simple steps to help out. By planting trees, recycling and reusing paper, and saving energy, carbon dioxide (CO₂) and other greenhouse gas emissions can be reduced.

Students learn that even though they are young, they can take energy-saving actions to protect the environment. They can also encourage others to plant trees. They can share their energy-saving and tree smartness with others.

**Vocabulary**

**Arbor Day**
A day set aside each year to celebrate trees. It is a tree planting holiday that has been celebrated for more than 130 years.

**power line**
A wire used to carry electricity from a power plant to a site where it is used.

**power plant**
A place where electricity is generated.
Procedures

1. Open the lesson by asking students if they know the official state tree of California.

Have students turn to page 20, Learning More About Trees, the Environment, and People, and the answer is there (redwood).

Read from page 20 and ask students to select a topic:

- Arbor Day — A time to plant and celebrate trees.
- Green Jobs and Careers — Working with trees.
- John Muir, naturalist — Every April 21 is John Muir Day in California.
- Rainforests — Where are they and why are they called rainforests?
- Smoky Bear — What he does for our forests
- The Legend of Johnny Appleseed

2. Have students turn to page 22, Branching Out — Connections to the Internet. This activity can also be conducted by having students work in pairs or small groups of students. Begin by discussing a sample topic, such as getting information on jobs related to trees. Brainstorm some of these jobs. This is also a time to introduce the idea of green jobs — those that are “friendly” to the environment, such as careers with companies that work with renewable energy sources. Ask students to imagine some “green” jobs that might be in their future work life.

Refer students to page 27 for websites where they can begin their research.

Instruct the students to follow the directions on page 22 (select a topic, research, and answer questions 3-5). Give students time on the computers. If there is no access to computers, use books at the school library. Read aloud the three items under the directions.

3. Direct students to turn and complete the crossword puzzle on page 23. An alternative for some classes is to have all the puzzle words listed on the board. Another alternative is to allow students to refer to the glossary while they are completing the puzzle.

Review the answers to the crossword puzzle and expand on this review by calling on students to use some of the words in sentences. Make it a rule that their sentences must help clarify what a word means. (See the solution to the crossword puzzle on page 32 of this guide.)
4 Instruct students to turn to page 21, Make Your Own Tree Poster. Each poster should illustrate how trees help the environment. Challenge students to create messages that explain the important things trees do for us and for our environment. For example, “Trees planted near houses provide shade and help save energy.” Other messages could be “Trees help clean the air” or “We can protect trees by recycling paper products” or “Trees are the ‘lungs of the earth.’ Plant and protect them!”

For ideas, students can use the information on the Grow Global tree poster. They may also use the information from the activities in this Trees, Energy, and the Environment activity book.

5 Distribute a Grow Global Poster to each student. Ask them, what do you think you will learn from this poster?

Explain that this poster is something to take home for parents or guardians. The family can post and refer to it many times, to learn about trees, energy, and the environment. The poster includes energy-saving tips that families can take to be more energy efficient, reduce waste, and conserve natural resources.

6 Have students return to page 1 where students were given an overview of the Trees, Energy, and the Environment program.

Ask them on a scale of 1 to 5 if they have become an Energenius about trees, energy, and helping to protect the environment. Students can raise fingers or a hand (5 is tops).

Remind students of all the things that trees provide us and how essential they are to the health of the Earth.

Summarize how students can celebrate trees and can take actions in their communities to promote the planting of trees.
Branching Out

✦ E-Cycling — Reusing or Recycling of Old Electronics
Extend the learning on the 3’rs from Lesson 3 by discussing how to keep electronics out of the trash. Students can research how eCycling conserves natural resources and protects the environment. Students can also identify where they can eCycle in their own area. Discuss with students why there is a growing need for e (electronic) recycling in the United States and around the globe. More information can be obtained at: www.epa.gov/smm/electronics

✦ Green is More Than a Color
Students can complete the three activities from the Trees, Energy, and the Environment Career Supplement (found in Appendix B). These activities related to green careers and jobs can enhance what students have studies in this unit.

✦ Our Energy Choices
www.eere.energy.gov/kids
Students will discover at this government website the importance of making wise energy-saving choices. As they play interactive games, complete puzzles, and encounter energy “monkeys,” they will learn the importance of saving energy, conserving natural resources, and protecting the environment.

✦ What Time is it? Shifting our Demand for Energy
Students should analyze and discuss why the demand for energy shifts at peak times (noon to 7:00 p.m.) during the day. They might begin by asking their parents or guardians why they think there are peak demand times for energy. Students should report their findings to the class. Focus the class discussion on actions individuals, businesses, and schools, could take to shift their demand for energy to non-peak times.
Solution to Crossword Puzzle (page 23)

PHOTOSYNTHESIS
A
P
F
FOSSIL FUELS
ENERGY
R
C
RECYCLING
A
R
E
B
E
P
ID
CONSERVATION
T
X
L
ARBOR DAY
R
L
TOE GUG
D ELECTRICITY
IN
E E
A
POWERLINES
UNT
CHLOROPHYLL
O
U
SEQUESTRATION
# Common Core State Standards*

