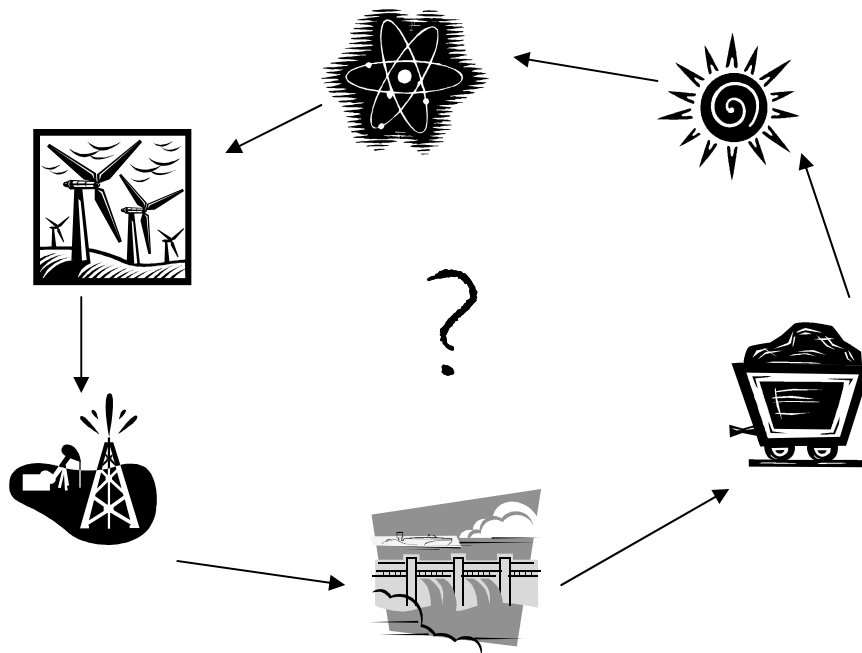


Great Energy Debate Game

SUBJECT AREAS

Science
Social Studies
Math
Language Arts

Students evaluate the advantages and disadvantages of the major energy sources in an innovative debate format.



Disadvantages



Advantages



STUDENT EDITION

- Intermediate -

Example



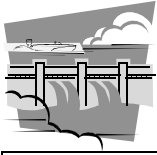
Solar

	<i>Advantage</i>	<i>Disadvantage</i>	<i>Just a Fact</i>
1. <i>Sol</i> means sun. Solar energy is energy from the sun.			✓
2. Solar energy is renewable. We will have solar energy as long as the sun shines.	✓		
3. The sun's energy is spread out and hard to capture. The energy is only available when the sun is shining, not 24 hours a day.		✓	



Coal

	<i>Advantage</i>	<i>Disadvantage</i>	<i>Just a Fact</i>
1. Coal is a shiny black rock that is buried underground. It was formed long ago from ancient plants.			
2. Coal contains chemical energy that was stored in the ancient plants. It is a fossil fuel.			
3. Coal is a nonrenewable energy source because it takes millions of years to form.			
4. We burn coal to make heat. We use the heat to make electricity. Industry burns coal to make steel and other products.			
5. We have a lot of coal in the U.S., so we don't need to import it from other countries.			
6. Burning coal is a cheap way to make electricity. A large part of our electricity comes from coal.			
7. Burning coal can pollute the air and produces carbon dioxide – a greenhouse gas.			
8. Power plants and industry work hard to reduce the amount of air pollution from burning coal.			
9. We dig coal from huge mines. Coal mines can pollute our water if they are not carefully managed.			
10. We transport coal mostly by trains; sometimes by barges and trucks.			
11. Almost a fourth (22.8%) of the energy we use in the U.S. comes from coal. We use it mostly for electricity. In Maine, approximately 10% of our electricity comes from coal.			



Hydropower

	<i>Advantage</i>	<i>Disadvantage</i>	<i>Just a Fact</i>
1. <i>Hydro</i> means water. Hydropower is the energy of moving water.			
2. Gravity pulls water from high ground to low ground. There is energy in moving water – mechanical energy.			
3. Water is a renewable energy source. Rain will fall as long as the sun evaporates water from the oceans, rivers, and lakes.			
4. Dams can be built across rivers to harness energy in water. Turbines at the bottom of the dams make electricity.			
5. Hydropower is the cheapest way to make electricity. Once a dam is built, the water flows through freely.			
6. Hydropower dams do not pollute the air since no fuel is burned.			
7. These dams sometimes permanently flood a lot of land when they are built. This can disturb wildlife habitat and riverside communities.			
8. Scientists are trying to develop new ways of helping fish pass through dams.			
9. The reservoirs made by dams can be used for fishing, boating and other sports. They can also prevent flooding downstream.			
10. Most good places to put hydro dams have already been used. The U.S. will not build many more hydro dams.			
11. Hydropower provides the U.S. with a small amount (2.7%) of the energy we use in the U.S. Hydropower is used to make electricity. In Maine, we get about 23% of our electricity from hydropower.			



