



⚡ Lesson Plan: Earth's Energy Resources

Grade Level: 6

Subject: Earth Science

Duration: 45–60

NGSS MS-ESS3-1: Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

🎯 Learning Objectives

By the end of this lesson, students will be able to:

- **Distinguish** between renewable and nonrenewable energy resources and provide examples of each.



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- **Biomass:** A fuel source composed of biological material, or materials from organisms that were once alive, such as plants and trees, animal waste, and food waste.
- **Natural resource:** All naturally occurring life forms, energy sources, and other natural substances that can be utilized by living organisms.
- **Recycling:** The system of treating, processing, and reusing materials.
- **Carbon footprint:** The total amount of carbon dioxide and other greenhouse gases released into the atmosphere as a result of human activities, especially the burning of fossil fuels.
- **Energy conservation:** Carefully using energy resources and reducing, if not eliminating, waste.



Materials Needed: (all links are included in this PDF)

- Printed copies of the Study Guide (<https://newpathworksheets.com/api/guide/study-guide-science-grade-6-earth-s-energy-resources-1.pdf>)
- Vocabulary matching worksheet (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-earth-s-energy-resources-1-1.pdf>)
- Practice Worksheet 0 (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-earth-s-energy-resources-1-0.pdf>)
- Practice Worksheet 1 (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-earth-s-energy-resources-1-1.pdf>)
- Practice Worksheet 2 (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-earth-s-energy-resources-1-2.pdf>)
- Samples of coal, oil (in sealed container), and natural gas information



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Step 2: Direct Instruction (15 minutes)

- Use the Study Guide to explain how fossil fuels (coal, oil, natural gas) formed from ancient plants and sea organisms over millions of years. (<https://newpathworksheets.com/api/guide/study-guide-science-grade-6-earth-s-energy-resources-1.pdf>)
- Display a piece of coal and explain: Coal is the carbonized remains of swamp plants. The original energy came from the sun through photosynthesis, so coal is solid sun energy stored over millions of years.



- Discuss the environmental problems of burning fossil fuels: air pollution, acid rain, smog, and carbon dioxide contributing to global warming.
(<https://newpathworksheets.com/api/guide/study-guide-science-grade-6-earth-s-energy-resources-1.pdf>)
- Introduce renewable energy sources (solar, wind, hydroelectric, geothermal, biomass) and explain how each harnesses natural processes that replenish quickly.
(<https://newpathworksheets.com/api/guide/study-guide-science-grade-6-earth-s-energy-resources-1.pdf>)

Step 3: Guided Practice (15 minutes)

- Distribute the vocabulary matching worksheet and work through it as a class, reinforcing key terms like fossil fuel, renewable resource, nonrenewable resource, and biomass.
(<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-earth-s-energy-resources-1-1.pdf>)
- Review the Study Guide section on renewable energy, discussing advantages (unlimited supply, less pollution) and disadvantages (weather dependent, high initial cost, location



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- Conduct a quick oral review by asking students to name one renewable and one nonrenewable resource and explain the difference.
- Have students complete Practice Worksheet 0 as a formative assessment to check understanding of energy resource types, fossil fuel formation, and environmental impacts.
(<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-earth-s-energy-resources-1-0.pdf>)



- Ask students to classify real-world energy sources: Have students identify whether a coal power plant, a solar panel array, and a wind farm use renewable or nonrenewable resources and explain one environmental benefit or drawback of each.

Differentiation Strategies

For advanced learners:

- Challenge advanced learners to research and compare the efficiency and cost of different renewable energy technologies, then present their findings on which technology is best suited for their local region.
- Have students calculate the carbon footprint reduction if a household switched from fossil fuel electricity to solar power, using data from the Study Guide.