**Trees, Energy, and the Environment Correlations for Grade 4**

<table>
<thead>
<tr>
<th>Common Core State Standards (CCSS)</th>
<th>ACTIVITIES</th>
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</thead>
</table>
| **Lesson One** To See a Tree, To Know a Tree | **Language Standards (LS): Vocabulary Acquisition and Use**<br><br>**4.LS.4c.** Consult reference materials, both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases.

| Lesson Two Trees Save Energy and Help the Environment | Students: consult the glossary and informational text to write their own definitions of domain-specific vocabulary (e.g., fossil fuels, greenhouse gas emissions). |
| Lesson Three Living With Trees | Students: consult the glossary and informational text to solve a crossword puzzle that utilizes domain-specific vocabulary. |
| Lesson Four The Wonder of Trees | Students: **Reading Standards for Informational Text (RSIT) Craft and Structure**<br><br>**4.RSIT.4** Determine the meaning of general academic and domain-specific words or phrases in a text.

| Students: | Students: consult the glossary and informational text to write their own definitions of domain-specific vocabulary (e.g., fossil fuels, greenhouse gas emissions).<br>Students: consult the glossary and informational text to design their own diagrams of the inside of a tree trunk.<br>Students: read informational text about deciduous and evergreen trees to write an energy-saving solution for a tree planting situation.\n| Students: consult the glossary and informational text to write their own definitions of domain-specific vocabulary (e.g., fossil fuels, greenhouse gas emissions).<br>Students: integrate informational text and a flow chart, and use a web-based resource to understand the process of photosynthesis.\n| Students: consult the glossary and informational text to solve a crossword puzzle that utilizes domain-specific vocabulary.\n| Students: utilize their notes to identify and label tree parts in a diagram.<br>Students: analyze a diagram to design their own diagrams of the inside of a tree trunk.<br>Students: read informational text about deciduous and evergreen trees to write an energy-saving solution for a tree planting situation.\n| Students: utilize a chart to observe tree species, identify their characteristics, and write how trees affect their surroundings.\n| Students: discuss eco-friendly green jobs, what the term “green” means, and imagine green jobs they might have in the future.\n| Students: consult the glossary and informational text to solve a crossword puzzle that utilizes domain-specific vocabulary. |

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<tr>
<td></td>
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</table>

**Reading Standards for Informational Text (RST) Integration of Knowledge & Ideas**

<table>
<thead>
<tr>
<th>4.RST.7. Interpret information presented visually, orally, or quantitatively and explain how the information contributes to an understanding of the text in which it appears.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students:</td>
</tr>
<tr>
<td>• utilize their notes to identify and label tree parts in a diagram.</td>
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<tr>
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<tr>
<td>Students:</td>
</tr>
<tr>
<td>• integrate informational text, a flow chart, and a web-based resource to understand the process of photosynthesis.</td>
</tr>
<tr>
<td>• integrate visual and print information with a web-based resource to write how a parked car can illustrate the greenhouse effect.</td>
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<th>Lesson Two</th>
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<tbody>
<tr>
<td>Students:</td>
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<tr>
<td>• analyze informational text and a diagram to write questions one should ask before safely planting a tree (e.g., are power lines nearby?).</td>
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</tbody>
</table>

**Reading Standards for Informational Text (RST): Range of Reading Level of Text Complexity**

<table>
<thead>
<tr>
<th>4.RST.10. By the end of year, read and comprehend informational texts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students:</td>
</tr>
<tr>
<td>• analyze a diagram to design their own diagram of the inside of a tree trunk.</td>
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<tr>
<td>• read informational text about deciduous and evergreen trees to write an energy-saving solution for a tree planting situation.</td>
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<td>Students:</td>
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<td>• analyze informational text and a diagram to write questions one should ask before safely planting a tree (e.g., are power lines nearby?).</td>
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<tr>
<td>• discuss what they can personally do for trees and the environment.</td>
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<tr>
<th>Lesson Four</th>
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<tr>
<td>Students:</td>
</tr>
<tr>
<td>• utilize web-based resources to discuss, research and write about topics related to this study of trees, energy, and the environment.</td>
</tr>
<tr>
<td>• refer to informational text in the Grow Global Poster to write slogans or messages about the many ways trees help the environment.</td>
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### Common Core State Standards (CCSS)

