

Discover Your Changing Climate

Rangers in the Classroom—Post-visit Lesson Plan



Grade Level: 5th

Setting: Classroom

Duration: 45 min —1 hour

Standards Addressed:

5th Grade

- ° Reading Comprehension:
2.2—2.4
- ° Writing Applications:
2.4
- ° Listening & Speaking:
1.4, 1.5
- ° Number Sense:
2.2
- ° Algebra and Functions:
1.1
- ° Mathematical Reasoning:
1.2, 2.2, 2.4

6th Grade

- ° Reading Comprehension:
2.1, 2.3, 2.6
- ° Writing Strategies:
1.1, 1.3
- ° Writing Applications:
2.5
- ° Speaking Applications:
2.4
- ° Mathematical Reasoning:
1.1—1.3, 2.4, 2.5

Introduction:

Thank you for joining us on an exciting adventure into the complex world of global climate change with our Discover Your Changing Climate program. We created this post-visit activity to review, reinforce and enrich your students' understanding of this valuable resource. Please refer to the program outline we provided during our visit to your class for additional sources of information. We hope you enjoyed the ranger visit and invite us back soon. Have fun!

Materials:

- ° Worksheets
- ° Pen or pencil
- ° Calculator
- ° Paper or poster board
- ° Markers or colored pencils

Instructions:

1. Students will evaluate different arguments and information to create a persuasive writing sample.
2. Students will review the information from the pre-visit energy use inventory of their home.
3. Students will create a flyer encouraging their family to conserve energy using the information from the ranger program and the four page worksheet as their guide.
4. The worksheet contains information on a variety of energy conservation methods. It walks the students through a number of math calculations to reinforce the financial implications of different choices.
5. Students will present their work aloud to the class.

Discover Your Changing Climate

Rangers in the Classroom—Post-visit Activity



Communicating about Global Climate Change

There will always be some uncertainty when we talk about complex systems like the earth's climate. Our understanding of the causes and possible consequences of global climate change is growing each day. Current scientific evidence shows us that human activity is affecting our global climate. Our atmosphere now has more carbon dioxide in it than in the previous 650,000 years. Most of this additional carbon dioxide is the result of humans burning fossil fuels for energy and the leveling of forests to make way for building and agricultural land. Carbon dioxide is a major contributor to the greenhouse effect and the warming of our planet.

Based on this information, scientists tell us that the climate is changing. Now is the time for all of us to reflect on our role as citizens of this earth. What can you do to get people thinking about and talking about climate change? Climate change is a global topic, but you can make a difference by making small changes in your own home.

Your assignment is to create a **flyer** to persuade the members of your family to use less electricity. You can make the flyer any size from a sheet of paper to a poster. Some ideas are to use things like poems, narratives, or tables to make your point. Use the information you gathered during the Energy Inventory activity to help you understand where electricity is used in your home and to give you ideas about where you can conserve or save energy.

Accurate information is important when telling people about climate change. You can use the information on the next few pages for ideas to make your flyer more persuasive.

Get creative with your flyer! Have fun!

Discover Your Changing Climate

Rangers in the Classroom—Post-visit Activity



Walk or Bike to School

Walking, riding a bike or a skateboard to school results in no new carbon dioxide emissions. Parents are worried about safety, so it is important to be alert to traffic and aware of your personal safety. Use helmets and travel in groups or with a buddy to stay safe.

What about creating a “walking bus” or “pedal train?” This is a safe and simple idea where an adult “driver” meets a groups of students and they walk or bicycle to school together. Riding the bus or carpooling with other families would also reduce carbon emissions by reducing the number of vehicles on the road.

Turn off the Car While Waiting in the Pick-up Line

Most drivers leave their cars running at different times of day for different reasons. An idling car wastes fuel. A car idling for two minutes uses the same amount of gas required to drive approximately one mile. If a driver idles for one hour, about one gallon of gasoline is wasted. Contrary to automotive myth, restarting a car doesn't damage the engine. In fact, 10 seconds spent idling consumes more fuel than restarting the engine.