For learners needing support:



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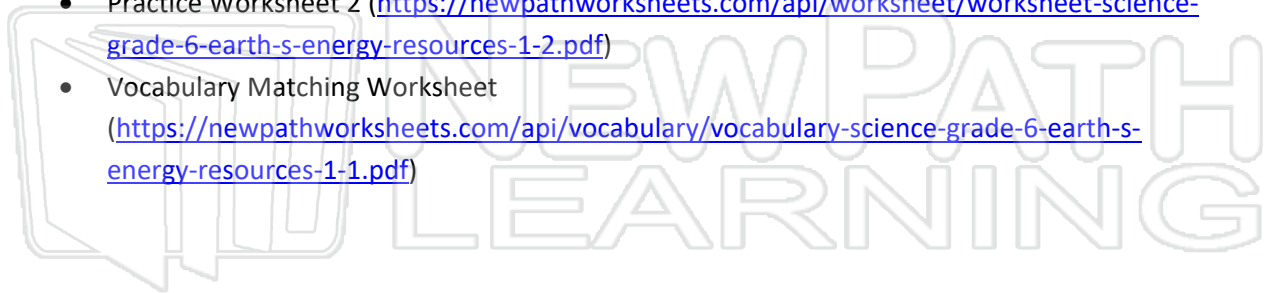
household uses energy and proposing three specific conservation strategies to reduce their family's carbon footprint.

Complete List of Available Resources:

- NewPathWorksheets: Earth's Energy Resources (<https://newpathworksheets.com/science/grade-6/earth-s-energy-resources-1>)



- Study Guide: Earth's Energy Resources (<https://newpathworksheets.com/api/guide/study-guide-science-grade-6-earth-s-energy-resources-1.pdf>)
- Practice Worksheet 0 (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-earth-s-energy-resources-1-0.pdf>)
- Practice Worksheet 1 (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-earth-s-energy-resources-1-1.pdf>)
- Practice Worksheet 2 (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-6-earth-s-energy-resources-1-2.pdf>)
- Vocabulary Matching Worksheet (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-6-earth-s-energy-resources-1-1.pdf>)



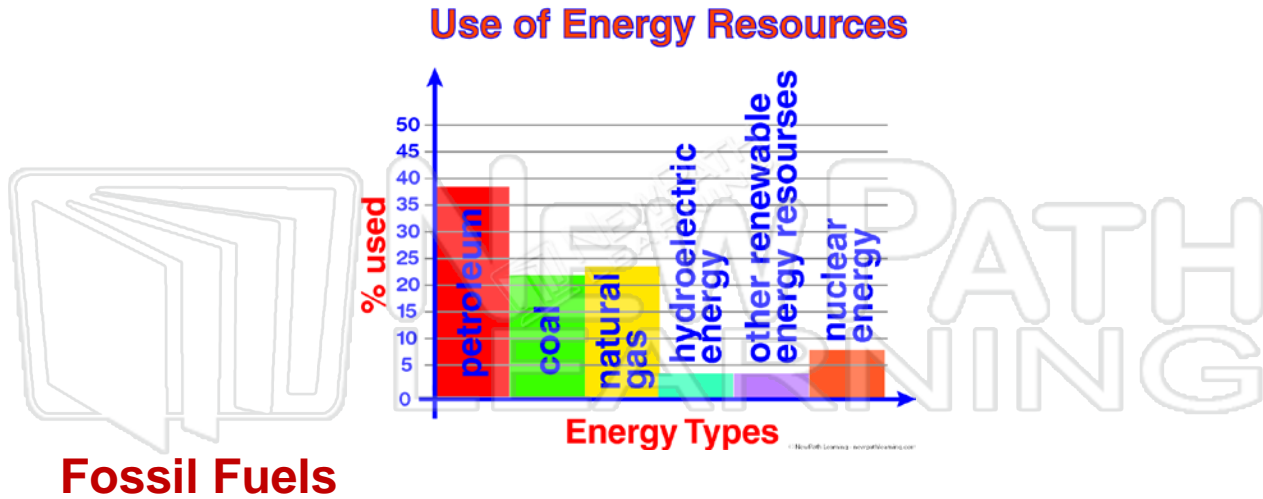
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NEW PATH LEARNING

EARTH'S ENERGY RESOURCES




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There are a number of natural materials that are burned to release the energy they contain, including oil, natural gas, and coal. These materials were formed from the decay of ancient plants and sea organisms that accumulated in enormous quantities in the Earth's crust. Because oil, natural gas, and coal are the products of plants and organisms, they are known as **fossil fuels**. The original source of the energy stored in fossil fuels is the sun. Radiation from the sun was absorbed by the plants. The plants used the energy in the process of photosynthesis. It is accurate to say that coal is solid sun energy!

