



**Department of  
Education**

# **Learn at Home Grade 8**

October 31, 2012

# Day 1 Schedule

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Subject	Minutes Per Day (At Least!)	Assignments	What Did I Learn Today?
English Language Arts	45	<input type="checkbox"/> Activity: Reading “Hope is the Thing”	<input type="checkbox"/>
Mathematics	45	<input type="checkbox"/> Problem A <input type="checkbox"/> Problem B	<input type="checkbox"/>
Science	30	Complete at least one of the following activities: <input type="checkbox"/> Activity 1: <i>A Power Problem</i> (English or Spanish) <input type="checkbox"/> Activity 2: Begin <i>Forces and Motion on Earth</i> activity	<input type="checkbox"/>
Fitness and Health	30	<input type="checkbox"/> Exercise for 30 minutes. Choose from the Activity Calendars at the back of this booklet	<input type="checkbox"/>
Arts	30	<input type="checkbox"/> Choose one or two activities from the Arts Activities at the back of this booklet	<input type="checkbox"/>
Educational TV Shows	30	<input type="checkbox"/> Choose TV shows to further your learning at home	<input type="checkbox"/>

# Day 1 English Language Arts

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## Activity 1: *Reading Poetry*

- Directions: Read the poem and complete the Poetry Reading Worksheets

### **Hope is the thing...**

By Emily Dickinson

Hope is the thing with feathers  
That perches in the soul,  
And sings the tune without the words,  
And never stops at all,

And sweetest in the gale is heard;  
And sore must be the storm  
That could abash the little bird  
That kept so many warm.

I've heard it in the chillest land,  
And on the strangest sea;  
Yet, never, in extremity,  
It asked a crumb of me.

# Day 1 English Language Arts (continued)

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## Poetry Reading Worksheet

First, paraphrase the poem. Restate each sentence of the poem in your own words.

Second, use hints from within "Hope is the thing..." to help you identify the speaker and the subject of the poem. Using textual evidence, explain how you were able to determine the speaker and subject of the poem.

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# Day 1 English Language Arts (continued)

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## Poetry Reading Worksheet (continued)

Third, identify two lines in the poem that reveal aspects of the speaker's character.

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Now, explain how you know your conclusions about the speaker's character are correct.

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Fourth, identify the theme, or main idea, of the poem.

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Analyze the development of the central theme of this poem that you indicated above.  
How does the speaker develop this idea over the course of the poem? What lines from the poem convey this development? Explain why you selected these lines.

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# Day 1 English Language Arts (continued)

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## Poetry Reading Worksheet (continued)

Fifth, jot down a literary technique or elements used in the poem, such as simile or personification.

### Literary Technique 1

*Examples from the poem:*

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- 
- 
- 

### Literary Technique 2

*Examples from the poem:*

- 
- 
- 
- 

Choose one literary technique from above and describe how the technique helps communicate the poem's theme.

# Day 1 Mathematics

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## Problem A

Angel and Jayden were at track practice. The track is  $\frac{2}{5}$  kilometers around.

- Angel ran 1 lap in 2 minutes.
  - Jayden ran 3 laps in 5 minutes.
- a. How many minutes does it take Angel to run one kilometer? What about Jayden?
- b. How far does Angel run in one minute? What about Jayden?
- c. Who is running faster? Explain your reasoning.

To check your answer, go to <http://illustrativemathematics.org/illustrations/82>



# Day 1 Science

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## Choose Activity 1 or 2 below:

### Activity 1: A Power Problem

- Read the article below and answer the questions that follow.
- Para Español, prime aquí:  
<http://schools.nyc.gov/Documents/teachandlearn/LearnatHome/ELL/8day1sp.pdf>

#### Vocabulary

Learn the new vocabulary words below. You will use these vocabulary words in today's activity.

- **commute** (noun): a journey to and from a job
- **emission** (noun): the release of something harmful into the air
- **hybrid** (noun): a car that uses more than one kind of power

#### A Power Problem



AP Photo/Elaine Thompson

**SEATTLE**, Washington (Achieve3000, November 24, 2008). Keeping a regular car from running out of fuel is pretty easy, since there's usually a gas station nearby. Keeping an electric car powered up, on the other hand, requires a bit more planning—and a 50-foot extension cord.

That's because an all-electric car doesn't run on gasoline. It runs on electricity, which is stored on batteries that are charged when the car is plugged in. The batteries power an electric motor that provides propulsion. An electric vehicle (EV) does not burn gasoline, so it does not produce emissions. Therefore, it is an environmentally friendly method of transportation.

Since EVs don't harm the planet, they've become fairly popular. Experts estimate there are several thousand road-certified EVs, meaning that they can be driven on highways. There may be tens of thousands of Neighborhood Electric Vehicles (NEVs), which can hold only enough power to be driven slowly and for short distances. Still, that is a small percentage of the more than 250 million vehicles on the road. The vast majority of drivers still own traditional gasoline vehicles.

Why aren't EVs more widespread? It could be because charging an electric car battery requires plugging the car into an electrical outlet. EV owners can use their home outlets, and most people charge their cars while they sleep, so it's not a problem for them to drive the car in the morning. If EV owners plan to take a long trip, however, they need to know where they will be able to charge their batteries, just as someone wandering through the desert would need to know where to get water. After all, NEVs that can travel up to 25 miles per hour typically go about 35 to 40 miles on a single charge; a few can't even go that far. While California has more than 500 public charging stations at parks, malls, and grocery stores to serve electric vehicles, such resources are still rare across the rest of the country.

The situation forces EV drivers like Steve Bernheim to get creative. Bernheim's Corbin Sparrow is an EV that can run only 25 miles on a single charge. Therefore, Bernheim, who lives near Seattle, Washington, has come to know the locations of outlets like a firefighter knows hydrants.

# Day 1 Science (continued)

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"I'm an expert at finding [outlets]," said Bernheim. He added that there are about 30 reliable places in Seattle to plug in. Most of these outlets are free, but others charge a fee that is considerably less than the cost of filling a regular car with gasoline. Sometimes, Bernheim cannot find a public outlet and must convince another EV owner to let him plug in.

Driving an electric car can be a challenge for drivers whose commute to work is much longer than their EVs can travel on a single charge. EV owner Jason Henderson is in this situation, but he feels obligated to make it work because he feels that gasoline-powered cars produce too much pollution. Henderson's car, a Saturn, was originally a traditional car. He paid an expert \$12,000 to convert it to an all-electric vehicle. Henderson estimates that in one 18-month period, the car costs him about \$252 in electricity to drive 9,000 miles. He doesn't find it difficult to find places to plug in, but "there should absolutely be more spots," he said. "Everyone has power outlets, so it's just a matter of making them available."

Many EV owners are making their outlets available. Jeff Smith has a sign posted next to the outlet at his home in Seattle. It reads, "plug-in vehicle parking only" and invites others to use the outlet. No one has taken him up on the offer yet. Still, Smith keeps the sign up because he knows firsthand how hard it can be to find an outlet.

Although public outlets are still rare, clusters of them are cropping up. For example, government officials in King County, Washington, which includes Seattle, are adding new outlets at public parking garages.

"We want to make sure we're ahead of the curve in doing what we can to support the use of these vehicles," said Rochelle Ogershok, a county transportation spokesperson.

These new outlets will serve current EV users. They might also pave the way for a new breed of plug-in cars that companies hope will appeal to the mass market.

"Every auto company in the world is developing all-electric [vehicles] or ... hybrids [that switch between electric and gasoline power]," said Zan Dubin Scott, a spokesperson for Plug In America, a nonprofit advocacy group for electric car owners. "The utilities, municipalities, and smart businesspeople are seeing that this is the future."

*The Associated Press contributed to this story.*

**Instructions:** Select the correct answer.

## Question 1:

Based on information in the article, what is one way that all-electric cars are different from traditional cars?

- All-electric cars run on batteries that power an electric motor, while traditional cars are powered by engines that burn gasoline.
- All-electric cars are easy to keep powered up, while it's more difficult to find fuel for traditional cars.
- All-electric cars produce emissions, while traditional cars are a more environmentally friendly method of transportation.
- All-electric cars are used by a vast majority of drivers, while traditional cars are used by relatively few drivers.

# Day 1 Science (continued)

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## Question 2:

The best alternate headline for this article would be \_\_\_\_\_.

- Drivers Find Sparse Outlets for Electric Cars
- Drivers Find NEVs Travel 25 Miles Per Hour
- Most Drivers Prefer Gasoline-Powered Vehicles
- Most Drivers Plug In EVs While They Sleep

## Question 3:

The author probably wrote this article in order to \_\_\_\_\_.

- Explain the benefits and drawbacks of owning an all-electric vehicle
- Convince prospective car buyers to purchase new all-electric vehicles
- Explain the reasons why all-electric vehicles are growing in popularity
- Convince businesspeople around the U.S. to set up charging outlets for EVs

## Question 4:

The article states:

**may be tens of thousands of Neighborhood Electric Vehicles (NEVs), which can hold only enough power to be driven slowly and for short distances. Still, that is a small percentage of the more than 250 million vehicles on the road. The vast majority of drivers still own traditional gasoline vehicles.**

Which would be the closest **synonym** for the word *vast*?

- Substantial
- Commercial
- Natural
- Traditional

## Question 5:

Which of these is not a statement of fact in the article?

- Everyone who travels by car to work should purchase an all-electric car.
- If an electric vehicle is road-certified, it means that it can be driven on highways.
- Since an electric vehicle does not burn gasoline, it does not produce emissions.
- California has more than 500 public charging stations at parks, malls, and grocery stores.

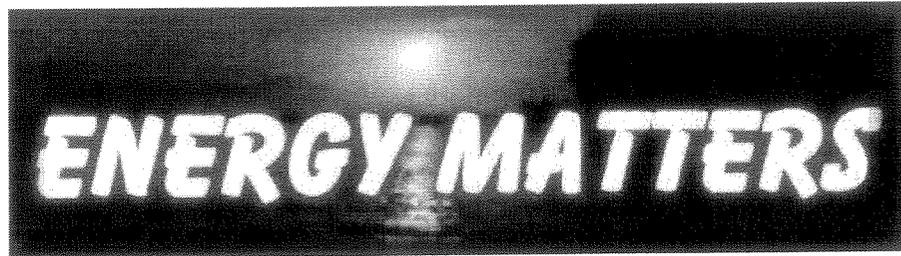
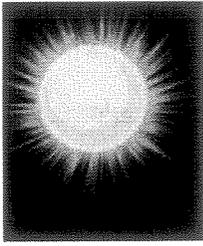
## Question 6:

According to the article, why is it difficult to find a place to charge an all-electric vehicle?

- Since all-electric vehicles are just now becoming popular, there are only a few public charging stations available around the U.S.
- Since all-electric vehicles are declining in popularity, most public charging stations are ending this service.
- Since it is so expensive to charge an all-electric vehicle, most cities can't afford to offer charging services to electric vehicle owners.
- Since most electric vehicle owners don't usually carry an extension cord, it isn't practical to create public charging stations.







## *Energy Through History*

Introduction

History

Physics

Types

Use

Game

### 1600's

The Netherlands was the first country to find coal in Europe, and it provided the fuel to England and other nearby countries. In the 17th century, England started producing coal of its own and supplying it to other countries. It suddenly became the provider of virtually the whole world.

In this century, Europeans also learned to contain solar heat in a closed room made out of glass (a greenhouse) to grow plants with the indoor warmth even in the cold weather.

### 1700's

Because most of Europe, especially England, had considerably diminished its forests by this century, it relied extensively on coal as its fuel. Another of the main causes of the considerable demand for coal was the invention of the steam engine. Coal mines were often filled with water that leaked in from the surface and had to be removed by means of lifting up a bucket attached to a rope in order to proceed with the mining. Seeing the inefficiency of the operation, Captain Thomas Savery invented a steam engine in 1698. Its purpose was exclusively to extract water out of the coal mines. His steam engine operated by means of the pressure of the atmosphere and is therefore called an atmospheric engine. It worked by filling a cylinder with steam and then pulling the water when the steam condensed with cooling.

