Name ______________________________

Class ______________________________

School ______________________________

Date ______________________________

Energy Smarts Team Pretest

1. It pays to turn off the lights in a room as soon as it is empty for more than

   a) 1 second.

   b) 1 minute.

   c) 5 minutes.

   d) 15 minutes.

2. On a cool sunny day, the best idea is to

   a) open the shades and turn on the lights.

   b) close the shades and turn on the lights.

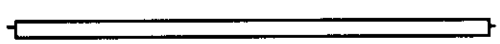
   c) open the shades and turn off the lights.

   d) close the shades and turn off the lights.

3. An incandescent light bulb is the most common type used in homes. When it is on it

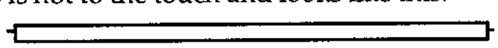
   a) is warm to the touch and looks like this:

   b) is warm to the touch and looks like this:



   c) is hot to the touch and looks like this:

   d) is hot to the touch and looks like this:



4. Which light bulb uses the most electricity?

   a) a 70 watt incandescent.

   b) a 70 watt fluorescent.

   c) They both use the same.

5. Which light bulb produces the most light?

   a) a 70 watt incandescent.

   b) a 70 watt fluorescent.

   c) They give off the same amount.

6. A school can lose energy right down the drain! All drips being equal, the most expensive leaky faucet

a) is a cold water faucet.

b) is a hot water faucet.

c) is a warm water faucet.

7. If someone asked you which was longer, a 40 centimeter snake or a 2 foot long snake, you would have to convert them both to the same units. It works this same way with energy: Electricity that lights a bulb, oil that burns in a furnace, and heat your body gives off can all be converted to Btu. A Btu is about the amount of heat energy in

   a) one wooden kitchen match.

   b) one firecracker.

   c) one average fireplace log.

   d) one gallon of gasoline.

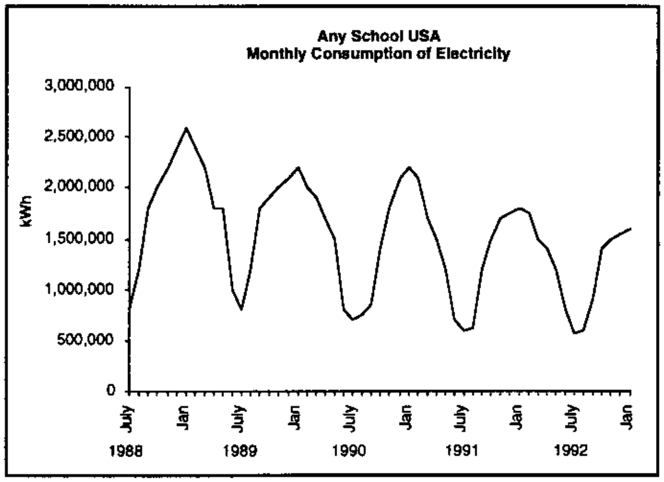
8. Electricity is measured in

   a) therms.

   b) watts.

   c) gallons.

   d) pounds.



9. This graph shows how much electricity was used at Any School USA during a 5 year period. In which month did Any School USA use the most electricity?

a) January 1989.

b) July 1991.

c) March 1990.

d) January 1992.

10. Many tools and appliances besides overhead lights use electricity in schools. Name three common items found at school besides lights that use electricity.

a)

b)

c)

H.T. Rae Simulation

Grades 4-6
Subjects: science and social studies

Activity:

Divide participants into problem-solving groups. Read aloud the H.T. Rae story (p. 14) or show it on an overhead transparency. Encourage groups to brainstorm solutions to the problem. Participants may either write down or draw their solutions.

Ask each group to share one or two solutions that represent the general feeling of the entire group. The instructor records suggestions on the board or on a large sheet of butcher paper.

The ending to the story is read or shown on the overhead projector. The instructor asks the class which solutions suggested by the class might really work.

Once participants realize that the astronaut group, the Uoy, really represents the majority of us, participants often change their minds about what should be done to solve the problem.

Solutions suggested by other students

"Lock them up in a space jail and throw away the key."

"Confine them to their own space and only give them enough food to barely exist."

"Tell them what they are doing wrong and warn them that if they don't change they'll be punished."

"Train them about recycling and other things that will make them understand how to improve."

"Force them out of the spaceship into space and let them deal with what it's like out there."

"Torture them by only giving them a few crumbs to eat until they learn their lesson."

"Do the same to them.... Take their food, mess up their air and water.... Maybe they won't be so mean if they saw how it felt."

H.T. Rae questions for discussion

1. Shall we lock up all people who pollute air and water?

2. Many people drive automobiles. What should be done about people who pollute air with their automobiles?

3. What shall we do with people who generate garbage? After all, most garbage is disposed of in a way that pollutes. Using landfills to bury garbage and incineration to burn garbage each presents a different pollution problem.

4. What about people who waste electricity? Leaving electrical appliances and devices on when they're not being used wastes energy. More energy must be produced when we waste it. Producing energy is expensive and uses earth's valuable resources.

5. Ask other questions that draw attention to the fact that each of us pollutes and wastes resources to some extent.

The H.T. Rae story

The H.T. Rae is a large spaceship that contains everything required for a long mission to explore the universe. Garden plots with fertile soil provide enough food for the astronauts during their voyage. The ship also has the ability to continually purify air and water—recycling these elements for the astronauts' use. The ship, however, has only a limited amount of natural resources on board.

Acquiring additional resources would not be a possibility for the astronauts. Wise use of natural resources on board is important if the ship is expected to have enough for its entire voyage.