**Lesson One**
**To See a Tree, To Know a Tree**

**Lesson Two**
**Trees Save Energy and Help the Environment**

**Lesson Three**
**Living With Trees**

**Lesson Four**
**The Wonder of Trees**

### ACTIVITIES

#### Writing Standards (WS) Research to Build and Present Knowledge

<table>
<thead>
<tr>
<th>4.WS.7. Conduct short research projects that build knowledge through investigation of different aspects of a topic.</th>
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<th>Students:</th>
<th>Students:</th>
<th>Students:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• conduct a scientific experiment with their teacher that helps explain the greenhouse effect.</td>
<td>• utilize a chart to observe tree species, identify their characteristics, and write how trees affect their surroundings.</td>
<td>• utilize web-based resources to discuss, research and write about topics related to this study of trees, energy, and the environment.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>4.WS.8. Recall relevant information from experiences or gather relevant information from print and digital sources; take notes, paraphrase, and categorize information, and provide a list of sources.</th>
<th>Students:</th>
<th>Students:</th>
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<tbody>
<tr>
<td></td>
<td>• utilize a chart to identify, write, and discuss the many things that trees provide at home and school.</td>
<td>• complete a KWL chart to identify and discuss what they want to know and what they have learned about global climate change and global warming.</td>
<td>• utilize a chart to observe tree species, identify their characteristics, and write how trees affect their surroundings.</td>
<td>• utilize web-based resources to discuss and research topics related to this study of trees, energy, and the environment.</td>
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<td>• utilize their notes to identify and label tree parts in a diagram.</td>
<td>• integrate visual and print information with a web-based resource to write how a parked car can illustrate the greenhouse effect.</td>
<td>• analyze informational text and a diagram to write questions one should ask before safely planting a tree (e.g., are power lines nearby).</td>
<td>• refer to informational text in the Grow Global Poster to write slogans or messages about the many ways trees help the environment.</td>
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#### Writing Standards (WS) Range of Writing

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<thead>
<tr>
<th>4.WS.10. Write routinely over extended and shorter time frames for a range of discipline-specific tasks, purposes, and audiences.</th>
<th>Students:</th>
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<tr>
<td></td>
<td>• utilize a chart to write and discuss the many things that trees provide at home and school.</td>
<td>• consult the glossary and informational text to write their own definitions of domain-specific vocabulary (e.g., fossil fuels, greenhouse gas emissions).</td>
<td>• utilize a chart to observe tree species, identify their characteristics, and write how trees affect their surroundings.</td>
<td>• utilize web-based resources to discuss and research topics related to this study of trees, energy, and the environment.</td>
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<td>• read informational text about deciduous and evergreen trees to write an energy-saving solution for a tree planting situation.</td>
<td>• utilize a chart to discuss and write ways of reducing the amount of paper they use at home and school.</td>
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<td>Students: • utilize a chart to identify, write, and discuss their ideas on the many things that trees provide at home and school.</td>
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<td>Students: • discuss eco-friendly green jobs, what the term &quot;green&quot; means, and imagine green jobs they might have in the future. • utilize web-based resources to discuss and research topics related to this study of trees, energy, and the environment.</td>
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<tr>
<td>Speaking and Listening (SL) Comprehension and Collaboration</td>
<td>4.SL.1d. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.</td>
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Common Core State Standards (continued)
### Common Core State Standards* (CCSS)

#### Lesson One
**To See a Tree, To Know a Tree**

**Language Standards (LS) Vocabulary Acquisition & Use**

5.LS.4c. Consult reference materials, both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases.

**Students:**
- consult the glossary and informational text to write their own definitions of domain-specific vocabulary (e.g., fossil fuels, greenhouse gas emissions).

**Reading Standards for Informational Text (RSIT) Craft and Structure**

5.RSIT.4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.

**Students:**
- utilize their notes to identify and label tree parts in a diagram.
- analyze a diagram to design their own diagram of the inside of a tree trunk.
- read informational text about deciduous and evergreen trees to write an energy-saving solution for a tree planting situation.

**Activities**

**Lesson Two**
**Trees Save Energy and Help the Environment**

**Students:**
- consult the glossary and informational text to write their own definitions of domain-specific vocabulary (e.g., fossil fuels, greenhouse gas emissions).

**Lesson Three**
**Living With Trees**

**Students:**
- consult the glossary and informational text to solve a crossword puzzle that utilizes domain-specific vocabulary.

**Lesson Four**
**The Wonder of Trees**

**Students:**
- consult the glossary and informational text to write their own definitions of domain-specific vocabulary (e.g., fossil fuels, greenhouse gas emissions).

- integrate informational text, a flow chart, and a web-based resource to understand the process of photosynthesis.

- utilize a chart to observe tree species, identify their characteristics, and write how trees affect their surroundings.

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**ACTIVITIES**

**Reading Standards for Informational Text (RST) Integration of Knowledge & Ideas**

| 5.RST.7. Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. | Students:  
- integrate informational text, a flow chart, and a web-based resource to understand the process of photosynthesis.  
- integrate visual and print information with a web-based resource to write how a parked car can illustrate the greenhouse effect. | Students:  
- analyze informational text and a diagram to write questions one should ask before safely planting a tree (e.g., are power lines nearby). | Students:  
- utilize web-based resources to discuss and research topics related to this study of trees, energy, and the environment. |

**Student Activities**

- Students:  
  - integrate informational text, a flow chart, and a web-based resource to understand the process of photosynthesis.  
  - integrate visual and print information with a web-based resource to write how a parked car can illustrate the greenhouse effect.  
  - analyze informational text and a diagram to write questions one should ask before safely planting a tree (e.g., are power lines nearby).  
  - utilize web-based resources to discuss and research topics related to this study of trees, energy, and the environment.  
  - refer to informational text in the Grow Global Poster to write slogans or messages about the many ways trees help the environment.  