In 1712, Thomas Newcomen invented a more effective steam engine. Like the Savery steam engine, it was an atmospheric engine and was made for pumping water out of coal mines. However, it was simpler and more effective than the previous one. Instead of making the water from the mine directly fill the cylinder of the engine, the Newcomen engine pumped the water indirectly with exterior pumps. It was a powerful and economical engine that had the capacity of up to 4.7 million foot-pounds of work per bushel of coal. Later, its efficiency was increased to 9 million foot-pounds/bushel of coal by J. Smeaton.



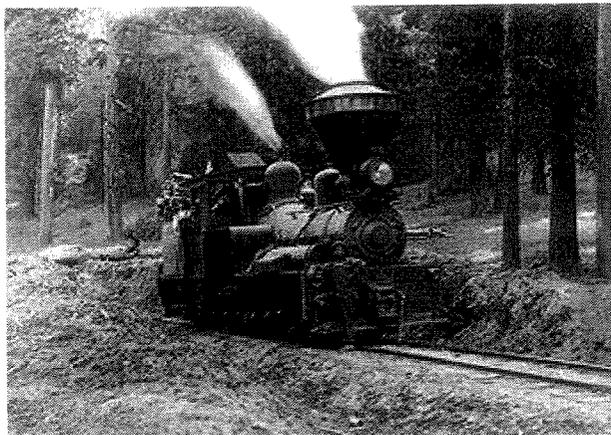
A Steam Engine from 1926

Credit: Alfred Harrell;  
Courtesy of The  
Smithsonian Institution

A superior steam engine was developed by James Watt in the 1770's. Unlike the two previous engines that relied on only one operating cylinder, Watt's

engine had two and operated with the flow of heat between the two cylinders rather than using the pressure of the atmosphere. Its efficiency was up to 20 million foot-pounds/bushel of coal, doubling the capacity of the Newcomen-Smeaton engine. Watt's steam engine was not only to be used in pumping water out of mines. It soon proved to have the greater significance of being the driving force of the Industrial Revolution.

## 1800's



A Steam Locomotive

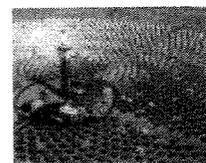
photo courtesy [The Amazing Picture Machine](#)

During the 19th century, the world went through a great change as the Industrial Revolution that started in England spread to the rest of Europe, North America and other parts of the world. Characterized by mass production aided by machines and the supply of much clothing, furniture and many other products, the demand for energy increased remarkably. Also, new means of transportation were developed with the application of the new technology such as

the construction of the first steam boat in 1807 and the first locomotive in 1804. This situation required the invention of more effective engines and cheaper energy sources.

While coal was being used extensively by the industrial movement, some scientists were already becoming concerned about the exhaust from combustion of the fossil fuel. Some of these scientists started developing natural energy sources as an alternative to coal. The energy sources include solar energy, hydroelectric energy, and geothermal energy.

Solar energy was first developed by Mouchout of France in 1860. His solar engine consisted of a glass-enclosed iron cauldron with reflectors that concentrated solar radiation to boil water and to operate a small steam engine with the steam produced. After observing this engine, William Adams improved the solar engine by reflecting solar radiation with several mirrors to a copper boiler elevated on a tower. A modern version of it looks like the picture on the left. With a configuration of 72 mirrors it was possible to produce 3 times as much power as the Mouchout solar engine. Several other modifications made by Charles Tellier, John Ericsson, Henry E. Willsie, Eneas, and Shuman considerably improved the performance of the solar engines, but the engines failed to commercialize because of the widespread and relatively

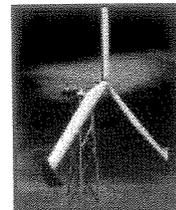


Modern solar panels

Credit: Sandia National Laboratories; Courtesy DOE/NREL

cheaper use of coal.

Constructions of small hydroelectrical power plants were also constructed in the 19th century. Windmills that up until then were used for pumping water or grinding crops were also developed in an attempt to produce electrical power. Geothermal energy began to be used to heat up houses and, by the end of the century, to produce electricity.



A wind turbine

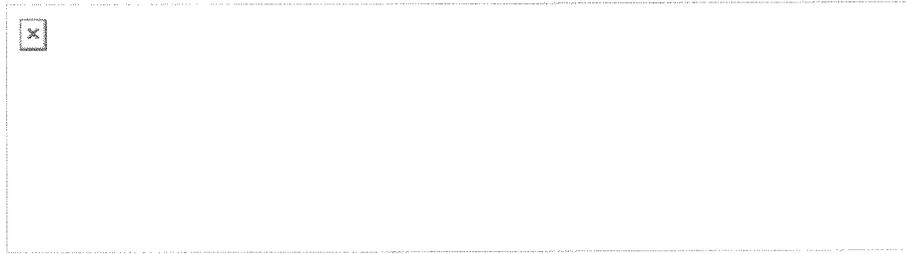
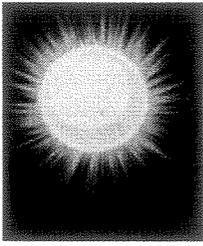
Credit: Warren Gretz. Courtesy of DOE/NREL

Another big change occurred when Colonel Edwin Drake managed to drill and extract crude petroleum oil out of the ground in Titusville, Pennsylvania. It was discovered that several useful products could be produced from petroleum, including kerosene, a gas that was ideal for lighting purposes, and gasoline, a fuel that could be used for locomotive purposes. With the invention of internal combustion engines mounted on automobiles, petroleum gradually began to dominate coal in the energy industry.



*Next Section: 1900's and the Modern Times* ➔

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## *Energy Through History*

### Introduction

History

### Physics

Types of Energy Sources

### Use

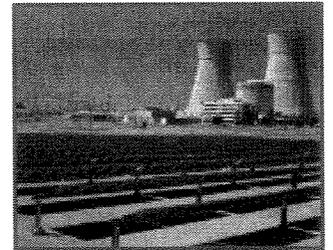
### Game

### 1900's

The French inventor Lenoir invented an internal combustion engine that used gasoline as fuel. It was a big relief for the oil companies since petroleum was not a preferred automobile fuel. The German inventors Daimler and Benz invented the first automobile by mounting the engine on a carriage. Henry Ford later put automobiles into mass production, and the car started to become a common means of transportation. The Wright brothers invented the first airplane with a gasoline engine, which ushered in an era of faster and cheaper transportation.

### Modern Times

As the exhaustion of fossil fuels and the environmental damage caused by the pollutants produced thereof became notable, scientists began to seek for an alternative source of energy. Some of the types of energy sources that are becoming popular are solar, wind, hydroelectric, biomass and geothermal energy. Many of them had already been developed nearly a century ago, but are only now coming into widespread use. Nuclear energy is widely used today. Its efficiency in producing energy is very attractive but the disposal of radioactive waste that is harmful to the environment is the main concern.



Nuclear cooling towers with a photovoltaic array in the foreground

Credit: Warren Gretz; Courtesy:

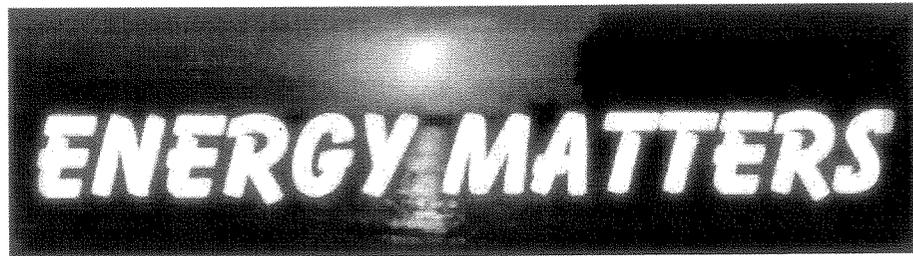
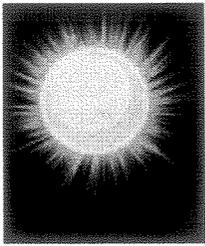
DOE/NREL

As we look over our energy's history, one thing is clear: the energy sources that have sustained civilized society for so long, namely fossil fuels, have been abused and are now rapidly becoming nonexistent. It is important for us to learn that whatever the energy source of the future turns out to be, we must learn to conserve and value it.



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[The 1970's Mideast Oil Crisis](#) 



## *Energy Through History*

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### The Mideast Oil Crisis

In October, 1973, panic gripped the United States. The crude oil-rich Middle-Eastern countries had cut off exports of petroleum to Western nations as punishment for their involvement in recent Arab-Israeli conflicts. Although the oil embargo would not ordinarily have made a tremendous impact on the US, panicking investors and oil companies caused a gigantic surge in oil prices. The situation, caused more by fear and irrationality than any firm economic basis, turned out to be one of the most memorable of the 1970s. Those who can remember the so-called "Mideast oil crisis" also remember long lines at the gas pump due to petroleum shortages and high gasoline prices.

To understand the oil crisis that gripped the world during the 1970s, we need to know a little of the history of Middle Eastern history and politics.

After World War II, the Allied powers created a Zionist state known as Israel to serve as a homeland for the millions of disfranchised (property-less) Jews throughout the world. Israel was proclaimed an independent nation by its people on May 14, 1948. The land for the new country was carved out of the British-controlled territory known as "Palestine." Although the Jews agreed to the settlement, the local Arabs refused to acknowledge the Israeli state and launched frequent attacks along its borders throughout the year 1949. The attacks eventually escalated into a full-scale conflict known as the "Suez-Sinai War."

The British and the French joined in on the side of the Israelis, presumably to punish Egyptian president Gomar Nasser for claiming control of the Suez canal, a manmade waterway connecting the Mediterranean and Red Seas. Only by decisive action on the part of the United Nations was the conflict resolved. During the fighting, Israeli forces managed to capture the Sinai Peninsula and the Gaza strip, but relinquished the territories at the urgings of the United States and other United Nations members.



Israel before June, 1967

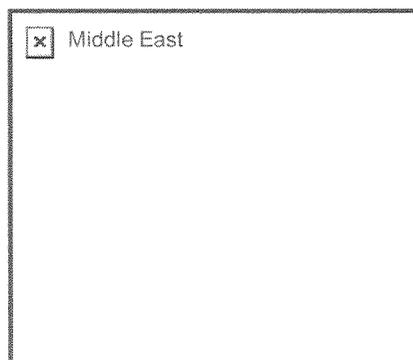


Cease-fire lines after the Six-Day War

Above maps courtesy of [the Government of Israel](#)

In response to their defeat at the hands of the Israelis, the Arabs began to unite with a common anti-Israel objective. An Arab attack force that gathered along Israel's borders prompted Israeli nationals to launch another offensive in 1967 which came to be known as the "Six-Day War." Backed by Western powers (primarily France), Israel succeeded in destroying the Arab forces and claimed the Gaza Strip, the Sinai Peninsula, the Golan heights, East Jerusalem, and the West Bank from the neighboring countries of Syria, Jordan, and Egypt.