The H.T. Rae is fully equipped to support everyone on board, but each of its systems must be carefully maintained, as there is no extra water, air, soil, food, or other resources. Successful maintenance of the entire ship and its systems depends on careful balance of each element and on cooperative behavior of all astronauts.

On board the H.T. Rae are many groups of astronauts. Most groups work well together and help one another for the good of the ship. One of these groups, the Uoy, is well-known for wanting more food than their own areas can produce. They buy, and sometimes take, some of the other astronauts' resources. They don't use resources wisely. In fact, they have been known to throw away their food and waste. This pollution has created a problem with the ship's clean water supply.

The Uoy have often been known to burn their excess waste, polluting the ship's air supply. This group of astronauts has really had quite an effect on the rest of the ship.

What should be done?

(Read the following after the group finishes the H.T. Rae simulation.)

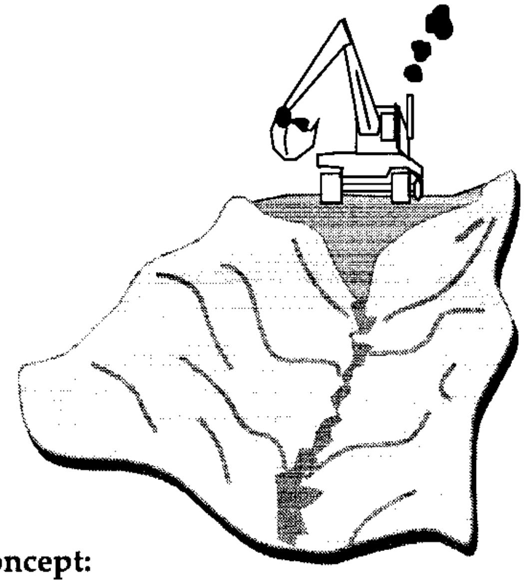
H.T. Rae is *Earth* spelled backwards. The spaceship represents Planet Earth. Uoy is *you* spelled backwards—this is to point out that we, as human beings, are often guilty of using more natural resources than we need. We are often guilty of throwing away and burying or burning our waste, which pollutes our water and air.

All of the air, water, soil, and natural resources we will ever have are on Earth now. We breathe the same air the dinosaurs breathed and drink the same water they drank. We are rapidly using up natural resources that have taken millions of years to make. We are the astronauts on Spaceship Earth, and it is our responsibility to keep the ecosystem in balance for future generations of inhabitants and to use our natural resources wisely.

Cookie Mining Simulation

Grades 4-6

Subjects: science, math, and social studies



Concept:

- Coal deposits, like many natural resources, are unevenly distributed throughout the world.
- Mining, like other methods used to extract natural resources, affects the environment to varying degrees.
- Many factors need to be considered when making decisions regarding the wise use of natural resources.

Background:

At present, coal provides nearly 20 percent of total United States domestic energy needs. This translates to nearly 3 tons per person each year. At present rate of use, world coal supplies will last slightly more than 70 years.

Fifty years ago when most coal mining was done manually, *underground* mines accounted for 96 percent of coal produced each year, while *surface* mining accounted for only 4 percent. Today, surface mining has increased to nearly 60 percent.

Before a company can surface mine, it must gather information about the site regarding growing conditions, climate, soil composition, vegetation, wildlife, etc. With this information, the company must post a bond for each acre of land it mines to ensure that it will be properly reclaimed.

What you'll need:

- Large, soft chocolate chip cookies, napkins, and paper clips—one of each for every student.
- Butcher paper or large graph paper.
- Optional: juice or milk.

What to do:

1. Give each student a cookie, a napkin, and a paper clip. *They are not to eat the cookies until the exercise is over.*

2. Ask students to suggest what the napkin, cookie, chocolate chips, and paper clip represent in the simulation. (Answers: napkin represents space, the universe; cookie, the earth; chocolate chips, coal; paper clip, mining machinery.)

3. Suggest that students pick a role to play in the simulation. Tell them not to divulge their role at this time. Possible role choices include:

   The president of a coal company—emphasis on mining a maximum amount of coal as a primary responsibility.

   An extremely environmentally conscious person—emphasis on taking care of the earth and its resources as a primary responsibility.

   A middle-of-the-roader—person who tries to strike an even balance between profits and environment.

Number of chips found before mining

Student name	# of chocolate chips
Rosie	16
Larry	19
Joe	13
Cindy	20
Malcolm	18
Carmen	16
Louie	16
Shawn	19
Susan	18
Billy	19
Cecile	18
Juan	21
Abby	17
JoAnne	17
Charlie	20
Total # chips	267
Avr. # chips per student	18

4. Instruct students to count how many visible chunks of coal are in their earth. Students may turn the cookie over to include any surface coal visible on the bottom. Record the average number of visible chips on butcher paper or graph.

5. Instruct students to begin "mining" their coal deposits. Students will mine their coal deposits from the perspective of the role they chose earlier.

6. Have students place their coal deposits in one pile and the earth's crust in another. Have students continue "mining" until most appear finished. When students finish, have them record the total number of pieces of coal mined on the butcher paper or graph.