Natural Gas

	<i>Advantage</i>	<i>Disadvantage</i>	<i>Just a Fact</i>
1. Natural gas contains energy – chemical energy. It was formed long ago from tiny sea plants and animals. It is a fossil fuel.			
2. Natural gas is buried deep underground. It is a nonrenewable energy source because it took a long time to form.			
3. Natural gas has no taste, color or smell. A distinct odor is added so we can tell if there is a leak.			
4. We burn natural gas to make heat. We use the heat to make products, warm buildings and make electricity.			
5. We get most of our natural gas from deposits within the U.S. and Canada.			
6. Burning natural gas produces air pollution and carbon dioxide – a greenhouse gas.			
7. Compared to oil and coal, natural gas produces much less ash, sulfur and carbon dioxide when burned.			
8. Cars with special engines can run on natural gas. It is cleaner and less expensive than gasoline, but not widely available.			
9. We dig deep into the ground to get natural gas and send it to a plant to be refined.			
10. We transport natural gas through pipelines. There are over a million miles of pipelines in the U.S.			
11. Almost a fourth (23.7%) of the energy we use in the U.S. comes from natural gas. We use it for heating, manufacturing and electricity. In Maine, we get about 28% of our electricity from natural gas.			



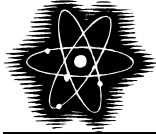
Petroleum

	<i>Advantage</i>	<i>Disadvantage</i>	<i>Just a Fact</i>
1. Petroleum is oil that is buried deep underground. We drill wells into the ground and under the ocean to reach it.			
2. Petroleum contains chemical energy. It was formed long ago from tiny sea plants and animals, which makes it a fossil fuel.			
3. Petroleum is nonrenewable because it takes millions of years to form.			
4. We refine petroleum to make gasoline, diesel and other fuels which we burn for energy.			
5. We use these fuels mostly for transportation. Petroleum is also used to heat buildings and make electricity.			
6. Petroleum is also used to make plastics, medicines, paint, soaps and many other products.			
7. Burning petroleum pollutes the air and releases carbon dioxide – a greenhouse gas.			
8. Drilling for petroleum and transporting it can pollute the land and water if the oil spills.			
9. We don't drill enough petroleum to meet our needs. We import about two-thirds of the oil we use from other countries.			
10. We transport petroleum by pipelines, oil tankers and trucks.			
11. Over a third (37.2%) of the energy we use in the U.S. comes from petroleum. We use it more than any other fuel, mostly for transportation. In Maine, we get about 6% of our electricity from petroleum.			



Solar

	<i>Advantage</i>	<i>Disadvantage</i>	<i>Just a Fact</i>
1. <i>Sol</i> means sun. Solar energy is energy from the sun.			
2. The sun is a big ball of gas. It produces energy all the time. The sun's energy reaches the earth in rays – radiant energy.			
3. Solar energy is renewable. We will have solar energy as long as the sun shines.			
4. We can build passive solar homes which capture the sun's free energy. Passive solar homes require no special equipment.			
5. We can also capture the sun's energy to heat water and buildings.			
6. Photovoltaic (PV) cells can change solar energy directly into electricity. PV cells can be used in places with no power lines.			
7. Although solar energy is free to use, electricity from PV cells costs more than from power plants because it takes a big investment to buy and install solar panels.			
8. Solar energy is a clean energy source – no fuel is burned to make the heat or electricity.			
9. The sun's energy is spread out and hard to capture. The energy is only available when the sun is shining, not 24 hours a day.			
10. We can store electricity from PV cells in batteries for use when the sun is not shining.			
11. A very small amount (0.1%) of the energy we use in the U.S. comes from solar power, not counting light.			



Uranium

	<i>Advantage</i>	<i>Disadvantage</i>	<i>Just a Fact</i>
1. Everything in the universe is made from tiny particles called atoms. In the center of each atom is a nucleus, which contains smaller particles.			
2. The nucleus has energy that holds it together – nuclear energy. The nucleus of a uranium atom has lots of energy holding it together.			
3. Uranium is a mineral buried underground. While it is not a fossil fuel, it is still a nonrenewable energy source.			
4. We have lots of uranium in the U.S., so we don't need to get it from other countries.			
5. We get energy from uranium by splitting its atoms into smaller atoms. When we split the atoms, some of the nuclear energy is set free as heat.			
6. We can use this heat to make electricity. The uranium isn't burned, so there is no air pollution.			
7. Uranium is a cheap way to make electricity.			
8. When we split uranium, rays of energy – called radiation – are also produced. This radiation can be very dangerous.			
9. The waste from nuclear power plants produces radiation for a long time. This waste must be carefully stored because it is harmful to humans and animals.			
10. Many people are concerned about how and where to store this waste. We do not currently have permanent place to store the waste.			
11. A small amount (8.3%) of the energy we use in the U.S. comes from uranium. We use it mostly for electricity. In Maine, we get about 26% of our electricity from Uranium.			



Wind

	<i>Advantage</i>	<i>Disadvantage</i>	<i>Just a Fact</i>
1. Wind is air in motion – kinetic energy.			
2. The sun heats the land and water on earth unevenly. The warm air rises and cooler air rushes in – that’s the wind.			
3. Wind is a renewable energy source.			
4. Wind turbines can capture the energy in wind to make electricity. Many wind turbines together are called a wind farm.			
5. Wind turbines take up a lot of land, but the land can still be used for growing crops and grazing animals.			
6. Although they are expensive to build, new wind turbines are an economical source of electricity since wind energy is free to use.			
7. Wind power is a clean energy source – no fuel is burned to make the electricity.			
8. Before building a wind farm, we must do environmental studies to avoid harming birds and bats.			
9. Many places don’t have enough wind to make electricity, and the wind doesn’t blow all the time.			
10. Electricity from wind farms is transported to nearby communities through power lines.			
11. A very small amount (0.1%) of the energy we use in the U.S. comes from wind. We use it mostly for electricity.			