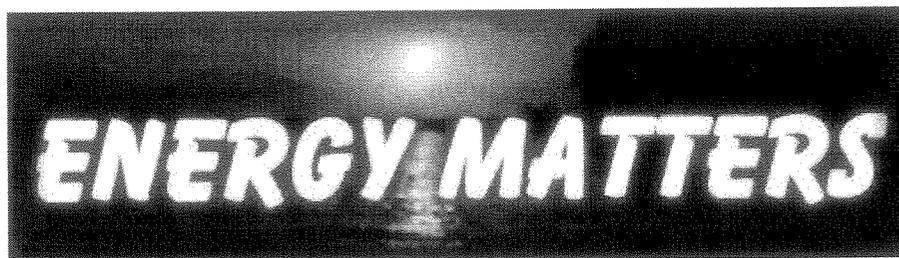
In 1973, Arab forces led by Egypt and Syria retaliated. Attacking on "Yom Kippur," the holiest of Jewish holidays, the Arabs were repulsed but nevertheless succeeded in impressing the Soviet Union. Backed by Soviet technology, the Arabs renewed their efforts against Israel. Furthermore, to punish the Western powers for aiding the Israelis, the Arab nations abruptly halted oil exports to countries such as the United States and the Netherlands. Although the Israelis-Arab conflict was eventually resolved with the help of the United States, the economic impact of the cutoff of Arab petroleum was extensive. Panic by western nations led oil prices to be greatly inflated. "Long lines at the gas pump" is now a phrase understood in America to describe the lack of gasoline in the United States due to rationing of limited petroleum imports during the 1970s.



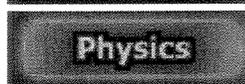
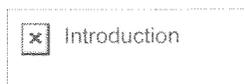
A map of the modern-day Middle East

Map courtesy [The Virtual Tourist](#)

There were more oil scares throughout the next two decades. When the shah of Iran was deposed during a revolution in that country, petroleum exports were diminished to virtually negligible levels, causing crude oil prices once again to be raised by an exorbitant amount. Further, Iraq's invasion of Kuwait in the 1990s also inflated oil prices, albeit for only a short time. These disturbing trends perhaps reinforce the world's dependence on Middle Eastern oil and argue for the development of new energy sources not tied to any particular geographic region of the planet.



## *The Physics of Energy*



### **There is no energy problem.**

Although the above statement might seem surprising, even shocking, given the length we have gone to explain the importance of energy to the world and the possibility of a crisis in the future, it is absolutely true when speaking from a physics point of view.

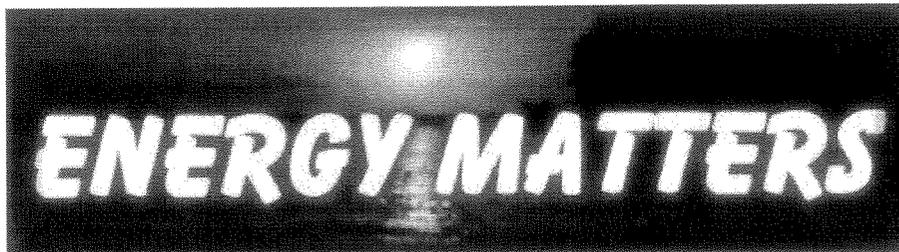
One of the most important and firmly established laws of physics is that energy is conserved, that is, energy will always remain at the same level in a closed system. The Earth can be considered a closed system, and many people argue that the Earth *gains* a useful net energy from the sun. So strictly speaking, even though the following terms are widely used, we will never actually "run out" or "use up" energy.

The problem we actually have is related to the storage of energy. A store of energy is called a fuel. A high level of energy is stored in coal, natural gas, and oil, making them the three most widely used and important energy sources in the world. Unfortunately, when these fuels are burned in chemical or nuclear reactions to release the energy, the original fuel mass is used up and cannot be recreated without spending more energy than the amount that could be obtained (defeating the purpose of an energy source altogether!). It is for this reason that we must find viable, infinite sources of energy before our finite supplies run out.

Laws of physics dictate that energy can be change from one form to another (or into matter - the reason why there's energy in fossil fuels). There are various forms of energy: kinetic energy (energy of motion), potential energy, mechanical energy, nuclear energy, etc., but we cannot directly use these forms of energy to turn on our TV or to cook food in the microwave. That's where electricity comes in. Since electricity is the primary form of energy consumed by the majority of the world's population, power plants must exist to convert heat from burning biomass or kinetic energy from falling water into the energy that flows through the wire in our homes.

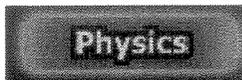
So, as you can see, physics is indeed important in understanding our energy use. Here are more sections that deal with the physics of energy:

- [Kinetic and Potential Energy Explained](#)
- [Missing Mass and the Theory of Relativity](#)



*The Physics of Energy*

Kinetic and Potential Energy

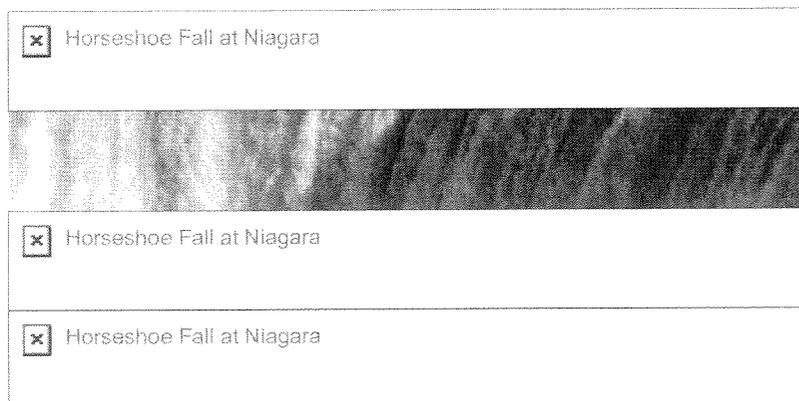


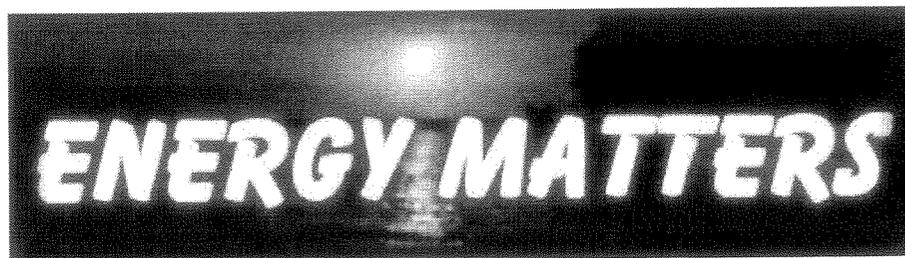
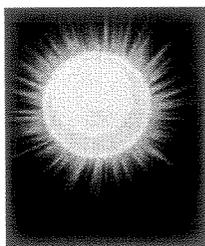
Learning about these two forms of energy is extremely important in understanding why man can obtain the usable energy from things like waterfalls and spinning turbines. Power plants serve to convert these physical forms of energy into energy to run our TVs and cook food in the microwave -- electricity!

**Kinetic Energy (KE)** is the name for energy associated with moving objects. A good way to remember this is by the formula  $KE = (1/2)mv^2$ , where  $m$ ; is the mass of the object and  $v$ ; is the velocity of the object. If you remember the formula, you will remember that kinetic energy is dependent upon velocity and mass, and thus has to do with moving objects.

**Potential Energy (PE)** is the name for energy stored in an object--or, the "potential" of an object to do work. For instance, a rock at the top of a cliff has more potential energy than one on the ground, because you could drop the rock off of the cliff and hit something below (converting the potential energy to kinetic).

The picture below of the world-famous Horseshoe Fall at Niagara Falls will further illustrate the difference between kinetic and potential energy. In this case, the two forms of energy are experienced by molecules of water. Point your mouse onto the photo (do not click) and watch the bottom status line of your browser.





## *The Physics of Energy*

### All About Vapor Pressure

Introduction

History

Physics

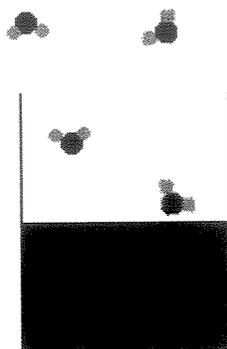
Types

Use

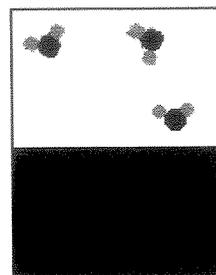
Game

Why does boiling a liquid create vapor that can spin a turbine? Actually, all liquids have a certain "vapor pressure" at certain temperatures. For instance, a cup of water at room temperature has vapor pressure even though you don't see steam coming out of it. So what causes vapor pressure?

Let's go back to the cup of water example. Look at the surface of the water. Now imagine zooming in really close. If you could see the individual molecules, you would notice that they were all moving around slightly, constantly jostling and shoving each other but staying in the same overall position. The movement is caused by the energy associated with the given temperature.



When there is no lid, water molecules can escape until there is eventually no water left in the container.



With a lid, the molecules are trapped in the container and so there is no net loss of water.

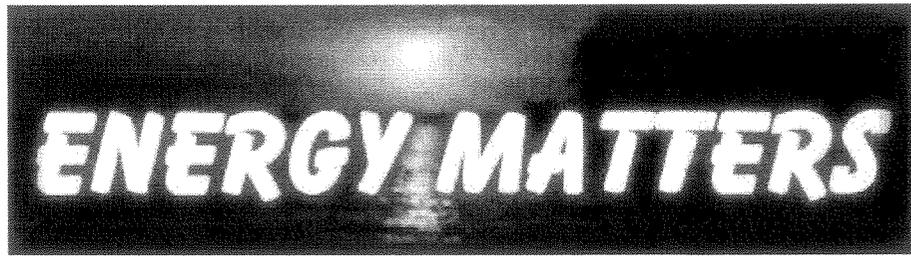
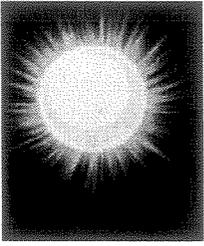
At room temperature, the molecules will all have a certain amount of energy and will therefore be moving around at a certain speed, whereas at a colder temperature, the molecules will have less energy and will not be moving around as much. At absolute 0 (0 Kelvin, or -273 degrees Celsius), the lowest possible temperature, technically the movement of the molecules would be at a minimum (although there would still be movement).

Now imagine that one of the molecules of water near the surface is pushed a little harder from below. The molecule gains just enough energy to "break free" of the other molecules and is launched into the air. The free molecule will most likely escape into the open air if there is no lid on the container; if there is a lid, however, then the molecule will bounce off of the different surfaces within the system and eventually return to the surface of the liquid where it "reattaches" itself to the other molecules.



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## *The Physics of Energy*

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### The Physics Definition of Energy

Energy and work occupy an important part of our ordinary life and are among the most important topics in physics. Work in terms of physics has quite a different meaning than the work we normally think of. In physics, work is done only when an object is moved in the direction of the applied force.

Energy in physics is defined as the ability to do work. That makes sense, right? After all, the more energy you have, the more schoolwork you can do...right. So anyway, another way to see it is that work is the force exerted multiplied by the distance, or  $W=FD$ . That also makes sense. If you push a really heavy object a certain distance, you do more work than if you push a lighter object that same distance.

The energy stored in the various sources covered in this page is, in one way or another, derived from the energy of the sun. For instance, when we burn wood, we are simply converting the sun's power that was stored in the growing plant into radiant (light) and thermal (heat) energy. Hydroelectric power is derived from the running water that flows from higher elevations to lower elevations. Again, it is the sun that provided the energy to evaporate water from lower heights and transported it to the upper heights as rain. So all the energy we deal with comes from the sun.

You've already read about kinetic and potential energy. Other types of energy that are discussed in this site are derivatives of kinetic energy. For instance, thermal energy is kinetic energy in the form of heat.

Read on to discover a much more in-depth view of the physics of energy.