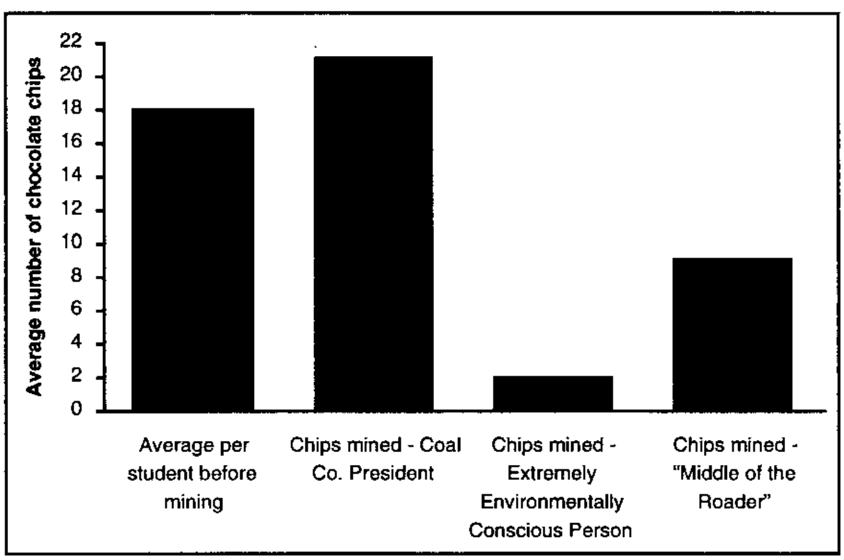
7. Quickly walk around the room asking students to guess the role of a particular student. (A cookie mined by a president of a coal company may appear to have most of the coal mined, with the earth appearing disturbed significantly. Another cookie may appear nearly untouched, with only one or two chocolate chips "mined." This causes minimal impact on the earth. This cookie may be mined by a student taking the role of an environmentalist.) Ask students to explain why they chose their particular role.

8. Before students are allowed to eat their cookie, instruct them to put their "earth" back together. Encourage them to try, even if their cookie looks like a pile of crumbs.

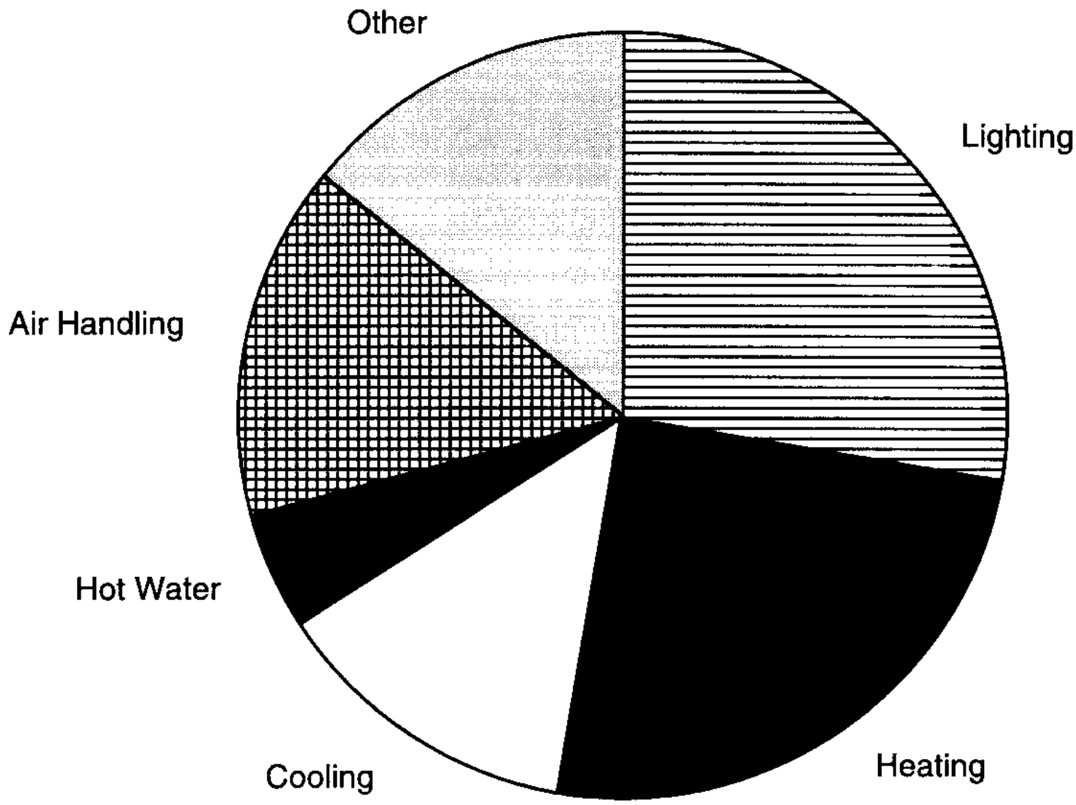
9. Discuss the following points with the class:

- There are more coal deposits than could be seen on the surface.
- "Mining" the deeper coal took more time and was more trouble than mining coal near the surface. (It takes energy to get energy.)
- Coal deposits were unevenly distributed. Some students had more coal deposits than others. Why?
- Once the earth is disturbed by mining, it is difficult to restore to its original state.
- What can be said about the employment of people versus the effect on the earth of obtaining those resources?