**Reading Standards for Informational Text (RST) Range of Reading Level of Text Complexity**

| 5.RST.10. By the end of the year, read and comprehend informational texts. | Students:  
- analyze a diagram to design their own diagram of the inside of a tree trunk.  
- read informational text about deciduous and evergreen trees to write an energy-saving solution for a tree planting situation. | Students:  
- integrate informational text, a flow chart, and a web-based resource to understand the process of photosynthesis.  
- utilize a KWL chart to identify and discuss what they want to know and what they have learned about global climate change and global warming. | Students:  
- utilize web-based resources to discuss, research and write about topics related to this study of trees, energy, and the environment.  
- refer to informational text in the Grow Global Poster to write slogans or messages about the many ways trees help the environment. |
### Common Core State Standards (CCSS)

#### Lesson One
**To See a Tree, To Know a Tree**

#### Lesson Two
**Trees Save Energy and Help the Environment**

#### Lesson Three
**Living With Trees**

#### Lesson Four
**The Wonder of Trees**

<table>
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<tbody>
<tr>
<td><strong>Writing Standards (WS) Research to Build and Present Knowledge</strong></td>
</tr>
</tbody>
</table>

**5.WS.7.** Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

**Students:**
- Conduct a scientific experiment with their teacher to write an explanation of the greenhouse effect.
- Utilize a chart to observe tree species, identify their characteristics, and write how trees affect their surroundings.

**5.WS.8.** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

**Students:**
- Complete a KWL chart to identify and discuss what they want to know and what they have learned about global climate change and global warming.
- Integrate visual and print information with a web-based resource to write how a parked car can illustrate the greenhouse effect.
- Utilize a chart to observe tree species, identify their characteristics, and write how trees affect their surroundings.

**Students:**
- Utilize web-based resources to discuss, research and write about topics related to this study of trees, energy, and the environment.
- Refer to informational text in the Grow Global Poster to write slogans or messages about the many ways trees help the environment.
### Common Core State Standards (CCSS)

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<td><strong>Lesson Four</strong> The Wonder of Trees</td>
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</tbody>
</table>

#### Writing Standards (WS) Range of Writing

<table>
<thead>
<tr>
<th><strong>5.WS.10.</strong> Write routinely over extended and shorter time frames for a range of discipline-specific tasks, purposes, and audiences.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students:</td>
</tr>
<tr>
<td>• utilize a chart to identify, write, and discuss the many things that trees provide at home and school.</td>
</tr>
<tr>
<td>• utilize their notes to identify and label tree parts in a diagram.</td>
</tr>
<tr>
<td>• read informational text about deciduous and evergreen trees to write an energy-saving solution for a tree planting situation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>Students:</th>
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<tbody>
<tr>
<td>• consult the glossary and informational text to write their own definitions of domain-specific vocabulary (e.g., fossil fuels, greenhouse gas emissions).</td>
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<td>• integrate visual and print information with a web-based resource to write how a parked car can illustrate the greenhouse effect.</td>
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<table>
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<th>Students:</th>
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<tr>
<td>• utilize a chart to observe tree species, identify their characteristics, and write how trees affect their surroundings.</td>
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<td>• analyze informational text and a diagram to write questions one should ask before safely planting a tree (e.g., are power lines nearby).</td>
</tr>
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<td>• utilize a chart to discuss and write ways of reducing the amount of paper they use at home and school.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Students:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• utilize web-based resources to discuss, research and write about topics related to this study of trees, energy, and the environment.</td>
</tr>
<tr>
<td>• refer to informational text in the Grow Global Poster to write slogans or messages about the many ways trees help the environment.</td>
</tr>
</tbody>
</table>

#### Speaking and Listening (SL) Comprehension and Collaboration

<table>
<thead>
<tr>
<th><strong>5.SL.1d.</strong> Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students:</td>
</tr>
<tr>
<td>• utilize a chart to identify, write, and discuss the many things that trees provide at home and school.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Students:</th>
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<tbody>
<tr>
<td>• utilize a KWL chart to identify and discuss what they want to know and what they have learned about global climate change and global warming.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Students:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• utilize a chart to discuss and write ways of reducing the amount of paper they use at home and school.</td>
</tr>
<tr>
<td>• discuss what they can personally do for trees and the environment.</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Students:</th>
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<tbody>
<tr>
<td>• discuss eco-friendly green jobs, what the term “green” means, and imagine green jobs they might have in the future.</td>
</tr>
<tr>
<td>• utilize web-based resources to discuss and research topics related to this study of trees, energy, and the environment.</td>
</tr>
</tbody>
</table>
# Common Core State Standards*  
## Trees, Energy, and the Environment Correlations for Grade 6

<table>
<thead>
<tr>
<th>Lesson One</th>
<th>Lesson Two</th>
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</tr>
</thead>
<tbody>
<tr>
<td>To See a Tree, To Know a Tree</td>
<td>Trees Save Energy and Help the Environment</td>
<td>Living With Trees</td>
<td>The Wonder of Trees</td>
</tr>
</tbody>
</table>

### ACTIVITIES

#### Language Standards (LS) Vocabulary Acquisition & Use

**6.LS.4c.** Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.

<table>
<thead>
<tr>
<th>Students:</th>
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<th>Students:</th>
</tr>
</thead>
</table>
| • consult the glossary and informational text to write their own definitions of domain-specific vocabulary (e.g., fossil fuels, greenhouse gas emissions). | • utilize their notes to identify and label tree parts in a diagram.  
• analyze a diagram to design their own diagram of the inside of a tree trunk.  
• read informational text about deciduous and evergreen trees to write an energy-saving solution for a tree planting situation. | • consult the glossary and informational text to solve a crossword puzzle that utilizes domain-specific vocabulary.  
• consult the glossary and informational text to write their own definitions of domain-specific vocabulary (e.g., fossil fuels, greenhouse gas emissions).  
• integrate informational text, a flow chart, and a web-based resource to understand the process of photosynthesis.  
• utilize a chart to observe tree species, identify their characteristics, and write how trees affect their surroundings. |