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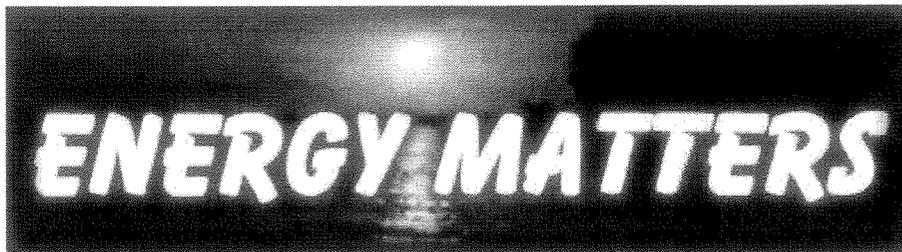
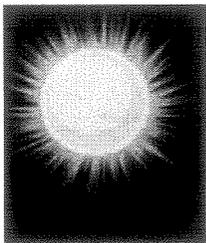
- [More on Energy and Work](#)
- [Kinetic and Potential Energy](#)
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## *Fossil Fuels*

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Although there are many different types of fossil fuels, we have chosen three that we feel are especially important: coal, petroleum, and natural gas. Because virtually all fossil fuel uses produce energy in pretty much the same way (see the *Theory* section), we have condensed them into one area on this website.

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- [Theory Behind Fossil Fuels](#)
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### Related Pages

- [Mideast Oil Crisis](#)



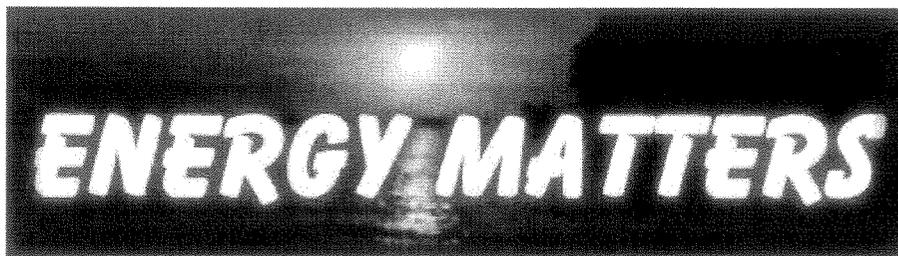
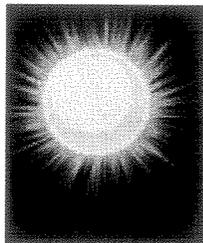
An oil rig in the North Sea

Fossil fuels have been a widely used source of energy every since the Industrial Revolution just before the dawn of the 20th century. Fossil fuels are relatively easy to use to generate energy because they only require a simple direct combustion. However, a problem with fossil fuels is their environmental impact. Not only does their excavation from the ground significantly alter the environment, but their combustion leads to a great deal of air pollution.

Follow the link to learn more about how fossil fuels can create energy.

*Next Section: Theory Behind Fossil Fuels* ➡



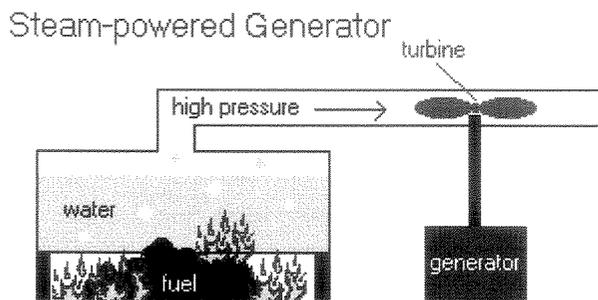


## Fossil Fuels

### Theory

The theory behind fossil fuels is actually quite simple. Burning coal, natural gas, and petroleum releases energy stored in the fuel as heat. The energy contained by the fuels is derived from the energy of the sun. For more detailed explanations of the origins of the different fossil fuels, visit the [coal](#), [natural gas](#), and [petroleum](#) pages.

The heat that is recovered upon combustion of the fuel can be used by us in several ways. Industrial processes that require extremely high temperatures may burn a great deal of very pure coal known as "coke" and use the energy released to directly heat a system. Some people make use of clean burning natural gas to heat their homes. Combustion of fossil fuels can also be used to generate electricity; the fuel is burned to heat water, and the steam from the boiling water spins turbines that power a generator, thereby manufacturing electricity:



*Next Section: The Pollution Problem*

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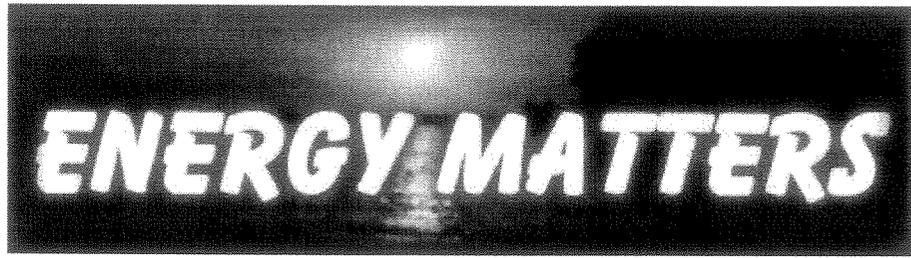
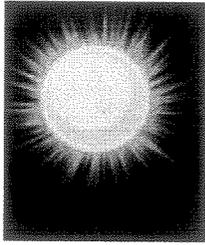
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## Types of Energy Sources

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#### Global Warming

You have probably heard of something called "global warning" before. Perhaps you are also familiar with the term "Greenhouse effect." Because those two terms are so important in understanding the pollution problem associated with burning biomass and fossil fuels, we should touch upon their definitions now.

Scientists believe that global warming is caused by the "Greenhouse effect." The greenhouse effect describes the accumulation of carbon dioxide in our earth's atmosphere. A layer of gas forms that traps heat inside the atmosphere, thereby acting as the glass ceiling of a greenhouse. Because heat is trapped by the carbon dioxide, it is believed that the earth is slowly warming. A potential (but relatively distant) danger of global warming is the melting of the so-called "polar ice caps" at the north and south poles. This occurrence would cause the ocean level to rise and perhaps flood many coastal cities.



#### The Advent of Fossil Fuels

Before humans were around on the earth, there was a relatively even recycling of carbon dioxide and oxygen. Plants require carbon dioxide to live, and they emit oxygen in return. Animals, on the other hand, need oxygen, but exhale carbon dioxide. But as humans began to burn fossil fuels to create energy (especially beginning just before the 20th century during the "Industrial Revolution"), more and more carbon



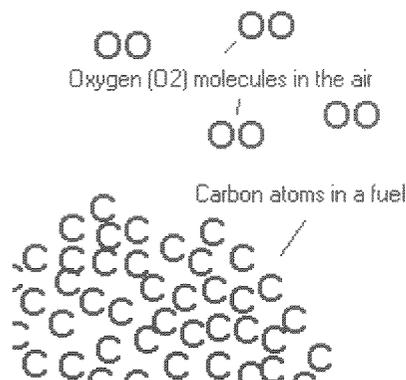
dioxide was emitted into the air until the balance was slowly destroyed.

The Harmac Pulp Mill on Vancouver Island, British Columbia, Canada

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### How Do Fossil Fuels and Biomass Pollute?

All fossil fuels and biomasses consist of carbon and hydrogen atoms. When these fuels are burned, or "combusted," carbon atoms unite with oxygen in the air to form carbon dioxide:



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### Other Polluting Byproducts of Fossil Fuel and Biomass Burning

Carbon dioxide is not the only byproduct of direct combustion of fuel. Small "particulates" that can become imbedded in the human respiratory system are also emitted. Particulates can cause coughing and damage to the lungs. Further, they can lead to cancer and lung disease.

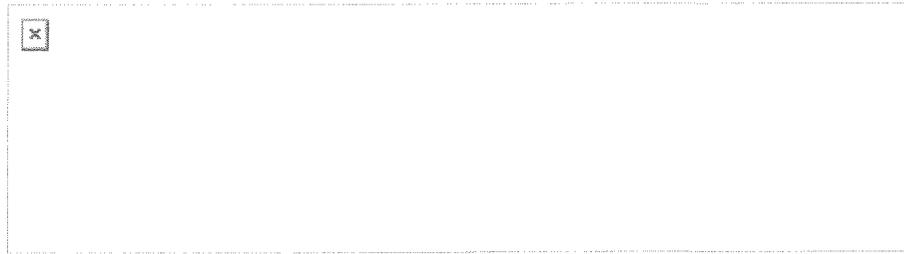
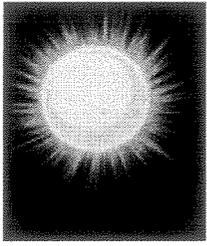
Carbon monoxide is produced when less oxygen is available in the immediate area. Carbon monoxide is more directly harmful to humans because it is odorless, colorless, and reduces the body's ability to transport oxygen. This leads to fatigue, nausea, and headaches (flu-like symptoms).

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### The Spectrum of Pollution

According to the Electronic Universe Project, "Materials on the low end of the energy scale such as wood and charcoal create the most pollution. Sources on the high end of the energy scale, such as natural gas burn very cleanly resulting in less air pollution."





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Man has utilized the power of water for years. Much of the growth of early colonial American industry can be attributed to hydropower. Because fuel such as coal and wood were not readily available to inland cities, American settlers were forced to turn to other alternatives. Falling water was ideal for powering sawmills and grist mills.

As coal became a better-developed source of fuel, however, the importance of hydropower decreased. When canals began to be built off of the Mississippi River, inland cities became linked to mainstream commerce. This opened the flow of coal to most areas of America, dealing the final blow to hydropower in early America.

Water power really didn't stage a major comeback until the 20th century. The development of an electric generator helped increase hydropower's importance. In the mid-20th century, as Americans began to move out of the cities and into "suburbia," the demand for electricity increased, as did the role of hydroelectricity. Hydroelectric power plants were built near large cities to supplement power production.



An overhead view of the Noxon Rapids Hydroelectric Power Project on the

## Hydroelectric Power

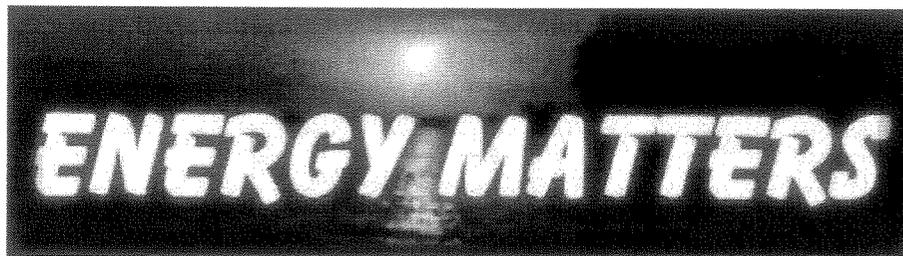
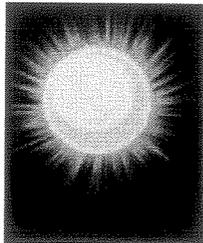
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### Related Pages

- [Kinetic and Potential Energy](#)

Hydropower had some help from the federal government in being established in America. The Tennessee Valley Authority (TVA) was implemented during the Great Depression of the 1930s. The program was designed to correct several problems in the Tennessee River Basin. These problems included frequent floods, erosion, and deforestation. The TVA provided for the building of several hydroelectric dams. Not only were the dams



## Solar Power

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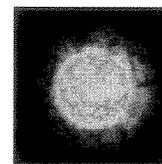
The name "solar power" is actually a little misleading. In fact, most of the energy known to man is derived in some way from the sun. When we burn wood or other fuels, we are releasing the stored energy of the sun. In fact, there would be no life on earth without the sun, which provides energy needed for the growth of plants, and indirectly, the existence of all animal life. The solar energy scientists are interested in is energy obtained through the use of solar panels. Although the field of research dealing with this type of solar power is relatively new, bear in mind that man has known about the energy of the sun for thousands of years.