10. Allow students to eat their cookie. Provide juice or milk if desired.

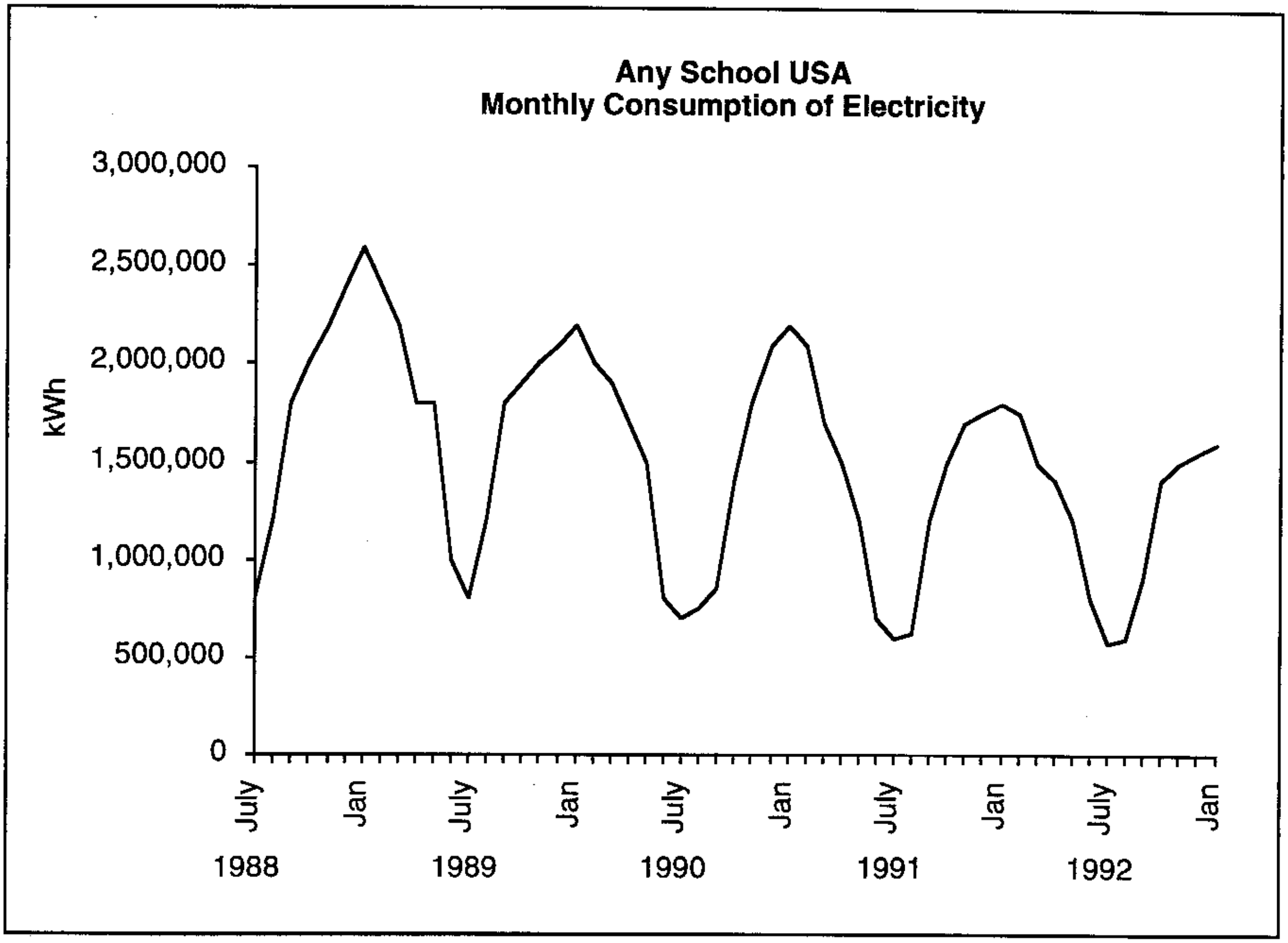


School Energy Consumption



Lighting	28%
Heating	25%
Cooling	13%
Hot Water	5%
Air Handling	15%
Other	14%

Make a transparency of this pie chart. Before you project it, cover up words identifying energy uses. Ask students to guess what energy uses different slices in the pie chart represent. After students guess a school's energy use, uncover words illustrating actual consumption. Point out that lighting is a significant portion of a school's energy use.



Ask students to interpret data on the line graph. Ask them to deduce why electricity use is less during summer months.

What's a Watt?

Grades 3-8
Subjects: science and math

Concept:

- Conservation reduces our energy demands.
- The cost of electricity to run different electrical devices varies.

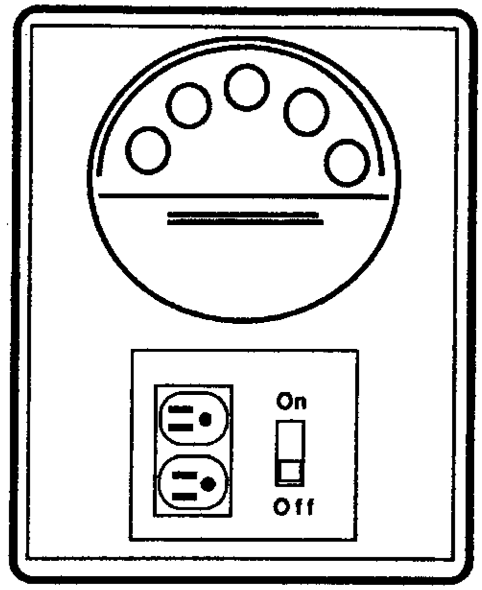
Objectives:

- Students will be able to determine how many watts an electrical appliance uses by timing the dial of a watt-rate meter and by reading electrical consumption information printed on the appliance.
- Students will be able to identify which appliances in their daily lives use more power and which appliances use less.
- Students will be able to state ways they can save energy in their daily lives.

Background:

Electricity is brought to a house through a three-wire cable. An electric meter connected to the household circuit breaker or fuse box shows how much electricity is used. Two *live wires* bring electricity from the fuse box to power outlets (plug-ins), utility boxes (lighting), and wall switches. Each live wire is at a voltage of 120 volts relative to ground and 240 volts relative to each other. The third wire, or *neutral*, is brought to a grounding bar in the circuit breaker box, or attached to a cold water pipe as well as to all power outlets, utility boxes, and wall switches. Every appliance plugged into an outlet also has a ground connection. The appliance ground is connected to the metal or plastic case of the appliance.

