

**Global Warming  
We Can Make a Difference  
Passport Resource Guide  
Grades 9-12**

**K-W-L Chart**

Before participating in the Global Warming Passport:  
As a class, or in groups, complete the first and second column of the KWL Chart.

GLOBAL WARMING		
What I know	What I want to know	What I learned

After participating in the Global Warming Passport:  
Complete the third column of the KWL Chart.

Use the information gathered to develop questions students can ask during the Passport. You may also use this information to participate in the activities described in this resource guide as well as determine additional research that would interest students.

**Vocabulary Words**

**Greenhouse Effect** – natural effect in which green house gases allow heat from the sun to enter the Earth’s atmosphere and keep infrared radiation from escaping the Earth’s atmosphere. It keeps the Earth’s temperature warm enough for living things to survive.

**Climate Change** – Climate is the long-term average of all aspects of a region’s weather. Climate change represents a change in these averages.

**Global Warming** – average increase in the Earth’s temperature which causes Climate changes

**Weather** – describes whatever is happening outdoors in a given place at a given time and includes precipitation, barometric pressure, temperature and wind conditions

**Climate** - total of all weather occurring over a period of years in a given place

**Atmosphere** – a thin layer of mixed gases that cover the Earth and make up the air we breath

**Biosphere** – part of the Earth's atmosphere, land, and oceans that supports living organisms

**Oceans** – cover 70% of the Earth's surface; have thermal properties which means the water stores heat

**Land** – covers 27% of the Earth's surface; different types of land and landforms affect weather patterns

**Ice** – covers 3% of Earth's surface; provides largest supply of freshwater

### **Websites:**

**For more words related to Global Warming go to:**

<http://www.epa.gov/climatechange/kids/glossary/index.html>

**For demonstrations on how global warming occurs go to:**

Global Warming

[http://www.epa.gov/climatechange/kids/global\\_warming\\_version2.html](http://www.epa.gov/climatechange/kids/global_warming_version2.html)

Water Cycle

[http://www.epa.gov/climatechange/kids/water\\_cycle\\_version2.html](http://www.epa.gov/climatechange/kids/water_cycle_version2.html)

Carbon Cycle

[http://www.epa.gov/climatechange/kids/carbon\\_cycle\\_version2.html](http://www.epa.gov/climatechange/kids/carbon_cycle_version2.html)

What can we do on a daily basis to make a difference?

<http://www.epa.gov/climatechange/kids/difference.html>

Additional general information

<http://www.epa.gov/climatechange/kids/cc.html>

## **Activity 1: What can I do/What can you do?**

1. Each student will use their family electricity bill/monthly statement to document the amount of electricity their household used for a specific billing cycle. The class may decide if they want to compare:
  - A specific month from last year to the same month this year (March 2006 and March 2007)
  - Last month and this month (March and April)

Discuss the variables associated with each plan. For example if the weather has changed drastically from one month to the next, it might be easier to compare the same month from two different years. Variables that may need to be considered are:

- Temperature/weather
- Number of people living in the household
- New large appliances that may have been installed

Note: Students do not need to share the dollar amount of their family bill, just the watts used.

2. Each student and/or group will determine one conservation tip they want to implement in their homes. They will have to bring family members on board with the plan as well. For example:
  - Turning lights off when you leave a room
  - Running the dryer less by hanging clothes to dry
  - Turning the air conditioner up 3-5 degrees or heater down 3-5 degrees
  - Keeping doors closed when air conditioning or heat is on

*Students will think of other strategies as well*

3. Students will implement plan for one month (or billing cycle) and then bring comparison energy usage to class. All students who chose the same conservation tip, for example, running the dryer less, will work together to build a graph that communicates their results.
4. The class will then create an overall chart that compares the different conservation strategies and outcomes.
5. Depending on results, students may want to continue to implement conservation strategies and document results. They may want to switch conservation strategies and try different strategies in different homes,

document changes in outcomes and develop/test hypotheses on contributing variables.

6. At the end of the project students will compile all data including general information on global warming, and create a report with visual and textual information to present to their classmates, PTO and/or other community groups.

## **Activity 2: What is our alternative?**

Divide the class into groups and have each group research one of the following energy alternatives, or another alternative they find. Have each group list the pros and cons of each alternative. Students can also do further research to determine if each alternative is a viable solution for your community.

### **Solar power**

It's been around a long time, but it's taken a while to develop an effective way of harnessing the Sun's energy.

Now, though, solar panels are a feature of many homes, generating electricity via photovoltaic cells.

They are now also being tested on sound barriers on the M27 in Hampshire to provide electricity as well as noise protection.

### **Water**

Hydro-power is safe and pollution-free, but is limited by location and the upheaval it can cause.

Hydro-electric power, where vast amounts of water are stored and then released at force, needs big sites; wave and tidal power need coastlines and can be costly to set up.

The UK's first wave-energy station, connected to the National Grid, is in Islay.

### **Wind**

The exposed UK is ideally placed to take advantage of the world's fastest-growing renewable-energy choice.

Modern windmills are environmentally friendly and use an endless – if fluctuating – source.

But their noise and obtrusiveness have generated some complaints, and the cost of setting up wind farms remains an obstacle.