#### Reading Standards for Literacy in Science/Technical Subjects (RST) Craft and Structure

**6-8.RST.4.** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.

### Notes

*California Common Core State Standards for English-Language Arts & Literacy in History/Social Studies, Science and Technical Subjects (Adopted by the California State Board of Education August, 2010 and modified March, 2013)*
**Common Core State Standards (CCSS)**

<table>
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</tr>
</tbody>
</table>

**ACTIVITIES**

### Reading Standards for Literacy in History/Social Studies (RH) Integration of Knowledge & Ideas

**6-8.RHS.7.** Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.

<table>
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<tr>
<td>• utilize their notes to identify and label tree parts in a diagram.</td>
<td>• integrate informational text, a flow chart, and a web-based resource to understand the process of photosynthesis.</td>
<td>• analyze informational text and a diagram to write questions one should ask before safely planting a tree (e.g., are power lines nearby?).</td>
<td>• integrate visual and print information with a web-based resource to write how a parked car can illustrate the greenhouse effect.</td>
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### Reading Standards for Informational Text (RST) Range of Reading Level of Text Complexity

**6.RST.10.** By the end of year, read and comprehend informational texts.

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<td>• analyze a diagram to design their own diagram of the inside of a tree trunk.</td>
<td>• conduct a scientific experiment with their teacher and write an explanation of the greenhouse effect.</td>
<td>• analyze informational text and a diagram to write questions one should ask before safely planting a tree (e.g., are power lines nearby?).</td>
<td>• utilize web-based resources to discuss, research and write about topics related to this study of trees, energy, and the environment.</td>
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</table>

### Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects (WHST) Research to Build and Present Knowledge

**6-8.WHST.7.** Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

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<th>Students:</th>
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<td>• utilize a chart to observe tree species, identify their characteristics, and write how trees affect their surroundings.</td>
<td>• utilize web-based resources to discuss, research and write about topics related to this study of trees, energy, and the environment.</td>
<td>• refer to informational text in the Grow Global Poster to write slogans or messages about the many ways trees help the environment.</td>
<td>• analyze a diagram to design their own diagram of the inside of a tree trunk.</td>
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<td></td>
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<tr>
<td><strong>6-8.WHST.9</strong> Draw evidence from informational texts to support analysis, reflection, and research.</td>
<td>Students: • utilize a chart to identify, write, and discuss the many things that trees provide at home and school.</td>
<td>Students: • complete a KWL chart to identify and discuss what they want to know and what they have learned about global climate change and global warming. • integrate visual and print information with a web-based resource to write how a parked car can illustrate the greenhouse effect.</td>
<td>Students: • utilize a chart to observe tree species, identify their characteristics, and write how trees affect their surroundings. • analyze informational text and a diagram to write questions one should ask before safely planting a tree (e.g., are power lines nearby?).</td>
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<td><strong>Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects (WHST) Range of Writing</strong></td>
<td>Students: • utilize a chart to identify, write, and discuss the many things that trees provide at home and school. • utilize their notes to identify and label tree parts in a diagram. • read informational text about deciduous and evergreen trees to write an energy-saving solution for a tree planting situation.</td>
<td>Students: • consult the glossary and informational text to write their own definitions of domain-specific vocabulary (e.g., fossil fuels, greenhouse gas emissions). • integrate visual and print information with a web-based resource to write how a parked car can illustrate the greenhouse effect.</td>
<td>Students: • utilize a chart to observe tree species, identify their characteristics, and write how trees affect their surroundings. • analyze informational text and a diagram to write questions one should ask before safely planting a tree (e.g., are power lines nearby?). • utilize a chart to discuss and write ways of reducing the amount of paper they use at home and school.</td>
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#### ACTIVITIES

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<td></td>
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<tr>
<td><strong>6.SL.1d.</strong></td>
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<td>•</td>
<td>Utilize a chart to identify, write, and discuss the many things that trees provide at home and school.</td>
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<td>Students:</td>
<td>• Discuss eco-friendly green jobs, what the term “green” means, and imagine green jobs they might have in the future. Utilize web-based resources to discuss and research topics related to this study of trees, energy, and the environment.</td>
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### Crosscutting Concepts (Science is a Human Endeavor)

**4. Energy**

4-PS3-4. Science affects everyday life.

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#### Students:
- Utilize a chart to identify, write, and discuss the many things that trees provide us.
- Read informational text about deciduous and evergreen trees to understand how trees planted in the “right” place can save energy.
- Integrate informational text, a flow chart, and a web-based resource to understand the process of photosynthesis.
- Utilize a KWL chart to identify and discuss what they want to know and what they have learned about global climate change.
- Write how a parked car with all windows closed on a sunny day can illustrate the greenhouse effect.
- Observe tree species, identify their characteristics, and write how trees affect their own surroundings.
- Write how a parked car with all windows closed on a sunny day can illustrate the greenhouse effect.
- Utilize web-based resources to discuss and research science topics related to this study of trees, energy, and the environment.
- Refer to informational text in the Grow Global Poster to understand the many ways trees help the environment.