At each power and lighting outlet no current flows until a lamp or appliance is plugged in and switched on. However, there is always a voltage at that point whether current flows or not. It is like a water tap; the pressure is always there although there is no flow until it is turned on.



You will find the watt-rate meter a useful addition to your classroom energy equipment. Your local utility company may help you obtain a meter.

Activity:

This exercise uses a watt-rate meter to show students how energy is measured in our homes, and how different appliances use different amounts of energy. A *watt-rate meter* is a device that measures electrical consumption.

What you'll need:

Watt-rate meter, clock with second hand, various common appliances or devices with a wide range of levels of energy consumption. Examples include a 100 watt incandescent bulb, compact fluorescent bulb, hair dryer, electric drill, overhead projector, radio, fan, hot plate, and portable electric heater.

What to do:

1. Time one revolution of the watt-rate meter dial using a 100W bulb. This data should equal 120 seconds for all watt-rate (electrical) meters. It can be used as a standard for students studying appliances.

2. Help students understand that the faster the dial goes, the more power (watts) is being used. Therefore, *half* the time needed for 100 watts would equal 200 watts and *twice* the time would equal 50 watts.

3. Using the watt-rate meter, show students electrical consumption of many common electrical appliances and equipment in the classroom. Switch appliances several times (e.g., from hair dryer to overhead projector) so students can see how speed of the dial changes.

4. Have students determine how many watts per hour different electrical appliances and equipment use. They can do this by timing revolutions of the dial and then calculating watts for that period of time. The 100-watt time is the starting point for calculations. Explain that all watt-rate meters, including the ones in their homes, measure watts at the same speed.

5. Have students record their findings in a chart with three columns. In the first column, write the name of the appliance. In the second column, record the number of seconds it takes for the dial to turn *one* time. Since they know that 100 watts takes 2 minutes (120 seconds) for one revolution, they then can fill in the third column with the number of watts the appliance uses. Have them compare their findings with the chart below:

One turn of the dial in seconds	Watts
7.5	1600
11.25	1200
13	1000
15	800
30	400
45	300
60	200
75	175
90	150
105	125
120	100
240	50

6. Point out the relationship between increased electrical consumption and the generation of heat. (A hair dryer is a good example.)

7. Discuss watt, kilowatt, and kilowatt-hours.

8. Show students that each appliance has electrical consumption information imprinted somewhere on the appliance.

9. Calculate the cost of using the lights in a classroom for one year.

Example:

42 lamps per room X 34 watts each =

42 X 34 = 1428 watts or 1.428 kilowatts (1 kilowatt = 100 watts)

1.428 kilowatts per hour X 6 hours =

8.568 kWh (kilowatt-hours) X $0.03 per kilowatt hour =

$0.26 per day per classroom

$0.26 X 175 days of school per year = $45 per year per classroom just for lights.

(Note: The 3 cents per kWh rate is the rate customers pay for electricity in Eugene, Ore. in 1993. This rate needs to be modified for specific areas. In Rhode Island, for example, customers pay 26 cents per kWh. All conditions being the same, it would cost a typical classroom in Rhode Island $389.84 per year just for lights.)

10. Discuss the two results conservation measures offer—using valuable resources wisely and saving money.

11. Discuss ways students can conserve energy in their daily lives. Some facts about conservation that may be useful to use in discussion include:

- Heat is measured in Btu (British thermal unit)—a common measuring unit of energy. One Btu is the amount of heat needed to raise 1 pound of water 1 degree Fahrenheit. One Btu is approximately equal to the amount of heat generated from one wooden kitchen match.

- The ballasts that charge the gas inside fluorescent lights are much more energy efficient then they were 25 years ago. In fact, energy used by a ballast manufactured 25 years ago would use about 15 minutes worth of electricity. In other words, many years ago it would be beneficial to leave the lights on in a room if you would return within 15 minutes. Many people still believe that leaving the lights *on* saves energy. Today's ballasts are so energy efficient, they require less than a second's worth of energy to ignite the gas inside a fluorescent tube. It does save energy to turn *off* the lights even if you're going to be gone for only a few seconds.

12. A lot of energy is used to heat a school. Discuss some ways to help save energy on heating both at home and in school.

What's a Therm?

Grades 5-8
Subjects: science, math, and social studies

Concept:

- Ability to visualize the amount of energy represented by a therm: what it does, how much it typically costs, how it compares to other energy units.
- What we know about long-term availability of natural gas and possible environmental consequences from its use.
- Options for conserving natural gas.

Background:

Natural gas is a combustible gas found in nature in underground reservoirs of porous rocks, either alone or in association with crude oil. Most commercial natural gas in the United States is *nonassociated gas*—gas that is independent of crude oil deposits.

Natural gas is measured in cubic feet. The largest constituent of natural gas (70 to 90 percent of the volume) is methane. Other components include ethane, propane, butanes, and some larger molecules.

On average, the heating value of commercial natural gas is 1,000 Btu/cubic foot. Heating value for a specific sample varies depending on the amount of gases having a higher heating value (such as ethane) and the amount of inert gases, which lower the heating value. Pipeline quality gas is required to have a minimum heating value of 900 Btu/cu ft.

In the United States before the 1870's, natural gas was considered largely a curiosity. In 1872, the first iron pipeline in the United States was built to carry natural gas 5-1/2 miles for use in Titusville, Pennsylvania. By the 1920's, natural gas production reached 80 billion cubic feet a year. In the 1930's, pipelines carried natural gas from Texas to the Midwest, and the fuel became important for heating and cooking.

