

COMPARE AND CONTRAST

Renewable

&

Nonrenewable Energy

Foyer

KNOWLEDGE ANTICIPATION

Will our need for energy someday exceed our supply?

Is the Energizer Bunny™ more like renewable or nonrenewable energy?
(Analytical Reasoning)

What are some of the energy challenges we face as a nation?
(Inductive Learning)

Workshop

PRACTICE

What are the advantages and disadvantages of each type of energy?
(Interpreting Data)

Nonrenewable energy is like ____?
Renewable energy is like ____?
(Metaphorical Expression)

Library

KNOWLEDGE ACQUISITION

How is Nonrenewable and Renewable energy resources similar and different?
(Compare and Contrast)

Porch

REFLECTION

How would you explain to your Congress person your position on the use of renewable energy resources?
(Write to Learn)
Personal Narrative

Kitchen

KNOWLEDGE APPLICATION

Why do we need to invest more resources in conservation efforts for renewable energy resources?
(Write to Learn)
Editorial

Compare and Contrast

Renewable & Nonrenewable Energy

One of the hottest topics being discussed by journalists, scholars, politicians, business leaders, and everyday citizens is energy. Much of the talk today is about nonrenewable energy, our current supply of it, its effect on the environment, and what will happen when sources of nonrenewable energy run out.

Students group and label a list of words related to energy as a way to help them think more deeply about the challenges we face. After reading two articles about energy, students will be able to distinguish nonrenewable energy from renewable energy, and be able to compare and contrast the characteristics, advantages, and disadvantages of each. Students will synthesize their learning by crafting an editorial in which they Thoughtfully explain and defend their position.

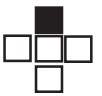


You all have seen the television ad with the Energizer™ Bunny that keeps going and going and going. But is it true? Does the battery eventually run out of energy?

Is the United States a little bit like the Energizer Bunny™? It keeps going and going, but will our need for energy someday exceed our supply? Will the American Energizer Bunny™ come to a halt? What can we do to prevent this from happening? Think about these questions and record your thoughts below:



A large, empty rounded rectangular box intended for students to write their thoughts and answers to the questions posed in the text above.



Group and Label: Energy Production and Consumption

Read through the following list of words. Put an asterisk (*) next to any of the words that you are not sure of. Then, group the words according to some common characteristics related to their meaning and label each group. (You can use the blank organizer on the opposite page.)

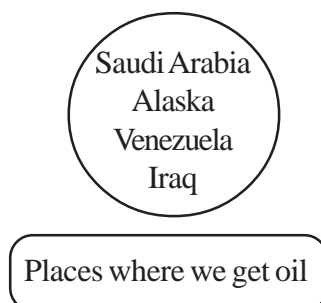
acid rain
affordable
Alaska
AMOCO
atmosphere
automobiles
bio diesel
carbon dioxide
coal
collect
convert
consumption
demand
dependency
energy
electricity
environmentalists
fabrics
factories

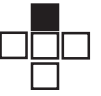
gasoline
geologists
global warming
greenhouse
homes
investment
Iraq
incentives
harness
hydroelectric
Mobil
natural gas
oil
plastics
petrochemicals
products
production
profits

transport
Saudi Arabia
Shell
smog
smoke
supply
sun
solar panels
Venezuela
wind
wind farm
water

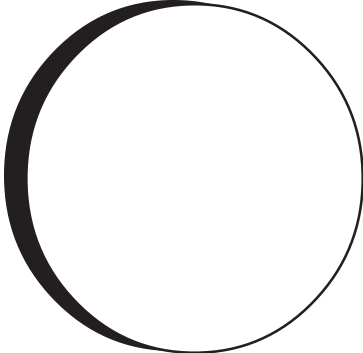
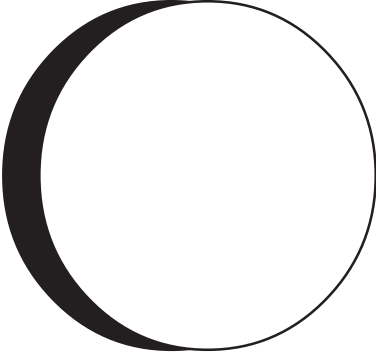
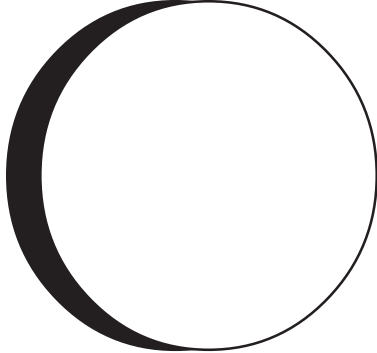