Light bulbs



A conventional bulb is basically a wire in a glass tube. When the light is turned on, an electrical current runs through this wire heating it up. When the wire gets hot enough it produces light. This process is called incandescence and was first discovered by Thomas Edison in 1879. These bulbs are called incandescent bulbs. Unfortunately, incandescent bulbs are not very efficient — only about 10% of the energy used by the bulb creates light. The rest is given off as heat.



A compact fluorescence light (CFL) uses a different technology to produce light. In a CFL, the glass tube contains an inert gas, liquid metal, and phosphorus instead of a wire. When a CFL is turned on, the electrical current passes directly from one end of the tube to the other. The electricity causes a chemical reaction between the materials in the tube which creates light. This process is much more efficient than an incandescent bulb.

According to the U.S. Department of Energy, if every American home replaced just one incandescent bulb with a compact fluorescent bulb, we would save enough energy to light more than 3 million homes for a year (that is six times the number of people living in Tulare County). (From: www.energystar.gov)

Wash Your Clothes in Warm or Cold Water

Electricity in the U.S. is measured in kilowatts. Energy companies charge for the number of kilowatts used in an hour. The cost per kilowatt hour (kWh) of electrical use varies across the country from \$0.15 to \$0.80 or more per hour. Household appliances uses varying amounts of energy depending on how old they are. The amount of energy used by a washing machine is directly related to the temperature of the water you are washing with. Almost 90% of the energy used by your washing machine goes to heating the water. The easiest way to save energy is to wash your clothes in cold water.

Discover Your Changing Climate

Rangers in the Classroom—Post-visit Activity



Bring Your Own Bags to the Grocery Store

Both paper and plastic bags take energy to make. They both consume large amounts of natural resources and will eventually end up in a landfill. Both types of bags can be recycled to some extent and can be used around the house. It is hard to determine which is better for the environment as both have pros and cons. Some people believe plastic is the better overall choice, others paper. Paper may consume more resources to produce, however, it is also more recyclable than plastic if you include the fact that paper can be composted and plastic bags cannot. (From: www.reuseit.com).

Instead of using plastic or paper bags, bring your own reusable bag to the grocery store. There are endless varieties of reusable bags and many are made from recycled materials. Some stores will give you a credit of five cents for every bag you bring in. Countries around the world and some cities in the U.S. are banning the use of plastic bags at checkout or are charging for them. This makes using a reusable bag a smart choice for the environment and your wallet.

Phantom Electricity

Phantom electricity, vampire loads or leaking electricity are all phrases used to describe the energy consumed by household appliances and electronics that are switched off or are in standby mode. It is estimated that phantom electricity accounts for 5—10% of U.S. residential energy consumption. The table below lists several common phantom energy devices in our homes.

Device (on, but not in use)	Watts used per hour
Phone charger plugged in	.3
Computer screen in sleep mode	1.4
Computer in sleep mode	21.1
Computer modem left on	5.4
Inkjet printer left on	5.3
Computer speakers left on	44.7
Cable Box with DVR turned off	44.1
DVD player left on	7.5
Game console left on	23.3
Microwave plugged in	3.1
Calculate the TOTAL:	

You can use the backside of this page to calculate your answer:

Discover Your Changing Climate

Rangers in the Classroom—Post-visit Activity



1. How many watts could be saved in one day if we unplugged all of the above appliances for 15 hours while we are asleep or away from the house? (hint: calculate total watts used each hour in table above and multiply by 15)
2. How many watts would be saved each week? (hint: There are 7 days per week.)
3. A kilowatt is equal to 1,000 watts. How many kilowatts would be saved each week?
4. If electricity costs \$0.15 per kilowatt/hour, how much money would be saved in one week by unplugging these devices?
5. If each kilowatt hour produces .52 pounds of CO₂, how much CO₂ could be saved each week by unplugging these devices?

Take a look around your home...do you see other devices that are wasting electricity when no one is using them?