So we must keep finding new sources in the earth to use. Burning fossil fuels also creates big environmental problems. Air and water pollution, including smog and acid rain, have already damaged plant and animal life and can create long-term health problems for many people. Scientists and nations are starting to understand the long-term effects of the carbon dioxide that fossil fuels release when they are burned. Scientists and environmentalists say that humans must reduce our **carbon footprint** –that is, use fewer fossil fuels that leave a mark (or footprint) on environments and ecosystems. Many are concerned that this carbon footprint and the use of fossil fuels may be contributing to global warming and thus affecting the world's habitats.

Lesson Checkpoint:
What is the liquid form of fossil fuel?

Renewable Energy Resources



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...to degrees to 70 degrees for a shower, than it does to heat water that starts at 40 degrees. Solar power is also used to create electricity through the use of **photovoltaic cells**. These cells convert electromagnetic radiation from the sun into electricity that can be stored in batteries or used directly. Electricity for the International Space Station is produced by arrays of photovoltaic cells that are arranged on panels.

Nuclear Energy

An alternative energy resource that has been harnessed for more than 30 years is **nuclear energy**. In nuclear reactor facilities, radioactive fuel is allowed to create a nuclear reaction in a controlled environment. The heat created by the reaction is used to heat water. The heated water is used to drive turbines to create electricity. Nuclear energy has the benefit that it does not create the pollution (like smog and acid rain) or emit carbon dioxide.

On the other hand, it does have its drawbacks. When nuclear fuel is depleted, it remains highly radioactive and must be disposed of safely. This is difficult and costly. In addition, if a nuclear reactor were to malfunction, radiation can be released into the atmosphere. Such a



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Simple steps in your everyday life can make a big difference in how much energy you and your family use. Turning off lights, air conditioners, televisions, stereos, computers, and other machines when they are not being used can dramatically reduce the amount of electricity used. More efficient automobiles and appliances reduce fossil fuel consumption and thus your 'carbon footprint.' If more people use public transportation and even walk instead of driving to local destinations, we can dramatically conserve energy resources.



Name _____ Class _____ Date _____

- 1 Which of the following is a **natural resource**?
- A crude oil
 - B native copper
 - C cod fish
 - D all of the above



- 2 Plastic is a **natural resource**.
Is this a **true** or **false** statement and **why**?

- A true; because plastic is made from a natural substance, oil
- B false; because plastic is made into a natural substance, oil
- C true; because plastic is useful to humans
- D false; because plastic is the product of a natural resource, oil

- 3 Trees, water, and corn are **examples** of _____.
- A nonrenewable resources
 - B renewable resources
 - C fossil fuels



- 4 **Native copper** deposits in Michigan and **crude oil** deposits in Texas are two examples of _____.

- A nonrenewable resources
- B renewable resources
- C fossil fuels



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- 9 A major solid fossil fuel is **coal**. Coal is the carbonized remains of ancient swamp plant material. There are different varieties of coal which are categorized according to how hard each is. **From softest to hardest**, the varieties of coal are _____.
- A lignite, anthracite, bituminous
 - B bituminous, anthracite, lignite
 - C lignite, bituminous, anthracite
 - D anthracite, bituminous, lignite



- B gasoline
C methane
D ethanol



- 10 The chart below gives an example of the different amounts of energy (in BTU's) released by coal when it is burned. **Why does anthracite provide more energy than lignite and bituminous coal?**

| Coal Type | BTU's/ton | % Carbon Content |
|------------|------------|------------------|
| Lignite | 12 million | 70 |
| Bituminous | 21 million | 80 |
| Anthracite | 25 million | 90 |

- A Anthracite contains fossils.
- B Anthracite has more compacted energy material.
- C Bituminous coal is found deeper in the crust so it is colder.
- D Lignite has lost some energy potential due to age.



Name _____ Class _____ Date _____

- 1 Which of the following is a **natural resource**?
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D

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B

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- B renewable resources
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A

5



A

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C



- B gasoline
- C methane
- D ethanol



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B




Name _____ Class _____ Date _____

1 **Petroleum and natural gas** are formed from the remains of _____.