By the 1960's, more than 500,000 different chemical compounds were being made from natural gas and oil. These chemicals are used in detergents, drugs, fertilizers, paints, plastics, synthetic rubber, nylon and rayon.

In 1991, 21.58 trillion cubic feet of natural gas was used in the United States. Of this, 4 percent was used in transportation, 14 percent in commercial buildings, 14 percent by electric utilities, 24 percent in homes, and 44 percent in industry.

Natural gas reserves in the United States and Canada were estimated in 1991 to be 338.7 trillion cubic feet.

Improving efficiency:

You can save energy if you get more benefit from each unit of fuel you use. For natural gas, you can improve efficiencies by reducing the amount of energy needed for a given benefit, by improving combustion efficiency, by increasing transfer of heat produced to the desired application, and by improving control so energy is used only when needed.

Natural gas and global climate change:

Methane and the carbon dioxide generated when natural gas is burned contribute to "greenhouse gases." Burning a therm of natural gas releases about 11.8 pounds of carbon dioxide into the atmosphere.

Use of natural gas as an energy source in Oregon was estimated to contribute 4.8 million tons of carbon dioxide in 1988 (about 8.5 percent of all greenhouse gas emissions in Oregon in 1988). Without actions to reduce increases, this is expected to grow to 6.2 million tons by 2005 (about 12.8 percent of the total in 2005). The actual increase is likely to be larger as these figures do not include the use of natural gas to produce electricity. Some Oregon utilities are turning to significant numbers of combustion turbines (which use natural gas to produce electricity) to meet electricity needs in the near term.

Natural gas measurement:

One cubic foot of commercial natural gas (on average)	1,000 Btu*
One kilowatt-hour (kWh) of electricity	3,412 Btu
One therm of natural gas	100,000 Btu

**British thermal unit*

Questions:

1. Natural gas bills typically are based on the number of therms used. Electricity use is based on the number of kilowatt-hours (kWh). How many cubic feet of natural gas are in a therm? How many kWh represent the same amount of energy as a therm of natural gas?

2. How many cubic feet of natural gas would be burned to deliver the same amount of energy as in 1 kWh of electricity?

3. How much does your household pay for a kWh of electricity? If natural gas is available in your community, how much do people pay for a therm of natural gas? In terms of energy available, which is the better buy?

4. If consumption of natural gas in the United States were to remain at 1991 levels, and assuming no imports or exports, how many years would it take before known North American gas supplies would be exhausted?

5. A 100 watt light bulb left on for 24 hours uses energy equivalent to how many therms?

---

6. Savings opportunity:
Draw a line between each action and the appropriate explanation as to why it saves energy.

A. Home insulation

B. Replace a pilot light with an electric ignition

C. Clean furnace filters

D. Sealed and insulated ducts

E. Anticipatory controls

1. Allows proper airflow through the heat exchanger and back into the home. Without proper airflow, more heat goes up the chimney.

2. Less heat is required if the heat that is produced at the furnace is delivered where it is needed in the home. In traditional forced-air furnaces typically 25 to 30 percent of heat is lost in ducts between the furnace and the room where heat is wanted.

3. Reduces the requirements for space heating and cooling.

4. Uses less energy by using energy only when it is actually needed.

5. As rooms get close to the desired temperature the flame stops and final heating is provided by the residual heat in the furnace. This helps minimize the amount of heat lost up the chimney.

Answers:

1. 100 cubic feet/therm, 29.3 kWh/therm
2. 3.4 cubic feet. Because of net energy loss associated with generation of electricity, it takes 3 times this amount or 10 cubic feet to generate 1 kWh of electricity.
3. Price of electricity/kWh X 29.3 kWh/therm. If greater than cost of gas/therm, then gas would be the better buy.
4. 338.7 trillion cubic feet divided by 21.58 trillion cubic feet/year = 15.7 years.
5. 100 watts X 24 hours = 2,400 watt-hours = 2.4 kWh
   2.4 kWh X .034 therms/kWh = .0816 therms
6. A3, B4, C1, D2, E5

Meter Reading

Grades 5-8
Subjects: science and math

Determine how much energy (electricity and/or natural gas) each family uses in one week by reading their power meters. You do this by reading the electric and/or gas meter every day at the same time each day.

Prepare by going over instructions in "How to Read Your Electric and Gas Meter" (p. 24).

Give each person a copy of the "Meter Reading Worksheet" (p. 25). Go over it together.

(Note: Some electric and gas meters may have five faces instead of four.)

Each participant then reads their electric and/or gas meter every day for one week and records the reading on the "Meter Reading Record" (p. 26). They should be sure to read it at the same time each day.

At the end of one week have each participant calculate how much energy (natural gas and/or electricity) their family used. To determine the amount, subtract the first reading from the last, and convert to common units such as Btu. Have the students share and discuss their results.

Possible discussion topics:

- Why do the amounts differ from household to household?
- How might weather affect energy consumption?
- How might the number of people in the family influence energy consumption?
- How might the size, age, insulation/ weatherization, etc. of homes influence energy consumption?
- What were some ways your family used electricity and/or natural gas during the week?

Make a line graph of each household's daily energy use. Possible discussion topics:

- Does the energy use differ from day to day? If so, why?
- Which day did your family use the most energy? Why?

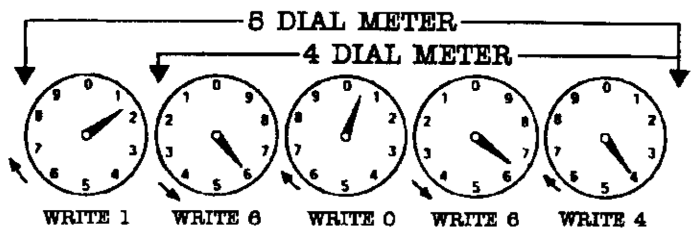
Suggest ways to conserve energy.