**Crosscutting Concepts (Energy and Matter)**

**4. Energy**

4-PS3-1,2,3 & 4. Energy can be transferred in various ways and between objects.

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#### Students:
- Integrate informational text, a flow chart, and a web-based resource to understand the process of photosynthesis.
- Write how a parked car with all windows closed on a sunny day can illustrate the greenhouse effect.
- Write questions one should ask before safely planting a tree (e.g., are power lines nearby?).
- Discuss what they can personally do for trees and the protection of the environment.
- Utilize web-based science resources to discuss, research and write about topics related to this study of trees and energy.

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*Next Generation Science Standards (NGSS) for California Public Schools, Kindergarten–Grade Twelve (adopted by California State Board of Education, September, 2013),*
**Next Generation Science Standards (NGSS)**

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**ACTIVITIES**

### Disciplinary Core Ideas

#### 4. From Molecules to Organisms: Structures and Processes

**LS1.A: Structure and Function**

4-LS1-1. Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.

**Students:**
- use their notes to label the structures of a tree with its various functions.

#### 4. Earth’s Systems

**ESS2.E: Biogeology**

4-ESS2-1. Living things affect the physical characteristics of their regions.

**Students:**
- Identify and discuss the many things that trees provide us at home and school (e.g., how are the characteristics of our city affected by trees?).

#### 4. Earth and Human Activity

4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

**Students:**
- utilize a chart to identify, write, and discuss the many things that trees provide us (e.g., the energy from foods that fuel our bodies).

**Students:**
- utilize a chart to discuss and write ways of reducing the amount of paper they use at home and school (e.g., what are natural resources used in producing this paper?).

**Students:**
- utilize web-based science resources to discuss, research and write about topics related to this study of trees.

**Students:**
- observe tree species, identify their characteristics, and write about external structures.

**Students:**
- Observe tree species, identify their characteristics, and write how trees affect their surroundings.

**Students:**
- refer to informational text in the Grow Global Poster related to saving energy and conserving natural resources.
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</table>
| Disciplinary Core Ideas | Students:  
- Discuss with peers “solutions” to help reduce the paper used at home and school, and write ways of reducing the amount of paper they use.  
- Discuss with peers what they can personally do for trees and the environment. | | | |
| 3-5. Engineering Design  
ETS1.B: Developing Possible Solutions  
3-5-ETS1-2. At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. | | | | |
**Next Generation Science Standards**

**Trees, Energy, and the Environment Correlations for Grade 5**

<table>
<thead>
<tr>
<th>Disciplinary Core Ideas</th>
<th>Crosscutting Concepts (Energy and Matter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Energy</td>
<td>5. Energy</td>
</tr>
<tr>
<td>PS3.D: Energy in Chemical Processes and Everyday Life</td>
<td>5-PS3-1. Energy can be transferred in various ways and between objects.</td>
</tr>
</tbody>
</table>
| 5-PS3-1. The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). | Students:  
  • integrate informational text, a flow chart, and a web-based science resource to understand the process of photosynthesis. |
| Students:  
  • integrate informational text, a flow chart, and a web-based science resource to understand the process of photosynthesis. | Students:  
  • integrate informational text, a flow chart, and a web-based science resource to understand the process of photosynthesis. |

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**Disciplinary Core Ideas**

### 5. Earth and Human Activity

**ESS3.C: Human Impacts on Earth Systems**

**5-ESS3-1.** Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth’s resources and environments.

<table>
<thead>
<tr>
<th>Students:</th>
</tr>
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<tbody>
<tr>
<td>• read informational text about deciduous and evergreen trees to identify how trees impact the Earth’s systems.</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>Students:</th>
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<tbody>
<tr>
<td>• integrate visual and print information to write how a parked car can illustrate the greenhouse effect.</td>
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<table>
<thead>
<tr>
<th>Students:</th>
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<tbody>
<tr>
<td>• learn that trees help the environment by absorbing large amounts of carbon dioxide (CO₂).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Students:</th>
</tr>
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<tbody>
<tr>
<td>• discuss and help summarize how trees help counter the effect of global climate change.</td>
</tr>
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</table>
### Next Generation Science Standards*  
**Trees, Energy, and the Environment Correlations for Grade 6**

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</tbody>
</table>
| **MS. Energy** | **MS-PS3-3.** The transfer of energy can be tracked as energy flows through a designed or natural system. | Students:  
• integrate informational science text, a flow chart, and a web-based resource to understand the process of photosynthesis. | | |
| **Disciplinary Core Ideas** | | | | |
| **MS. Earth and Human Activity** | | | | |
| **ESS3.3C:** Human Impacts on Earth Systems | **MS-ESS3-3.** Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth’s environments can have different impacts (negative and positive) for different living things. | Students:  
• identify and discuss what they want to know and what they have learned about global climate change.  
• integrate visual and print information with a web-based science resource to write how a parked car can illustrate the greenhouse effect. | | |

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*Next Generation Science Standards (NGSS) for California Public Schools, Kindergarten–Grade Twelve (adopted by California State Board of Education, September, 2013),*
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#### Disciplinary Core Ideas

**MS. Earth and Human Activity**

ESS3.D: Global Climate Change

**MS-ESS3-5.** Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth’s mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities.