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- [Theory Behind Solar Power](#)
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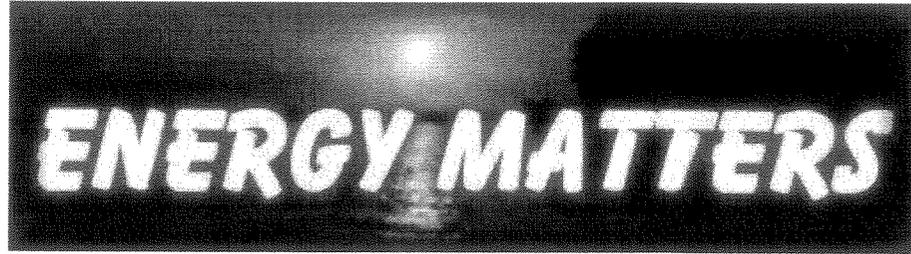
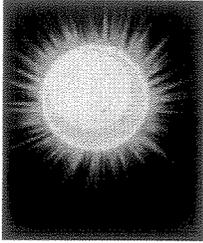
### Related Pages

- [Solar Thermal Applications](#)
- [Photovoltaic Applications](#)



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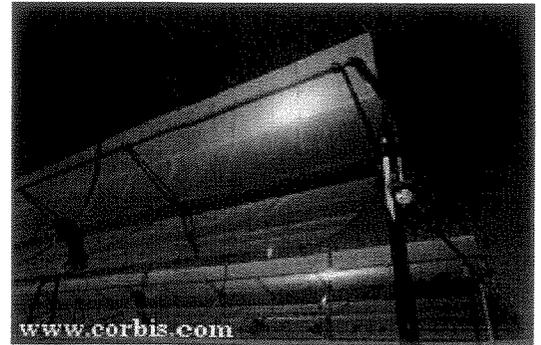
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### Theory

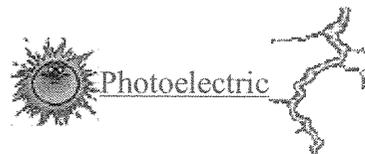
The energy of the sun can be used in many ways. When plants grow, they store the energy of the sun. Then, when we burn those plants, the energy is released in the form of heat. This is an example of indirect use of solar energy.

The form we are interested in is directly converting the sun's rays into a usable energy source: electricity. This is accomplished through the use of "solar collectors," or, as they are more commonly known as, "solar panels."

There are two ways in which solar power can be converted to energy. The first, known as "solar thermal applications," involve using the energy of the sun to directly heat air or a liquid. The second, known as "photoelectric applications," involve the use of photovoltaic cells to convert solar energy directly to electricity. Learn more about them by following the links below.

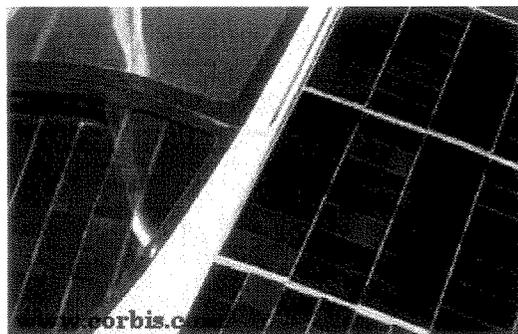


Solar power panels at a solar power plant in Boron, California



Solar power has an exciting future ahead of it. Because solar power utilizes the sun's light, a ubiquitous resource (a resource that is everywhere), solar panels can be attached

to moving objects, such as automobiles, and can even be used to power those objects. Solar powered cars are being experimented with more and more frequently now.

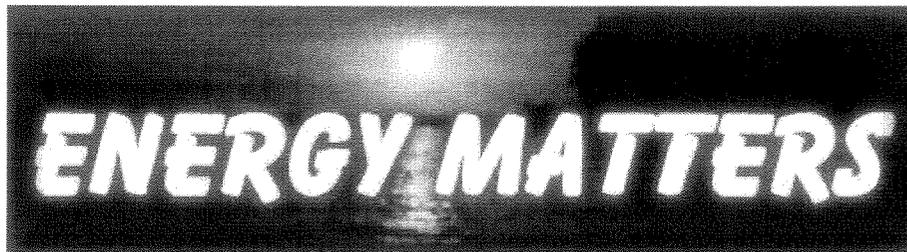
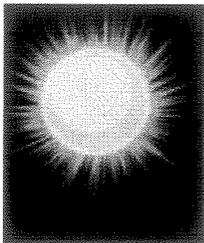


Solar energy panels on "Dream Car I", Australia



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## Advantages and Disadvantages

### Advantages

- Inexhaustible fuel source
- No pollution
- Often an excellent supplement to other renewable sources
- Versatile--is used for powering items as diverse as solar cars and satellites

### Disadvantages

Very diffuse source means low energy production--large numbers of solar panels (and thus large land areas) are required to produce useful amounts of heat or electricity  
Only areas of the world with lots of sunlight are suitable for solar power generation

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# Day 2 Schedule

Subject	Minutes Per Day (At Least!)	Assignments	What Did I Learn Today?
English Language Arts	45	<input type="checkbox"/> Activity: Reading “The Debt”	<input type="checkbox"/>
Mathematics	45	Complete: <input type="checkbox"/> Problem A <input type="checkbox"/> Problem B	<input type="checkbox"/>
Science	30	Complete at least one of the following activities: <input type="checkbox"/> Activity 1: <i>Lights off Around the World</i> (English or Spanish) <input type="checkbox"/> Activity 2: Continue <i>Forces and Motion on Earth</i> activity looking at types of energy	<input type="checkbox"/>
Fitness and Health	30	<input type="checkbox"/> Exercise for 30 minutes. Choose from the Activity Calendars at the back of this booklet	<input type="checkbox"/>
Arts	30	<input type="checkbox"/> Choose one or two activities from the Arts Activities at the back of this booklet	<input type="checkbox"/>
Educational TV Shows	30	<input type="checkbox"/> Choose TV shows to further your learning at home	<input type="checkbox"/>

# Day 2 English Language Arts

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## Activity 1: *Reading Poetry*

- Directions: Read the poem and complete the Poetry Reading Worksheet

### **The Debt**

*By Paul Laurence Dunbar (1872–1906)*

THIS is the debt I pay  
Just for one riotous day,  
Years of regret and grief,  
Sorrow without relief.

Pay it I will to the end—  
Until the grave, my friend,  
Gives me a true release—  
Gives me the clasp of peace.

Slight was the thing I bought,  
Small was the debt I thought,  
Poor was the loan at best—  
God! but the interest!

# Day 2 English Language Arts (continued)

## Poetry Reading Worksheet

First, paraphrase the poem. Restate each sentence of the poem in your own words.

Second, use hints from within "The Debt" to help you identify the speaker and the subject of the poem. Using textual evidence, explain how you were able to determine the speaker and subject of the poem.

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# Day 1 English Language Arts (continued)

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## Poetry Reading Worksheet (continued)

Third, identify two lines in the poem that reveal aspects of the speaker's character.

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Now, explain how you know your conclusions about the speaker's character are correct.

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Fourth, identify the theme, or main idea, of the poem.

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Analyze the development of the central theme of this poem that you indicated above.  
How does the speaker develop this idea over the course of the poem? What lines from the poem convey this development? Explain why you selected these lines.

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# Day 1 English Language Arts (continued)

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## Poetry Reading Worksheet (continued)

Fifth, jot down a literary technique or elements used in the poem, such as simile or personification.

### Literary Technique 1

*Examples from the poem:*

- 
- 
- 
- 

### Literary Technique 2

*Examples from the poem:*

- 
- 
- 
- 

Choose one literary technique from above and describe how the technique helps communicate the poem's theme.

# Day 2 Mathematics

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## Problem A

Nia and Trey both had a sore throat so their mom told them to gargle with warm salt water.

Nia mixed 12 teaspoon salt with 3 cups water.

Trey mixed 12 teaspoon salt with 112 cups of water.

Nia tasted Trey's salt water. She said, "*I added more salt so I expected that mine would be more salty, but they taste the same.*"

- Explain why the salt water mixtures taste the same.
- Find an equation that relates  $s$ , the number of teaspoons of salt, with  $w$ , the number of cups of water, for both of these mixtures.
- Draw the graph of your equation from part b.
- Your graph in part c should be a line. Interpret the slope as a unit rate.

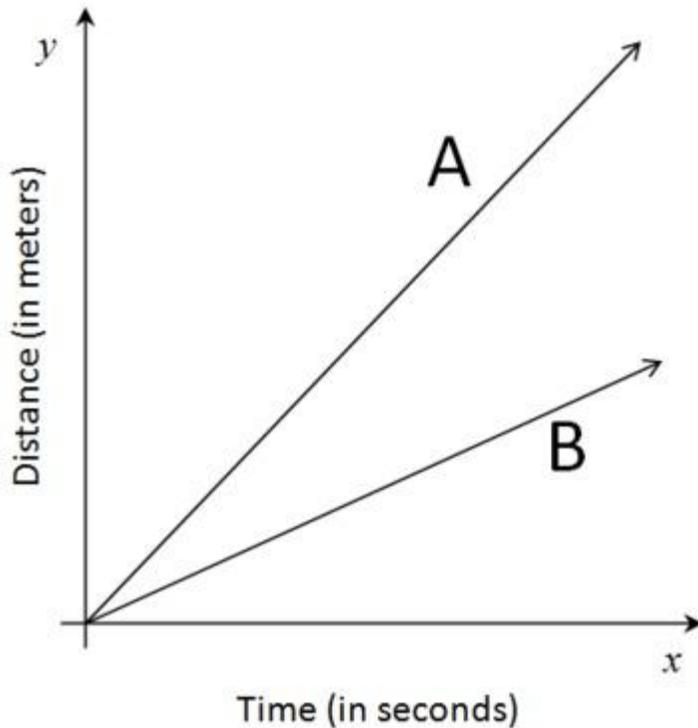
To check your answer, go to <http://illustrativemathematics.org/illustrations/86>

# Day 2 Mathematics

---

## Problem B

The graphs below show the distance two cars have traveled along the freeway over a period of several seconds. Car A is traveling 30 meters per second.



Which equation from those shown below is the best choice for describing the distance traveled by car B after  $x$  seconds? Explain.

- a.  $y=85x$
- b.  $y=60x$
- c.  $y=30x$
- d.  $y=15x$

To check your answer, go to <http://illustrativemathematics.org/illustrations/57>

# Day 2 Science

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Choose Activity 1 or 2 below:

## Activity 1: *Lights Off Around the World*

- Read the article below and answer the questions that follow.
- Para Espanol, prime aquí:  
<http://schools.nyc.gov/Documents/teachandlearn/LearnatHome/ELL/8day2sp.pdf>

### Vocabulary

Learn the new vocabulary words below. You will use these vocabulary words in today's activity.

- brokerage** (noun) a place where property is bought and sold by professionals on behalf of customers
- cadence** (noun) the flow or rhythm of events
- landmark** (noun) an important building or place

### Lights Off Around the World



**SYDNEY, Australia** (Achieve3000, April 17, 2008). On Saturday, March 29, the Sydney Opera House went dark. So did Rome's Colosseum, Chicago's Sears Tower (now known as the Willis Tower), and several other landmarks around the world. People turned off the lights of these icons of civilization to take part in Earth Hour, a worldwide campaign to highlight the possible threat of climate change.

Earth Hour is an annual event established by the environmental group World Wildlife Fund. Its promoters urged governments, businesses, and households to turn off their lights and use candle power for at least 60 minutes starting at 8 p.m. on March 29, wherever they were. Why? Scientists say that electric plants produce greenhouse gases that remain in the atmosphere and trap sunlight. This, some scientists say, contributes to climate change. Earth Hour officials hoped that 100 million people would turn off their nonessential lights and electronic goods for the hour. This would reduce electricity consumption and demand on electric plants.

Earth Hour first took place in Australia in 2007. This year, it expanded to encompass much more of the globe. In the South Pacific, Europe, and North America, people turned off their lights in cadence with the different time zones.

"What's amazing is that [Earth Hour is going beyond] political boundaries and happening in places like China, Vietnam, [and] Papua New Guinea," said Andy Ridley, executive director of Earth Hour. "It really seems to have [struck a chord with many people]."