HOW TO READ YOUR ELECTRIC AND GAS METER

Name: ______________________________ Date: __________

How To Read Your Electric Meter

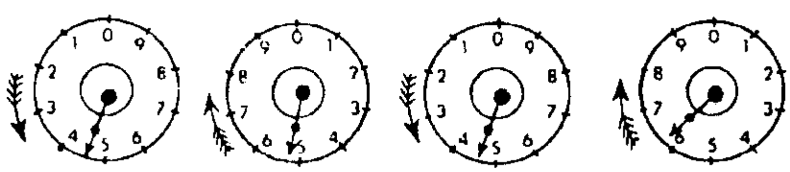
The dials are like watch faces lined in a row (every other dial moves counterclockwise). The reading for a five dial meter would be 16,064. The reading for a four diameter would be 6,064.



Notice that when the pointer is between two numbers, you should record the lower of the two numbers.

When the pointer seems to be directly on a number, look at the dial to the right, if the pointer on the right side dial has passed "0," then write down the number the pointer seems to be on; if the pointer on the right side dial has not passed "0." then write down the previous lower number on the dial you are recording.

How To Read Your Gas Meter



4
Take the number the first pointer has just passed...

5
And the number the second pointer has just passed...

4
And the number the third pointer has just passed...

6
And the number the second pointer has just passed...

Add two zeros 454600
This is the meter reading (in cubic feet of gas).

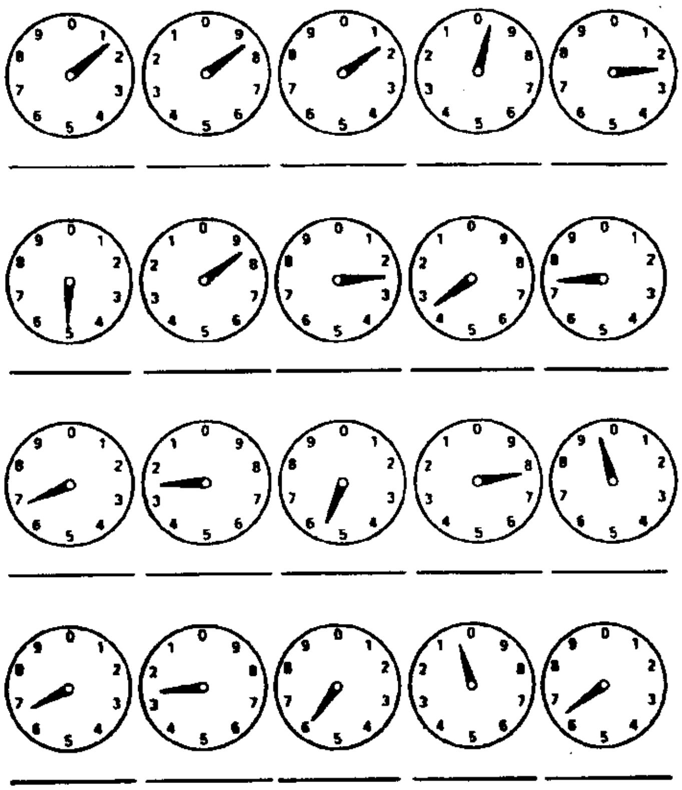
From National Energy Foundation, 1986, Energy 6: Multidisciplinary activities for the classroom developed by the National Energy Foundation especially for teachers. *Used with permission.*

"METER READING WORKSHEET"

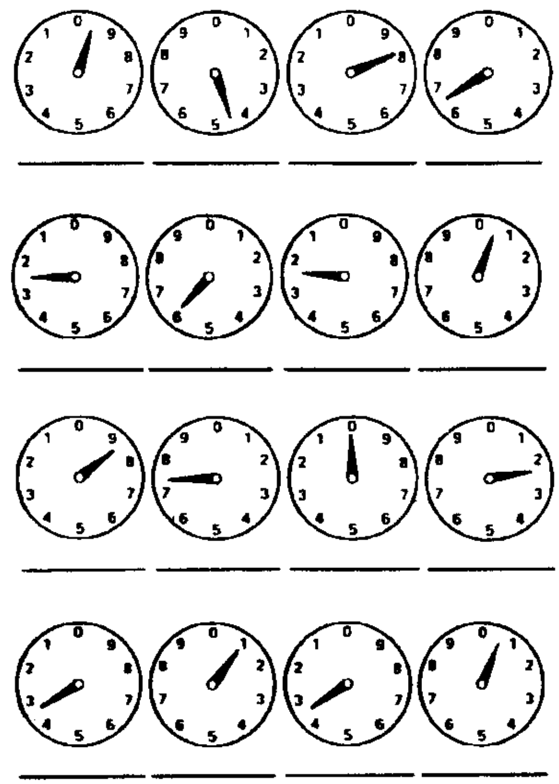
Name: ______________________________ **Date:** __________

Read the following meters and record your answers in the space below each.

Electric Meters



Gas Meters



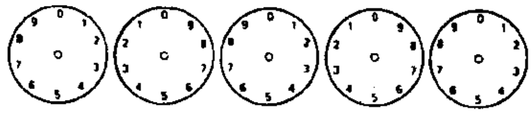
METER READING RECORD

Name: ______________________________ Date: __________

ARE YOU SAVING ENERGY? A good way to find out is to keep a record of the electricity or natural gas you use before and after beginning your conservation effort. The chart below will help you record your progress. 1. Draw the positions of the hands of the meter on the dials each day at the same time. 2. Write the number in the space below each dial and on the line at the right. 3. Subtract the readings on day one from day two. Repeat each day for seven days.