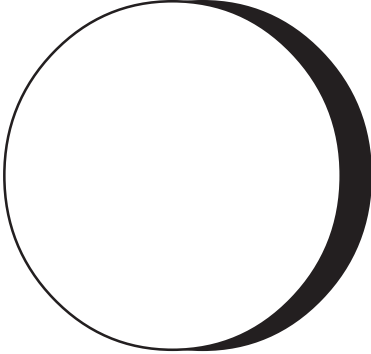
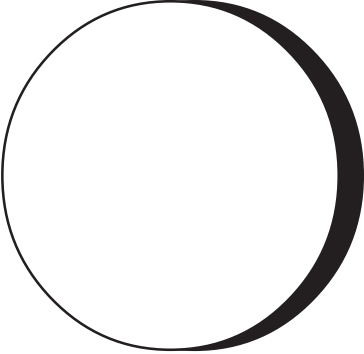
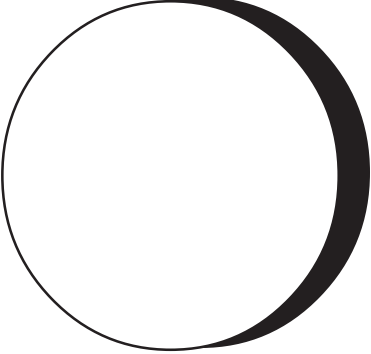





For example, you might make a group that looks like this:





Group and Label: Energy Production and Consumption

What are three challenges we face?

1. _____
2. _____
3. _____



Facing the Challenge: Nonrenewable and Renewable Resources

Nonrenewable

Fossil fuels are nonrenewable, which means that their supplies are limited. Coal, oil, and natural gas are examples of fossil fuels. Most of the energy we use today for industry, transportation, and in our homes, about ninety percent of our total use, comes from the burning of fossil fuels.

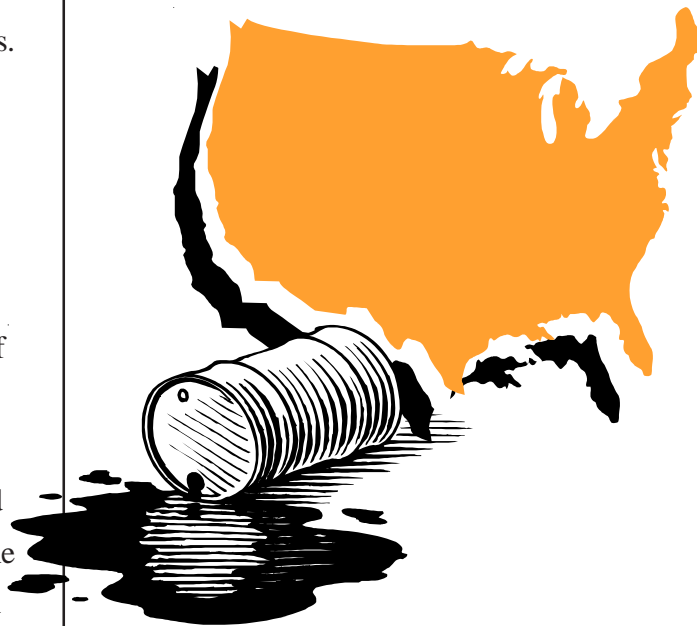


Fossil fuels are highly effective sources of energy because they are rich in hydrocarbons. When fossil fuels are burned, hydrocarbons combine with oxygen at high temperatures and significant amounts of energy are released. The amount of energy produced by burning oil and natural gas is three times greater than the energy produced by burning wood. In addition, fossil fuels are easier to transport, store, and use than most other fuel sources.

Many of the products we use everyday are made from fossil fuels. Petrochemicals are derived from oil or natural gas and are used to make plastics, fabrics, and building materials.

Despite these advantages, the use of fossil fuels presents several problems. The burning of fossil fuels for energy is a major cause of pollution. When burned, fossil fuels pollute our air with chemicals like carbon dioxide. When released, carbon dioxide traps dust and heat in our atmosphere, which contributes to global warming.

Fossil fuels are also subject to dramatic price changes due to varying supply and demand. Relying on fossil fuels also perpetuates our dependency on imported energy.