- **Students:** conduct an experiment on the greenhouse effect.
- **Students:** visit a website to learn about global climate change.
- **Students:** summarize what they have learned about global climate change.

#### Crosscutting Concepts (Influence of Science, Engineering, and Technology on Society and the Natural World)

**MS. Engineering Design**

**MS-ETS1-1.** All human activity draws on natural resources and has both short and long term consequences, positive as well as negative, for the health of people and natural environment.

- **Students:** learn throughout the study how natural resources are limited.
- **Students:** refer to informational text in the Grow Global Poster to discuss trees and the “health” of the environment.
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Pacific Gas and Electric Company’s Energenius Educational Series provides engaging, educational programs that teach preschool, elementary, and middle school students about energy, the environment, and the conservation of natural resources. If you are an educator in Pacific Gas and Electric Company’s service territory, you qualify to receive Energenius instructional materials without charge.

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• Colorful posters and activity books.
• A sense of empowerment to impact their environment in a positive way.

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Glossary

**Arbor Day**
A day set aside each year to celebrate trees. It is a tree planting holiday that has been celebrated for more than 130 years.

**atmosphere**
The whole mass of air surrounding the earth.

**branch**
A woody limb growing from a trunk or another secondary limb of a tree.

**carbon dioxide (CO₂)**
A colorless, odorless gas absorbed from the air by trees (photosynthesis) and released back into during the decay of plant matter.

**carbon sequestration**
The process by which trees remove carbon dioxide (CO₂) from the atmosphere.

**climate change**
Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period of time (decades or longer).

**crown**
The upper part of a tree, which includes the branches and leaves.

**deciduous**
A tree that sheds its foliage at the end of the growing season.

**demand response**
Programs and ways that energy companies (utilities) and consumers can better manage when and how they use energy. Using less energy during peak demand hours is an example of demand response.

**distributed energy generation**
The generation of electricity near to the place where it is being used. On-site distributed generation examples include a school powered by solar panels, a farm powered by its wind turbines, an office building powered by fuel cells.

**energy efficiency**
The use of energy without waste. Energy efficiency refers to work done using the smallest amount of energy needed.

**environment**
Everything that makes up our surroundings. The natural environment includes land, air, water, and other features of nature.

**evergreen**
A tree that has foliage throughout the year.

**foliage**
The leaves or needle of a tree.

**fossil fuels**
Fuels formed from the remains of plants and animals that lived over 70 million years ago. Fossil fuels include coal, natural gas, and oil.

**global warming**
Global warming is an average increase in the temperature of the atmosphere near the Earth’s surface and in the troposphere, which can contribute to changes in global climate patterns. Global warming can occur from a variety of causes, both natural and human induced. In common usage, “global warming” often refers to the warming that can occur as a result of increased greenhouse gases from human activities.

**greenhouse effect**
When heat from the sun becomes trapped in the Earth’s atmosphere.
greenhouse gases
Gases such as carbon dioxide, methane and others that trap the heat of the sun in the atmosphere.

habit
What people automatically do over and over again the same way, without thinking about it.

habitat
A place where a plant or animal normally lives.

lateral roots
Roots which extend horizontally from the primary root and serve to anchor the tree securely into the soil. These roots also contribute to water uptake and facilitate the extraction of nutrients from the soil.

leaf
Any flattened, green outgrowth from the stem of a vascular plant. Or an above ground plant organ specialized for photosynthesis.

peak demand
The times during the day when the demand for electricity is the highest. This period of the day is between noon and 7:00 p.m.

photosynthesis
The process trees use to make their food by using water, carbon dioxide and sunlight to make sugar. The sugar is used as food and the oxygen is released into the atmosphere.

pollution
The contamination of an area with substances that can harm living things. When fossil fuels are burned, they release gases into the air, resulting in air pollution.

power line
A wire used to carry electricity from a power plant to a site where it is used.

power plant
A place where electricity is generated.

root hair zone
Root hairs are hair-like extensions of the other roots. Root hairs increase the capacity of a tree to absorb water and nutrients.

tap root
A straight tapering root that grows vertically down. It forms a center from which other roots sprout.

trunk
The main stem of a tree, usually covered with bark.

An Energenius
is someone who knows a lot about conserving natural resources like trees. An Energenius is also something of a genius when it comes to energy and how to use it efficiently. An Energenius always protects the environment.
Career Awareness
Career awareness activities at the elementary level are developed to introduce students to a range of jobs and careers that they might pursue in the future. Career awareness in the intermediate grades is about discovering the “possibilities” that could be in a student's own future. As students move through the grades they will discover the education and training needed for specific jobs and participate in further awareness activities and in-depth career exploration experiences.

These supplemental activities will focus on a range of jobs and careers that relate to students’ study of trees, energy, and the environment. Activity one uses a Q and A interview format to provide a close-up view of a career as an arborist. This Q and A activity also provides a template that students use to conduct interviews with men and women who have jobs that benefit the environment.