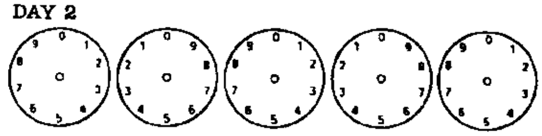
☐ Electric Meter ☐ Natural Gas Meter

DAY 1



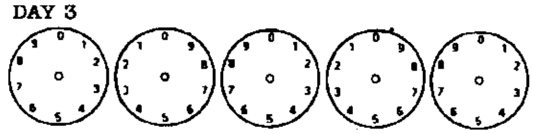
Meter Reading Day 1 __________

DAY 2



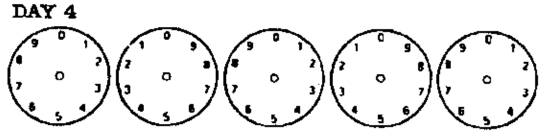
Reading Day 2 __________
Reading Day 1 __________
Energy used __________

DAY 3



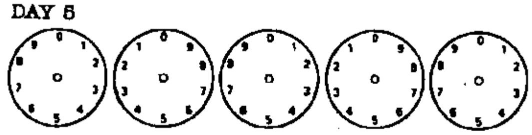
Reading Day 3 __________
Reading Day 2 __________
Energy used __________

DAY 4



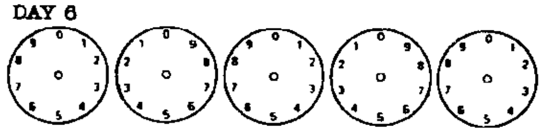
Reading Day 4 __________
Reading Day 3 __________
Energy used __________

DAY 5



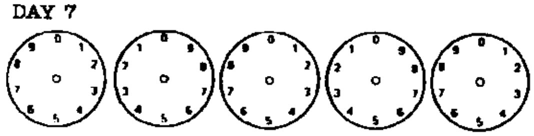
Reading Day 5 __________
Reading Day 4 __________
Energy used __________

DAY 6



Reading Day 6 __________
Reading Day 5 __________
Energy used __________

DAY 7



Reading Day 7 __________
Reading Day 6 __________
Energy used __________

Name ______________________________

Class ______________________________

School ______________________________

Date ______________________________

Energy Smarts Team Post-test

1. It pays to turn off the lights in a room as soon as it is empty for more than

    a) 20 minutes.

    b) 15 minutes.

    c) 5 minutes.

    d) 1 second.

2. One way to save energy on lighting is

    a) to use incandescent bulbs whenever possible.

    b) to use sunlight when possible.

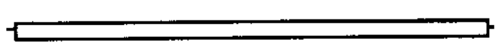
    c) to use light bulbs with more watts.

    d) to keep the window shades closed.

3. A fluorescent light bulb is the most common type used in schools. When it is on, it

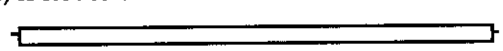
    a) is warm to the touch and looks like this:

    b) is warm to the touch and looks like this:



    c) is hot to the touch and looks like this:

    d) is hot to the touch and looks like this:



4. Which light bulb uses the most electricity?

    a) a 100 watt incandescent.

    b) a 100 watt fluorescent.

    c) They both use the same.

5. Of all the things that schools do, most energy is used for

    a) heating.

    b) cooling.

    c) lighting.

    d) hot water.

6. Which of the following is an energy waster?

    a) a closed door when the heat is turned on.

    b) a water faucet that doesn't leak.

    c) a dark, empty room.

    d) an empty room with a radio on.

7. If someone asked you which was heavier, a 40 pound monkey or a 2 kilogram tomato, you might have to convert them both to the same units before answering. It works the same way with energy. The electricity that lights a bulb, the oil that burns in a furnace, and even the heat your body gives off can all be converted to Btu. A Btu is about the amount of heat energy in

    a) one wooden kitchen match.

    b) one firecracker.

    c) one average fireplace log.

    d) one gallon of gasoline.

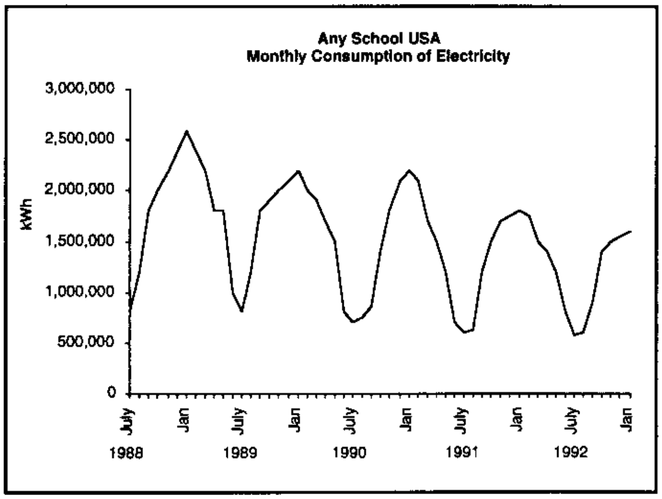
8. Use of electricity is measured in

    a) therms.

    b) kilowatt hours.

    c) gallons.

    d) pounds.



9. This graph shows how much electricity was used at Any School USA during a 5 year period. In which month did Any School USA use the least electricity?

a) January 1989.

b) July 1992.

c) March 1990.

d) January 1992.

10. There are many things that people can do to save energy in schools. Besides turning out lights when leaving the room, give three other energy saving tips.

a)

b)

c)