In cities around the U.S., people participated in Earth Hour. In Chicago, Illinois, lights on more than 200 downtown buildings were dimmed during the evening on March 29, including the stripe of white light around the top of the John Hancock Center. The red-and-white marquee outside Wrigley Field also went dark. Workers in Phoenix, Arizona, turned out the lights in all downtown city-owned buildings for one hour. In San Francisco, California, darkened restaurants glowed with candlelight. Some of the lights on the Golden Gate Bridge, Coit Tower, and other landmarks were extinguished for the hour.

# Day 2 Science (continued)

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Greece, which lies in a time zone one hour ahead of most of Europe, was the first on the continent to mark Earth Hour. On the isle of Aegina, near capital city Athens, much of the population marched by candlelight to the port. Parts of Athens itself, including the floodlit city hall, also turned to black.

In Ireland, the government turned off the lights in scores of its buildings, as well as at bridges and monuments in more than a dozen cities and towns. However, the lights remained on at the international banks and brokerages of Dublin's financial district, where desks sat empty with their computers running.

"The banks should have embraced this wholeheartedly, and they didn't. But it's a start. Maybe next year," said Cathy Flanagan, an Earth Hour organizer in Dublin. Likewise, much of Europe—including France, Germany, Spain, and European Union institutions—planned nothing to mark Earth Hour.

Earth Hour was observed in many other places, however, including New Zealand, Fiji, and Australia. In Sydney, where an estimated 2.2 million observed the blackout last year, the two architectural icons, the Opera House and Harbour Bridge, faded to black against a dramatic backdrop of a lightning storm.

Internet search engine Google also supported Earth Hour by blackening its normally white home page. The page read, "We've turned the lights out. Now it's your turn."

*The Associated Press contributed to this story.*

**Instructions:** Select the correct answer.

## Question 1:

According to the article, what is the purpose of Earth Hour?

- The World Wildlife Fund created the event to raise global awareness about the possible threat of climate change.
- The World Wildlife Fund created the event to help cities save electricity on monuments all year long.
- The World Wildlife Fund created the event to raise awareness about a change in time zones.
- The World Wildlife Fund created the event to help consumers pay for electricity in their homes.

## Question 2:

What is this article mainly about?

- In cities around the world, citizens marched by candlelight through major streets and thoroughfares.
- In cities around the world, government officials turned off the lights on bridges and monuments.
- In cities around the world, people turned off their lights for one hour to take part in Earth Hour.
- In cities around the world, the World Wildlife Fund helped turn off lights on some landmarks.

## Question 3:

Which of these is **most** important to include in a summary of this article?

- The country of Greece lies in a time zone that is one hour ahead of most of Europe.
- Some people around the world turned off lights to take part in Earth Hour.
- The red-and-white marquee outside Wrigley Field went dark for Earth Hour.
- Some people in Ireland left their computers running during Earth Hour.

# Day 2 Science (continued)

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## Question 4:

The article states:

**Earth Hour officials hoped that 100 million people would turn off their *nonessential* lights and electronic goods for the hour. This would reduce electricity consumption and demand on electric plants.**

Look at the passage above and think about the article. Which would be the closest **antonym** for the word *nonessential*?

- Defective
- Logical
- Petty
- Vital

## Question 5:

Which of these is not a statement of fact from the article?

- In Chicago, Illinois, lights on 200 downtown buildings were dimmed during Earth Hour.
- Earth Hour is the best way for people to show that they care about the planet.
- On the isle of Aegina, near Athens, Greece, people marched by candlelight to the port.
- Earth Hour calls for people to turn off their lights for one hour in a year.

## Question 6:

Based on the article, how was Earth Hour this year different from Earth Hour 2007?

- This year, the World Wildlife Fund asked businesses to turn off their lights, while last year it only asked households to participate.
- This year, Earth Hour included turning off all nonessential electronic devices, while last year included turning off lights only.
- This year, the World Wildlife Fund asked financial institutions to participate, while last year it only asked leaders to dim the lights on bridges.
- This year, Earth Hour included countries from around the world, while last year the event was held in Australia only.

## Question 7:

Which is the closest **synonym** for the word *cadence*?

- Rhythm
- Review
- Radius
- Reward





# Day 3 Schedule

Subject	Minutes Per Day (At Least!)	Assignments	What Did I Learn Today?
English Language Arts	45	<input type="checkbox"/> Activity: Reading “Rain Music”	<input type="checkbox"/>
Mathematics	45	<input type="checkbox"/> Complete Problem A and Problem B	<input type="checkbox"/>
Science	30	Complete at least one of the following activities: <input type="checkbox"/> Activity 1: <i>Will This Oil Fly?</i> (English or Spanish) <input type="checkbox"/> Activity 2: Continue <i>Forces and Motion on Earth</i> activity by writing a draft of your six-page paper	<input type="checkbox"/>
Social Studies	60	<input type="checkbox"/> Activity about the Great Depression	<input type="checkbox"/>
Fitness and Health	30	<input type="checkbox"/> Exercise for 30 minutes. Choose from the Activity Calendars at the back of this booklet	<input type="checkbox"/>
Arts	30	<input type="checkbox"/> Choose one or two activities from the Arts Activities at the back of this booklet	<input type="checkbox"/>
Educational TV Shows		<input type="checkbox"/> Choose TV shows to further your learning at home	<input type="checkbox"/>

# Day 3 English Language Arts

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## Activity: *Reading Poetry*

- Directions: Read the poem and complete the Poetry Reading Worksheet

### **Rain Music**

*By Joseph S. Cotter, Jr.*

ON the dusty earth-drum  
Beats the falling rain;  
Now a whispered murmur,  
Now a louder strain.

Slender, silvery drumsticks,  
On an ancient drum,  
Beat the mellow music  
Bidding life to come.

Chords of earth awakened,  
Notes of greening spring,  
Rise and fall triumphant  
Over every thing.

Slender, silvery drumsticks  
Beat the long tattoo—  
God, the Great Musician,  
Calling life anew.

# Day 2 English Language Arts (continued)

## Poetry Reading Worksheet

First, paraphrase the poem. Restate each sentence of the poem in your own words.

Second, use hints from within "Rain Music" to help you identify the speaker and the subject of the poem. Using textual evidence, explain how you were able to determine the speaker and subject of the poem.

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# Day 1 English Language Arts (continued)

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## Poetry Reading Worksheet (continued)

Third, identify two lines in the poem that reveal aspects of the speaker's character.

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Now, explain how you know your conclusions about the speaker's character are correct.

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Fourth, identify the theme, or main idea, of the poem.

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Analyze the development of the central theme of this poem that you indicated above.  
How does the speaker develop this idea over the course of the poem? What lines from the poem convey this development? Explain why you selected these lines.

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# Day 1 English Language Arts (continued)

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## Poetry Reading Worksheet (continued)

Fifth, jot down a literary technique or elements used in the poem, such as simile or personification.

### Literary Technique 1

*Examples from the poem:*

- 
- 
- 
- 

### Literary Technique 2

*Examples from the poem:*

- 
- 
- 
- 

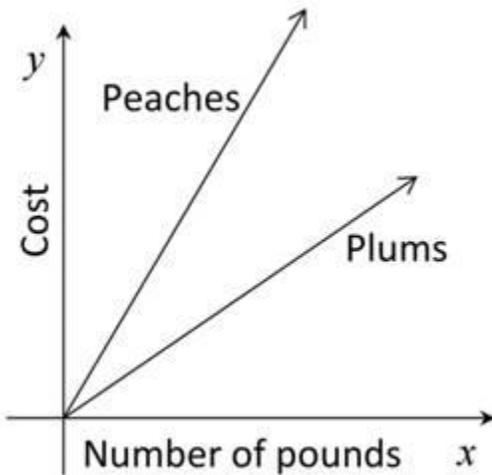
Choose one literary technique from above and describe how the technique helps communicate the poem's theme.

# Day 3 Mathematics

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## Problem A

The graphs below show the cost  $y$  of buying  $x$  pounds of fruit. One graph shows the cost of buying  $x$  pounds of peaches, and the other shows the cost of buying  $x$  pounds of plums.



a. Which kind of fruit costs more per pound? Explain.

b. Bananas cost less per pound than peaches or plums. Draw a line alongside the other graphs that might represent the cost  $y$  of buying  $x$  pounds of bananas.

To check your answer, go to <http://illustrativemathematics.org/illustrations/55>



c. Using the same coordinate axes, draw a graph that represents  $y$ , the amount of money Mariko would make for working  $x$  hours.

d. How can you see who makes more per hour just by looking at the graphs? Explain.

To check your answer, go to <http://illustrativemathematics.org/illustrations/184>

# Day 3 Science

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## Complete Activity 1 or 2 below:

### Activity 1: *Will This Oil Fly*

- Read the article below and answer the questions that follow.
- Para Espanol, prime aquí:  
<http://schools.nyc.gov/Documents/teachandlearn/LearnatHome/ELL/8day3sp.pdf>

#### Vocabulary

Learn the new vocabulary words below. You will use these vocabulary words in today's activity.

- alternative fuel** (noun): a fuel other than regular gasoline, usually one that is better for the environment
- carbon neutral** (adjective): leaving no carbon dioxide in the atmosphere
- comparable** (adjective): similar

#### Will This Oil Fly



AP Photo/ NZ Herald, Paul Estcourt

**WELLINGTON**, New Zealand (Achieve3000, January 28, 2009). Air New Zealand recently announced that it had successfully flown a passenger jet that was powered in part by a type of vegetable oil. The airline believes that replacing regular jet fuel with this biofuel could cut costs and be better for the environment.

The two-hour test flight included a full-power takeoff and cruising to 35,000 feet. One of the four engines on the Boeing 747-400 airplane was powered by a 50-50 blend of standard A1 jet fuel and oil from jatropha plants. Air New Zealand Chief Executive Rob Fyfe called the flight "a milestone for the airline and commercial aviation."

The test flight took place at a time when airlines are making a push for alternative fuels. These companies are struggling to make money. Why? The petroleum that airplanes have always used as fuel became extremely costly in 2008. In addition, now that the economy has slowed down, airlines are bracing for a drop in business. Taken together, these two factors have prompted airlines to look for ways to save money.

Many people feel that biofuels offer a promising solution. That's true not only because they could be cheaper to produce than jet fuel, but also because they may be better for the environment.

Biofuels are made from plants, such as sugar, corn, or soybeans. They are sustainable fuels because unlike petroleum, the oil can be made again and again as new crops are grown. However, many biofuels have been criticized because they use food crops and may end up reducing the world's food supply.

According to Air New Zealand officials, jatropha oil is a superior biofuel. Why? The jatropha plant is not a food crop. And since it can grow with little water on land that is considered poor for farming, it does not compete with food crops for land. Like jet fuels, jatropha oil blends emit greenhouse gases when they are burned. However, airline officials insist that jatropha oil is carbon neutral because the jatropha plant absorbs the air's harmful carbon dioxide when it is growing.

# Day 3 Science (continued)

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Air New Zealand chief pilot Captain David Morgan, who was onboard the airplane during the test flight, said the airline wants jatropha to become a certified aviation fuel. The company hopes that by 2013, 10 percent of its flights will be powered, at least in part, by biofuels.

Reaching this goal may help the environment, but would it also have an economic benefit, as Air New Zealand is hoping? So far, officials could not say whether their jatropha fuel blend would be cheaper than standard jet fuel. They do expect the cost of the blend to at least be comparable to that of jet fuel.

Still, the cost of fuel depends on the supply. If there is an adequate supply, the cost will be lower. If the supply is low, the cost will be higher. Currently, jatropha isn't being widely grown because it is not in demand. Therefore, Air New Zealand Group Manager Ed Sims cautioned that the company would not be able to ensure easy access to large quantities of jatropha oil until at least 2013.

"[To have the] amount of fuel around the world to be able to power the world's airlines is still some years off," said Sims.

*The Associated Press contributed to this story.*

**Instructions:** Select the correct answer.

## Question 1:

The best alternate headline for this article would be \_\_\_\_\_.