The Go Global Poster is used in activity two to focus students on an even wider range of jobs. The circles on the poster create many opportunities to connect with jobs and careers that benefit the environment. In activity three students use the Internet to learn about jobs with the U.S. Forest Service. They may be surprised to learn that the range of jobs includes archeologists, teachers, and soil scientists.

**ACTIVITY ONE:**
Meet the Tree Doctor..........................60-61

**ACTIVITY TWO:**
What Trees Do For the Environment.........62-63

**ACTIVITY THREE:**
Jobs in the Forest..................................64

The above activities can be easily copied for individual student use. Go to [www.pge.com/energenius/careers](http://www.pge.com/energenius/careers).


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Although Adela does keep trees healthy, her job is that of an arborist. The interview that follows will introduce you to the work of an arborist.

**Q. Why would someone call you a tree doctor?**

A. Simply answered, my job as an arborist is to take good care of trees and to keep them healthy. So that is why someone might say arborists are doctors for trees. There is a range of jobs that arborists do, but they all relate to the “health” of trees.

**Q. Why aren’t arborists just called tree specialists?**

A. Words in the English language are often based on words from other languages. Arbor is the Latin word for tree. Whenever you see the word arbor you know it has something to do with trees. For example some people in the U.S. celebrate Arbor Day each year by planting trees. Arborists are people who take care of trees. Arboriculture is what arborist study.

**Q. How did you get interested in working with trees?**

A. In high school I had a summer job at a large nursery where I learned so much about the care and planting of trees. I also learned how some trees only grow in certain climates. At school I also helped organize a tree planting project. You could say these experiences “rooted” my interest in a job working with trees.

After high school I took an entry level job as an arborist. Later I took classes at a community colleges that helped me learn more about trees and plants.

**Q. Why would an energy utility company need arborists?**

A. Trees during heavy storms and winds can cause power outages and safety issues by falling on power lines. Arborists are used to analyze and trim trees that could cause dangers during storm seasons. They are also used to analyze where trees can be safely planted to avoid underground utility lines.

**Q. Do you think being an arborist is a green job?**

A. I think green jobs are ones that somehow contribute to preserving or enhancing our environment. Trees enhance and contribute to the environment. The work of the arborist is to take care of trees and trees are there to help take care of the environment. Yes, arborists do have a “green” job.
Branching to Other Careers

Directions: Use this form to interview someone who will be invited to the class as a guest speaker.

Name of person interviewed:__________________________________________________________

Job:____________________________________________________________________________

1. What is the job that you do?
____________________________________________________________________________
____________________________________________________________________________

2. How did you get interested in working in this career?
____________________________________________________________________________
____________________________________________________________________________

3. What is the education or training that you needed for this job?
____________________________________________________________________________
____________________________________________________________________________

4. Could you describe a typical day at work?
____________________________________________________________________________
____________________________________________________________________________

5. What is the hardest part of your work?
____________________________________________________________________________
____________________________________________________________________________

6. When you were our age what did you think you wanted to do when you grew up?
____________________________________________________________________________

(Write four other questions you would like to ask)
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
ACTIVITY TWO: A Tree Full of Jobs

For the Environment
You have studied many things that trees do for our environment and for each of us. From providing a harvest of food, a barrier to noise, to fighting global climate change, trees do many things for us each day. The circles on the tree describe only some of the things that trees provide us.

Circles on the Tree
The circles on the tree can also be used to think about jobs and careers. For example, the circles for shade in the summer or warmth in the winter a person might ask a nursery owner, a gardener, or an arborist to help them select the right tree to plant.
Career Awareness Can Start With A Tree

Directions:
1. Work in pairs or small groups to think of careers and jobs related to the circles shown from the poster.

2. Select three of the circles from the poster and write these in the blank circles. (For example: Wildlife Habitat)

3. Identify and list these jobs and careers. Write the title of the circles you have chosen in the blank circle spaces provided (e.g., “Clean the Air”).

4. Be prepared to tell the class why you selected the circles you did.

Bonus: Create a Guess My Tree Job game to play with other students.

A. Name It!
Related Jobs and Careers
_____________________________________________
_____________________________________________
_____________________________________________
_____________________________________________

B. Name It!
Related Jobs and Careers
_____________________________________________
_____________________________________________
_____________________________________________
_____________________________________________

C. Name It!
Related Jobs and Careers
_____________________________________________
_____________________________________________
_____________________________________________
_____________________________________________
ACTIVITY THREE: A Job with the U.S. Forest Service

The U.S. Forest Service manages and cares for an estimated 193 acres of land. They employ more than 30,000 permanent employees in locations all across the country. Some jobs require advanced college degree while others do not. Their website (www.fs.fed.us/fsjobs/jobs_overview.shtml) states that there are jobs for people with many types of skills.

Directions:
Click on the left menu that reads Parents and Students.

1. Summarize the key points in this message to parents and students about working for the U.S. Forest Service.

2. What would you consider the pros and cons about a job with the Forest Service?

3. Search General Careers Overview at www.fs.fed.us/fsjobs/jobs_overview.shtml. Select one of the following jobs to read about:
Archaeologist        Fish biologist       Forester

4. What are the major points you have learned about this U.S. Forest Service job? (Name the job)
Notes