- A dead trees
- B dinosaurs
- C carbonate minerals like calcite
- D ancient, microscopic sea organisms

2 Here is a picture of a coal mine. In certain digging called **strip mining**, the surface land is literally stripped away to get at the coal seams underneath. What does this **lead to environmentally**?




- A instability of surface topography
- B surface water runoff pollution
- C both of the above
- D none of the above

3 In this picture, the marble is being eaten away by pollution. The **particular pollution causing this destruction is** _____.



- A smog
- B acid rain
- C groundwater pollution

4 What is the **original source** of all the energy stored in all fossil fuels?



- A nutrients in the soil
- B carbon dioxide in the air
- C the sun
- D nutrients in the ocean waters



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- C water
- D light




- C The wind is colder on high hilltops.
- D The wind is weaker, but more predictable.

9 Moving water is renewable energy that has been harnessed since ancient days and is now used to make electricity. This is called **hydroelectric energy**. What is **one problem with the use of hydroelectric energy**?



- A large amounts of falling water are needed to make large amounts of electricity
- B air pollution
- C technology to build dams is limited
- D none of the above

10 **Organic material** that stores energy is called _____.




- A ethanol
- B kerosene
- C geothermal energy
- D biomass



Name _____ Class _____ Date _____


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A dead trees
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(D)

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5



(B)

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(B)


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(A)

10

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A ethanol
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(D)



Name _____ Class _____ Date _____

1 In 2007, President George W. Bush encouraged Americans to produce and use more **renewable fuels** such as ethanol (a type of alcohol) made from corn.


The popular name for **gasoline mixed with ethanol** is _____.

- A ethagasahol
- B gasohol
- C biogas
- D biomix


2 A single **acre** of corn can produce enough corn to make **1,000** liters of alcohol for gasoline. The population of the United States consumes approximately **1,510,000,000** (1.51 billion) liters of gasoline every day.

How many acres of corn would we need to harvest in order to replace the gasoline consumed each day?



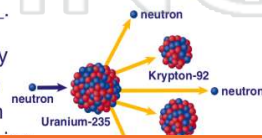
- A 151 acres
- B 1.51 million acres
- C 151 million acres
- D 151 billion acres

3 Which of the following is an example of **biomass**?



- A tree branches
- B cow dung
- C dried leaves
- D all of the above

4 The **process** of **splitting the nuclei** of radioactive elements to release energy is called _____.



- A nuclear energy
- B nuclear fusion
- C nuclear fission




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8 propane




A 92% C 38%
B 84% D 46%



9 **Renewable** resources are practically **limitless** because we can easily replace them as needed. **Is this a true or false statement and why?**

- A true; because they can be easily grown in large amounts
- B false; because it is possible to consume renewable resources faster than they grow back
- C true; because renewable resources are limitless by definition
- D false; because some renewable resources, like oil, are deep in the earth's crust

10 **1,510,000,000** liters of gasoline are consumed every day in the United States. **If we were able to reduce consumption by 2%, how many liters would be saved in the course of a year?**





- A 30.2 million liters
- B over 11 million liters
- C over 11 billion liters
- D less than 11 million liters



Name _____ Class _____ Date _____

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D biomix

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(B)

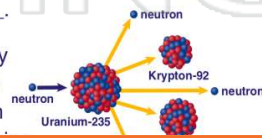
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(C)



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(A)

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Energy Types

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(C)



Name _____ Class _____ Date _____

Match each of the following terms to its definition:

Natural resource

Renewable resource

Fossil fuel

Biomass

Nonrenewable resource

Recycling

1. - a fuel source composed of biological material, or materials from organisms that were once alive (for example, plants and trees, animal waste and food waste)



2. - fuels, including oil, natural gas and coal, that are formed from the decomposition of ancient organisms, mostly in the



3. energy living



4. consu

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5. and reusing materials

- the system of treating, processing



6. restored, or at least replenished, as quickly as it is needed





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Natural resource

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2. fossil fuel - fuels, including oil, natural gas and coal, that are formed from the decomposition of ancient organisms, mostly plant material that w



3. nat
source
organ



4. nor
consu

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5. recycling - the system of treating, processing and reusing materials



6. renewable resource - a resource that can be naturally restored, or at least replenished, as quickly as it is needed