- Jetliner Flies Partly on Biofuel
- Jetliner Cruises at 35,000 Feet
- Airlines Struggling To Make Money
- Airlines Seeking Certified Aviation Fuel

## Question 2:

According to the article, what is one reason why jatropha oil is considered a superior biofuel?

- The jatropha plant can grow with little water on land that makes poor farmland, so it doesn't compete for agricultural space with food crops.
- The jatropha plant is not a popular food, so only part of the crop yield is used for food while the rest can be used for biofuel.
- Jatropha oil does not emit harmful carbon dioxide when it is burned, but most other biofuels do.
- Jatropha oil is a certified aviation fuel that is widely used by airlines, while other forms of biofuel have not yet been certified.

## Question 3:

Which is the closest **synonym** for the word *comparable*?

- Equivalent
- Temporary
- Beneficial
- Commercial

# Day 3 Science (continued)

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## Question 4:

Suppose that Marcus wants to find out about other uses for biofuels. He would find **most** of his information \_\_\_\_\_.

- Under the heading "biofuel applications" in a reference book about alternative fuels
- Under the heading "petroleum" on a Web site about traditional fuel sources
- In a textbook entry about the manufacturing process of various biofuels
- In a newspaper article about the many types of fuels used by airlines

## Question 5:

The article states:

Biofuels are made from plants, such as sugar, corn, or soybeans. They are *sustainable* fuels because unlike petroleum, their oil can be made again and again as new crops are grown. However, many biofuels have been criticized because they use food crops and may end up reducing the world's food supply.

Read the passage above and think about the article. Which of the following is probably true of a fuel that is *sustainable*?

- It is a renewable source of energy.
- It is harmful to most marine life.
- It emits greenhouse gases as it grows.
- It can be considered a petroleum byproduct.

## Question 6:

Which of these is not a statement of fact?

- Jatropha oil is by far the best alternative energy source available on the market today.
- Jatropha plants absorb some of the air's carbon dioxide when they are growing.
- Biofuels are made from plants such as sugar, corn, soybeans, and jatropha.
- Biofuel was mixed with jet fuel during a recent Air New Zealand test flight.

## Question 7:

Which of these is **most** important to include in a summary of this article?

- Air New Zealand recently conducted a successful test flight using a mix of biofuel and jet fuel.
- Air New Zealand Chief Executive Rob Fyfe said that he was excited about a recent airline flight.
- Biofuels have been criticized because they can use food crops and may end up reducing the world's food supply.
- Biofuels that are made from jatropha oil blends emit greenhouse gasses when they are burned.

## Question 8:

This article is placed in a category of news called "Technology." In which other category would this article fit best?

- Business News
- Across the U.S.
- Sports Extra
- Animals in Action



# Day 3 Science (continued)

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## Activity 2: Science Inquiry Project – Forces and Motion on Earth

### Vocabulary

Learn the new vocabulary words below. You will use these vocabulary words in the activities today.

- **Fusion:** The joining together of light atomic nuclei to form a heavier nucleus.

**Directions:** This is day three of a three day assignment.

- Day 3: By now, you should have researched the following types of energy resources: windmills, wave and water mills, solar panels, dams, geothermal stations, and composting gas for energy. Write a draft of a six-page report that explains how each type of energy resource works and saves energy, money, and the environment. . In your report, be sure to:
  - Introduce each topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables, etc), when useful to aiding comprehension.
  - Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.
  - Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.
  - Use precise language and domain-specific vocabulary to inform about or explain the topic.
  - Establish and maintain a formal style and objective tone.
  - Provide a concluding statement or section that follows from and supports the information or explanation presented.

### Additional Resources:

The following websites will help you with this activity.

**Wikipedia Encyclopedia:** Type in “windmills, watermills, solar panels, dams”

[http://en.wikipedia.org/wiki/Main\\_Page](http://en.wikipedia.org/wiki/Main_Page)

**Energy Matters:** <http://library.thinkquest.org/20331/types/>

**Fact Monster – Types of Energy:** <http://www.factmonster.com/ipka/A0907040.html>

*Source: This activity is from Glencoe NY Science, Grade 8 Unit 4: Forces and Motion on Earth*

[http://glencoe.mcgraw-hill.com/sites/0078778808/student\\_view0/unit4/unit\\_project\\_2.html](http://glencoe.mcgraw-hill.com/sites/0078778808/student_view0/unit4/unit_project_2.html)

# Day 3 Social Studies

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Learn about the Great Depression in the late 1920s and 1930s by reading letters, writing a letter, and looking at pictures. Read the background information and follow the directions below.

## Background:

The **Great Depression**, starting in 1929 and ending in the late 1930s, was an economic downturn that affected many countries of the world, including the United States. It began in the United States with the collapse of the stock market on October 29, 1929. This became known as Black Tuesday. The depression that followed affected banking, the availability of credit, industry, and consumer spending. Drought and erosion combined to cause the Dust Bowl, which caused hundreds of thousands of people to leave their farms in the Midwest. The Great Depression led to high levels of unemployment, a banking crisis, and homelessness.

During the Great Depression, thousands of young children and young adults wrote letters to Eleanor Roosevelt, the wife of President Franklin D. Roosevelt, asking for help. (Franklin D. Roosevelt won the presidency in 1932.) They communicated with her as a confidant or friend with whom they could share the details of their lives, no matter how painful or even embarrassing to them. In their letters, they seemed certain that Mrs. Roosevelt, the nation's first lady, would come to their aid.

## Directions:

Read the letters below and answer the following questions:

- What are the characteristics of the two young people writing to Mrs. Roosevelt?
- Sometimes writing to an important or influential person about a problem is an effective means of resolving that problem. Have you ever written such a letter? What were the results?
- Do you think that Mrs. Roosevelt responded to the letters herself or do you think her responses were “canned” (already written by someone on her staff)? What makes you think that these responses were personal or canned replies?

(Please note these letters are primary-source materials that contain grammatical and spelling errors.)

# Day 3 Social Studies (continued)

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## Letter 1



Dear Mrs. Roosevelt

Granette, Ark.  
Nov. 6, 1936

Dear Mrs. Roosevelt

I am writing to you for some of your old soiled dresses if you have any. As I am a poor girl who has to stay out of school. On account of dresses & slips and a coat. I am in the seventh grade but I have to stay out of school because I have no books or clothes to wear. I am in need of dresses & slips and a coat very bad. If you have any soiled clothes that you don't want to wear I would be very glad to get them. But please do not let the news paper reporters get hold of this in any way and I will keep it from getting out here so there will be no one else to get hold of it. But do not let my name get out in the paper. I am thirteen years old.

Yours Truly,  
Miss L. H.  
Gravette, Ark.  
R #3  
c/o A. H.

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# Day 3 Social Studies (continued)

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Reply to the letter:

November 13, 1936

My dear Miss H:

Mrs. Roosevelt and her Secretary are away and in their absence I have been asked to acknowledge their mail.

I know Mrs. Roosevelt would be very sorry to hear of your difficulties. However, she would be unable to comply with your request as there are certain persons to whom she sends the clothing for which she has no further use.

Very sincerely yours,  
[no signature]

## **Letter 2**

Greensboro N.C.  
February 12, 1938

Mrs. Eleanor Roosevelt,  
Washington D.C.

Dear Mrs. Roosevelt

On January 1st I was layed off from my work leaving my father the whole support of our family. just recently he was cut down to three days a week with a cut in salary. With seven of us in the family it is just about impossible for us to live on this amount.

My mother has been sick for over two months having had a nervous breakdown and we are unable to buy or furnish her with the medicine required for her recovery.

I am 18 years of age the oldest girl in the family, and it just seems impossible for me to get a job any where. I have been to Mills, Stores and Firms of all sorts. I am willing and able to work. Can furnish excellent references but at this time of the year it just seems impossible to find work.

We are so in debt and each week the bills are piling higher and higher that it just seems as if there was no way out.

We must make a payment on our furniture bill. And if it isn't paid soon they will be out any day for our furniture. And on top of this we are behind in our rent.

It would be a big help if we could get some of our bills paid on as they are already impatient for their money.

If you could help us out with from \$35.00 to \$50.00 I believe we would be the happiest family in the world.

## Day 3 Social Studies (continued)

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We have a good respectable family, none of us have ever been in any trouble, and our characters are above reproach.

Just as soon as I get back to work and the family on their feet again I will pay you back as much a week as possible until your kind favor has been fully repaid.

My father's work has been very poor for the past year. He is an advertising salesman, and his work right now is practically nothing; and as he has had kidney trouble for some time, taking more than he could make, for medicine. He has been improving recently, since he had his teeth extracted, and is looking forward to a job but which will not be available for a month or more. We went through the depression without asking for relief. I registered January 14th for unemployment compensation, and although promised \$6.25 a week, have not received a cent as yet.

Won't you please grant me the afore mentioned favor, please make it a personal favor, Mrs. Roosevelt, for if you would refer it to a local agency, I would suffer untold delay and embarrassment.

Although we are poor, we try to hold off embarrassment, for you know it is "hard to be broke, and harder to admit it."

Please grant me this favor and I will ever be

Gratefully yours,  
D.B.

This is not intended for publication

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Reply to the letter:

February 15, 1938

My dear Miss B.:

Mrs. Roosevelt has asked me to acknowledge your letter which she read with sympathy. She is indeed sorry to know of your difficult situation, but regrets that she unable to lend you the money needed. The number of demands on her resources make it impossible for her to respond to the many requests for loans, much as she would like to do so.

Mrs. Roosevelt suggests that you get in touch with the National Youth Administration, and the United States Employment Service, Department of Labor, as these agencies may be able to assist you in finding employment.

Very sincerely yours,

Secretary to  
Mrs. Roosevelt

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# Day 3 Social Studies (continued)

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## Extension Activity:

Imagine you were one of these children, now grown up. Write a follow-up letter to Mrs. Roosevelt, explaining how your life has unfolded since the last letter.

**May 2009**

**Dear Mrs. Roosevelt,**

**Since I wrote to you many years ago, my life has changed in many ways. Now I am ...**

## Teaching with Documents

**Directions:** Study the pictures below and complete the worksheet.

## Day 3 Social Studies (continued)

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# Day 3 Social Studies (continued)

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## Step 1 – Observation

Study the photographs for two minutes. Form an overall impression and then examine individual items. Next, divide each photo into quadrants and study each section to see what new details become visible.

Use the chart below to list people, objects and activities in the photographs.

### Picture 1

People	Objects	Activities

### Picture 2

People	Objects	Activities

## Day 3 Social Studies (continued)

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### Step 2 – Inference

Based on what you have observed above, list three things you might infer from these photographs.

- 1.
- 2.
- 3.

### Step 3 – Questions

What questions do these photographs raise in your mind?

Where could you find answers to them?

*Designed and developed by the Education Staff, National Archives and Records Administration, Washington, DC 20408  
[http://www.archives.gov/education/lessons/worksheets/photo\\_analysis\\_worksheet.pdf](http://www.archives.gov/education/lessons/worksheets/photo_analysis_worksheet.pdf)*

## **Fitness and Health Activities**

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Participate in **30 or more minutes** of daily physical activity. Choose **at least three (3) activities** from the options below and the following calendars. There is something for everyone! Each one takes about 10 minutes. Increase your heart rate, improve flexibility, and build muscle strength!

If you have access to the Internet, you can track your physical activity by going to [http://www.bam.gov/sub\\_physicalactivity/cal\\_index.asp](http://www.bam.gov/sub_physicalactivity/cal_index.asp), where you can create a customized physical activity calendar.