The United States, which is home to only five percent of the world's population, now uses more than thirty percent of all the energy produced globally today. Fossil fuel resources in the Earth are severely limited. At the present rate of use, the United States may run out of fossil fuels as soon as the year 2060.

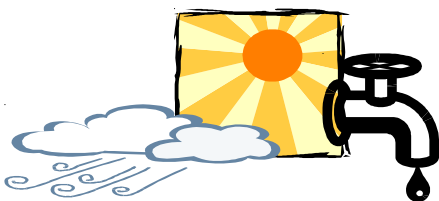
Geologists are hard at work trying to find new sources of fossil fuels. Alternative energy sources are also being developed, but the conservation of current fossil fuel resources is still the best way to provide energy for the future.



Renewable

Renewable energy is generated from sources that are derived from, and quickly replenished by, the natural movements and mechanisms of the Earth.

The sun, wind, and water are major sources of renewable energy. Solar cells, wind farms, and hydroelectric power have been used successfully to generate electricity for industry, transportation, and for use in homes.



Renewable energy usually does not pollute the environment. However, renewable energy is difficult to harness. Energy from the sun and wind disperse throughout a very wide area. Since this energy is not concentrated in one place, it must be collected before it can be used. In addition, solar and wind energy must be converted into other viable forms of energy, such as heat and electricity. Finally, solar and wind energy must also be stored for use when the sun is not shining or the wind is not blowing.

Biomass is another form of renewable energy, that is derived from plants or animals. The solar energy stored in the chemical compounds of biomass can make liquid fuels like ethanol for cars, gaseous fuels like methane that can be burned in place of natural gas, and solid fuels like wood chips that can be burned instead of coal.

Scientists estimate that the solar energy received by the Earth in a single day is enough to meet the world's energy needs. The key in using renewable energy resources lies in our ability to develop affordable and reliable technology that can tap this immense nonpolluting resource. Furthermore, an incentive structure needs to be established that makes the investment in such technology viable.

The question is not whether there is enough renewable energy, but rather when will the technology be available that will allow renewable energy to emerge as a reliable and affordable source of energy.





Compare and Contrast: Nonrenewable Energy vs. Renewable Energy

Take a few minutes to think about the two articles you have just read on nonrenewable and renewable energy. In the figure below, describe the two sources of energy using the following criteria: types of energy, uses, forms, benefits, and challenges. Finally, use the Top Hat organizer (on the opposite page) to draw out the important similarities and differences between the two types of energy.

Description

Nonrenewable	Criteria	Renewable
	Uses	
	Forms	
	Benefits	
	Challenges	

Compare and Contrast: Nonrenewable Energy vs. Renewable Energy



Now that you have described both kinds of energy you are ready to compare and contrast them. Use the Top Hat organizer below to identify what you think are the important similarities and differences between renewable and nonrenewable energy.

Nonrenewable Energy	Renewable Energy
Similarities	

Advantages and Disadvantages



Based on your reading and analysis, what are the advantages and disadvantages of each type of energy?

Nonrenewable Energy	
Advantages	Disadvantages

Renewable Energy	
Advantages	Disadvantages



Metaphorical Expression

To help deepen your understanding of each type of energy, you will try some metaphorical thinking.

Consider the statements below and complete the simile for each type of energy by selecting one of the five options. Remember to explain your connections.

Nonrenewable Energy

Nonrenewable energy is like...

1. a scavenger hunt
2. your childhood
3. the fountain of youth
4. a roller coaster
5. a lopsided peace treaty

Connections

Renewable Energy

Renewable energy is like...

1. a DVD/video store
2. a family farm
3. compound interest
4. an algebraic equation
5. the four seasons

Connections



Editorial

Now that you understand some of the challenges we face regarding energy production and consumption and have learned the difference between nonrenewable and renewable energy, write an editorial about the advantages and disadvantages of each type of energy and why we need to invest more resources in conservation and developing renewable energy sources.





What? So What? Now What?

What have you learned about the challenges we face regarding energy consumption and production? What have you learned about Renewable and nonrenewable resources?

So, what does all of this information on nonrenewable and renewable energy mean to you? What is your position? Where do you stand on this issue?

Now what? Contact your local representative and find out where he or she stands on this issue. Decide whether his/her position is consistent with your own. Then, send an email or a letter telling your representative about your position and why you think it is important.