- Activity Calendar (in English and Spanish) – online at
  - [http://www.aahperd.org/naspe/Toolbox/pdf\\_files/May09/Calendar\\_Sec\\_Eng.pdf](http://www.aahperd.org/naspe/Toolbox/pdf_files/May09/Calendar_Sec_Eng.pdf) (English)
  - [http://www.aahperd.org/naspe/Toolbox/pdf\\_files/May09/Calendar\\_Sec\\_Span.pdf](http://www.aahperd.org/naspe/Toolbox/pdf_files/May09/Calendar_Sec_Span.pdf) (Spanish)
- “10 at a Time” Activity Calendar – online at
  - [http://www.aahperd.org/naspe/Toolbox/pdf\\_files/May09/Ten.pdf](http://www.aahperd.org/naspe/Toolbox/pdf_files/May09/Ten.pdf)
- Small Space Energizers – online at
  - <http://www.ncpublicschools.org/docs/curriculum/healthfulliving/resources/instructional/middleschoolenergizers/healthfuliving.pdf>
- Muscle Strengthening Routine at Home – online only
  - <http://cdc.gov/physicalactivity/everyone/videos/index.html>
- Physical Activity Games – online only
  - <http://www.kidnetic.com/Kore/>



# November 2012

## Secondary Physical Activity Calendar



Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	<p>MilkPEP and the NBA teamed up to launch <i>Get Fit By Finals</i>, a new fitness and nutrition education initiative for teens. Visit <a href="http://www.MilkDelivers.org">www.MilkDelivers.org</a> NOW to download a FREE <i>Get Fit</i> activation kit that includes a guide to implementing <i>Get Fit By Finals</i> in your school -- plus fitness and nutrition tips and tools from the NBA. <b>Log on by May 1</b> and tell us how you're getting your students fit and you could be eligible to WIN A GYM MAKEOVER FOR YOUR SCHOOL! Also, check back to Web site weekly for new NBA player videos you can use in your classroom or gym to help motivate your students to get fit.</p>			<p>1 25 body squats w/ hands behind your head. Now 3 sets of as many push-ups as you can do.</p>	<p>2 4 intervals, 15 min running, walk for 1 min between each interval.</p>	<p>3 Get outside today with the family and go fly a kite!</p>
<p>4 3 sets/15 reps bench press; 3 sets/ 15 reps tricep dips.</p>	<p>5 Jump rope 2 min, fast walking 2 min, 12 minute run; repeat 3X.</p>	<p>6 3 sets/15 reps body squats, then 3 sets/20 reps concentration curls.</p>	<p>7 1 mile fitness run, sprint 50 yds, jog 50 yds- do this for 1 mile. Try again for a second fitness mile.</p>	<p>8 3 sets /to tolerance, sitting overhead press. 3 sets/15 reps lying hamstring curl.</p>	<p>9 4 sets/10 reps lying leg raises; 4 sets/10 reps lifting side plank.</p>	<p>10 Go bowling today with friends or family. No lanes? Make pins from old 2 liter bottles filled w/sand or water.</p>
<p>11 3 sets/12 reps inclined push-ups; 3 sets/15 reps tricep extensions.</p>	<p>12 Yoga plank position-hold and raise each leg one at a time 10X. Repeat 2 more sets. 3 sets/12 reps toes to ceiling on bench.</p>	<p>13 15 squat jumps with a ball extending overhead; 3 sets 15 reps one-arm row to both sides.</p>	<p>14 2 min of ab work-basic crunches, crunches with legs up, twisting crunches. Repeat two more times.</p>	<p>15 3 sets/15 reps stiff-legged dead lift; 3 sets/20 reps standing lateral raise.</p>	<p>16 Speed play today: run, jog, run fast, walk, skip, run for a total of 40 min. Stretch afterward.</p>	<p>17 Find 3 friends, go to the park and play 2 v. 2 volleyball.</p>
<p>18 3 sets/12 reps declined push-ups; 3 sets/12 reps flies.</p>	<p>1 3 sets/20 reps knee tucks on a bench; 3 sets/15 reps reverse crunch.</p>	<p>20 3 sets/20 reps bicep curl w/resistance; 3 sets/15 reps back extensions.</p>	<p>21 Find a basketball and perform 4 sets of 25 crunches with the basketball held under your chin.</p>	<p>22 Alternating walking lunges- 3 sets/20 reps; 4 sets/8 reps standing shoulder press.</p>	<p>23 Ride a bicycle for one hr-pick a scenic route around town. Wear your helmet! No bike? One hr power walk/jog.</p>	<p>24 Find a tennis court, play tennis for 30 minutes or hit against a wall</p>
<p>25 3 sets/10 reps wide arm push-ups; jump rope for 2 min in between each set.</p>	<p>26 4 sets/10 reps twisting bench crunch; 10 min power walk in between each set.</p>	<p>27 3 sets/15 reps superman; 3 sets/20 reps alternating bicep curls.</p>	<p>28 How about some 3 on 3 basketball today?</p>	<p>29 3 sets/20 reps calf raises off a step; 3 sets/ 15 reps seated overhead press.</p>	<p>30 3 sets/15 reps single leg lift; 10 min. jog in between sets.</p>	



# November 2012



## Ten At A Time Physical Activity Calendar

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Need help remembering exercises? Go to <a href="http://www.shapefit.com/training.html#8">http://www.shapefit.com/training.html#8</a> for demos of exercises.	<i>Duplicated with permission from the National Association for Sport and Physical Education (NASPE). To assess whether your child is receiving a quality physical education program, visit <a href="http://www.naspeinfo.org/observePE">www.naspeinfo.org/observePE</a> for an observation assessment tool.</i>			<b>1</b> <b>Squats w/ hands behind your head.</b>	<b>2</b> <b>Power-walk 10 min.</b>	<b>3</b> <b>Tricep dips.</b>
<b>4</b> <b>Bench press.</b> 	<b>5</b> <b>Jump rope.</b>	<b>6</b> <b>Concentration curls.</b>	<b>7</b> <b>Lying hamstring curl.</b> 	<b>8</b> <b>Sitting overhead press.</b>	<b>9</b> <b>Lying leg raise.</b>	<b>10</b> <b>Lifting side plank.</b> 
<b>11</b> <b>Inclined push-ups.</b>	<b>12</b> <b>Yoga plank position.</b>	<b>13</b> <b>One-arm row to both sides.</b> 	<b>14</b> <b>Twisting crunches.</b>	<b>15</b> <b>Stiff-legged dead lift.</b>	<b>16</b> <b>Jump rope 10 min.</b>	<b>17</b> <b>Tricep extensions.</b>
<b>18</b> <b>Declined push-ups.</b>	<b>19</b> <b>Knee tucks on a bench.</b>	<b>20</b> <b>Bicep curl w/resistance.</b>	<b>21</b> <b>Crunches with a basketball held under your chin.</b>	<b>22</b> <b>Alternating walking lunges.</b>	<b>23</b> <b>10 min power walk/jog.</b>	<b>24</b> <b>Toes to ceiling on bench.</b>
<b>25</b> <b>Wide arm push-ups.</b>	<b>26</b> <b>Twisting bench crunch.</b>	<b>27</b> <b>Superman.</b>	<b>28</b> <b>Standing shoulder press.</b>	<b>29</b> <b>Calf raises off a step.</b>	<b>30</b> <b>Single leg lift.</b>	<i>Each day lists one exercise that can be executed "10 at a time." Keep track of each set of 10 reps you accomplish throughout the day, or for cardio, ten minutes of the activity.</i>

# **Arts Activities for Grades 6-8**

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*A number of the activities listed reference specific works of art. If you are not familiar with them you may find them on the internet (even the performances). However, these are provided as examples, and you can substitute similar works of art with which you are familiar or to which you have access.*

All Arts Activities taken from the *Blueprints for Teaching and Learning in the Arts: Grades PreK-12*.

## **DANCE**

- Create a work using original movement material, devices to manipulate phrases, and a clear choreographic structure.
- Analyze how varying the use of force affects the way a movement feels, is perceived, and is interpreted.
- Maintain a dance journal, including dance research, dance resources and notation.
- Reflect upon personal criteria for evaluating dance, and share in discussion.
- Research the connections between two dance styles.
- Make a “family tree” of a dance form including major artists and dates of significant works.
- Research the period in which a choreographer was working or a dance form arose.
- Choose from a “grab bag of countries,” and research the dances of the country chosen.
- Brainstorm the ways in which studying dance affects students’ health.

## **MUSIC**

- Listen to the folk song “Shenandoah,” and write a private journal entry describing feelings evoked by the music.
- Share a recording or performance of a song from a particular culture that evokes a similar personal response.
- Compare at least two different settings of the same text in a choral work from online resources. Discuss specific similarities and differences in repertoire, such as: “Ave Maria” (Schubert, Byrd, others), “Still Nacht”/“Silent Night”(Gruber; German and English versions), “Anvil Chorus” (Verdi; Italian and English versions), “Toreador Song” (Bizet; French and English versions).
- Compare a jazz song performed by two different soloists— such as “Cherokee” (R. Noble) by Charlie Parker, Ella Fitzgerald, Wynton Marsalis, or others—listening for differences and similarities in “musical voice.”
- Create a “Top 10 list” of favorite performers, repertoire representative of classical, world, jazz, and popular music styles and genres. Each item should be supported by a written explanation containing music vocabulary, where appropriate.
- Prepare a historical timeline reflecting world, national, state, or municipal events and their corresponding musical components.

## **THEATER**

- Rehearse and perform a scene in front of others.
- Rehearse and perform the same scene in three distinct styles or genres such as situation comedy, reality show, soap opera, disaster movie.
- Research and portray a character, using at least one appropriate costume piece, prop, gesture, need and physical shape.
- Perform the written word in a reading or memorized presentation.
- Using original writing related to a specified theme, develop it into a monologue.

- Write a scene that has:
  - a plot comprising of a sequence of actions characters with clear intentions/wants
  - obstacles to characters' wants
  - character growth or transformation from overcoming an obstacle or resolving conflict
  - unified and consistent theme
  - written stage directions, including character descriptions and notes
  - clear and articulated choices about dramatic style, structure and convention
- Analyze a dramatic script for elements of structure, character development, conflict and plot.
- Create a marketing poster for a show with an identifiable dominant image.
- Measure a room and create a ground plan including furniture and other elements from the room.
- Make a CD or audio tape to score a scene.

## **VISUAL ARTS**

- Create a painting that demonstrates:
  - the rich use of a specific painting medium such as: watercolor, tempera or acrylic
  - awareness of light, value and contrast
  - strategies to depict the illusion of depth
  - use of prior observational sketches
- Create a pencil, conté, or pen and ink drawing that demonstrates:
  - perspective
  - observation of detail
  - scale of objects and figures
  - a wide range of values
  - a personal view
- Discuss techniques of perspective and scale, artist's choice in degree of detail, artist's message.
- Create a collage that demonstrates:
  - use of a variety of materials and textures
  - unity through color
  - balanced composition

# Educational TV Shows

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Channel	Show	Subject	Day	Time	Recommended Audience	Description
Discovery	How It's Made	Science, Engineering	Weekdays	6:00-7:00 PM	4-5, 6-8, 9-12	The show is a documentary program showing how common, everyday items (including food products like bubblegum, industrial products such as motors, musical instruments such as guitars, and sporting goods such as snowboards) are manufactured.
Discovery	Mythbusters	Science, Engineering	Weekdays	2:00 PM	4-5, 6-8, 9-12	MYTHBUSTERS mix scientific method with gleeful curiosity and plain old-fashioned ingenuity to create their own signature style of explosive experimentation.
WLIW and WNEW	NOVA	Nature, Science	Thursdays	9:00 PM,	6-8, 9-12	Award winning science show on various subjects from space to evolution to ancient civilizations. Episodes available online with additional resources. <a href="http://www.pbs.org/wgbh/nova/">http://www.pbs.org/wgbh/nova/</a>

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NYC TV - 25	Globe Trekker	Geography	Weekdays	7:30 PM	6-8, 9-12	Globe Trekker transports viewers to unforgettable destinations through its stunning photography, rhythmic indigenous music and spirit of adventure. In each episode, one vibrant young traveler ventures off-the-beaten path to soak up the local culture, sample the cuisine and revel in