Draft Detectives

First Grade
Activity: 1
Time: 1 Class Period

General Description
Students will search the school for drafts and propose solutions to fix the loss of energy.

Objectives
Students will relate the waste of energy by drafts to the need for conservation; identifying problem areas of the school and propose solutions.

Arizona State Standards
SC01 S1C1 PO1 Compare common objects using multiple senses
SC01 S1C2 PO1 Demonstrate safe behavior and appropriate procedures (e.g., use of instruments, materials, organisms) in all science inquiry
SC01 S1C2 PO2 Participate in guided investigations in life, physical, and Earth and space sciences
SC01 S1C2 PO4 Record data from guided investigations in an organized and appropriate format (e.g., lab book, log, notebook, chart paper)
SC01 S1C4 PO1 Communicate the results of an investigation using pictures, graphs, models, and/or words
SC01 S6C1 PO5 Identify ways to conserve natural resources (e.g., reduce, reuse, recycle, and find alternatives)

W01 S1C1 PO1 Generate ideas through prewriting activities (e.g., brainstorming, webbing, drawing, writer's notebook, group discussion)
W01 S1C1 PO2 Draw a picture or storyboard about ideas generated

M01 S2C1 PO2 Make a simple pictograph or tally chart with appropriate labels from organized data

LS F2. Give and follow multiple-step directions

Teacher Background
Explain to students what drafts are, model how to find a draft and allow students to identify them in groups. The class can discuss what it means when dirt collects outside of windows and doors. After discovering the drafts, students can brainstorm solutions. One solution might be to make draft stoppers by filling cloth tubes or old socks with kitty litter. The students can then decorate the draft stoppers. Have the students come up with additional ways in which they can prevent drafts.

Materials (per student)
Pencils
Plastic food wrap
Tape

Procedure/Exploration

1. Create “draft detectors”
    a. Use the tape to attach the food wrap to the pencil.
    b. Blow gently on the wrap to observe how it moves.
2. Test windows and doors in the classroom and around the school by holding your draft detector near the edges of doors and windows.
3. Record the locations where leaks were found.
4. Have students brainstorm solutions.
5. Create some of the solutions (or make draft stoppers described above).

Race to Water

First Grade
Activity: 2
Time: 1 Class Period

General Description

Students will determine if different colors absorb heat at different rates. The students will classify the water as a solid or liquid depending on the stage of the activity.

Objectives

Students will investigate the rate of heat absorption of different colors.
Students will classify water as a solid or liquid by observing the characteristics of water.
Students will use what they learn about color and heat absorption to decide what color clothing they should wear at different times of the year.

Arizona State Standards

SC01 S1C1 PO1 Compare common objects using multiple senses
SC01 S1C1 PO3 Predict results of an investigation based on life, physical, and Earth and space sciences (e.g., animal life cycles, physical properties, Earth materials)
SC01 S1C2 PO1 Demonstrate safe behavior and appropriate procedures (e.g., use of instruments, materials, organisms) in all science inquiry
SC01 S1C2 PO2 Participate in guided investigations in life, physical, and Earth and space sciences
SC01 S1C2 PO4 Record data from guided investigations in an organized and appropriate format (e.g., lab book, log, notebook, chart paper)
SC01 S1C4 PO1 Communicate the results of an investigation using pictures, graphs, models, and/or words
SC01 S5C1 PO2 Classify materials as solids or liquids
SC01 S6C2 PO1 Identify evidence that the Sun is the natural source of heat and light on the Earth (e.g., warm surfaces, shadows, shade)
SC01 S6C3 PO2 Analyze how the weather affects daily activities

M01 S2C1 PO1 Formulate questions to collect data in contextual situations
M01 S2C1 PO2 Make a simple pictograph or tally chart with appropriate labels from organized data
M01 S2C1 PO3 Interpret pictographs using terms such as most, least, equal, more than, less than, and greatest
M01 S2C1 PO4 Answer questions about pictographs using terms such as most, least, equal, more than, less than, and greatest
M01 S2C1 PO5 Formulate questions based on graphs, charts, and tables
M01 S2C1 PO6 Solve problems using graphs, charts, and tables

Teacher Background

It is very important to have the ice cubes as uniform as possible.

Materials (per student group)

(5) 4-inch square pieces of colored paper (white, black, red, green, blue)
Ice cubes
Activity Card 1-2

Procedure/Exploration

1. The students will be divided into groups.
2. They will predict which color helps the ice win the melting race.
3. Place the cubes on the paper and put them in a sunny place.
4. Record which ice cube melts first, second, third, fourth and fifth.
5. Have students share the data with their classmates.
6. Based on individual data "Which color caused the ice to melt the fastest?"
7. Based on class data "Which color caused the ice to melt the fastest?"
8. How does this experiment affect the color choices we make?

Race to Water

First Grade
Activity: 2
Activity Card: 1-2

Student's Name: **Date:**

Recording Sheet

Highlight the color that you think will melt the fastest. Then record the real time it takes each ice cube to melt on each color.

Color	Group 1	Group 2	Group 3	Group 4	Group 5
Black					
White					
Red					
Green					
Blue					

What does your data tell you about colors and the speed that ice cubes melt?

Below draw and color a picture of yourself during the summer. Make sure you show what type of clothes and what colors you would wear to stay the coolest.	Below draw and color a picture of yourself during the winter. Make sure you show what type of clothes and what colors you would wear to stay the warmest.

Solar Race

First Grade
Activity: 3
Time: 1 Class Period

General Description
Students will investigate the properties of solar energy by comparing the temperature of water placed in a variety of locations.

Objective
Students will identify the effects of solar energy on water in a variety of locations.

Arizona State Standards
SC01 S1C1 PO1 Compare common objects using multiple senses
SC01 S1C1 PO3 Predict results of an investigation based on life, physical, and Earth and space sciences (e.g., animal life cycles, physical properties, Earth materials)
SC01 S1C2 PO1 Demonstrate safe behavior and appropriate procedures (e.g., use of instruments, materials, organisms) in all science inquiry
SC01 S1C2 PO2 Participate in guided investigations in life, physical, Earth and space sciences
SC01 S1C2 PO4 Record data from guided investigations in an organized and appropriate format (e.g., lab book, log, notebook, chart paper)
SC01 S1C4 PO1 Communicate the results of an investigation using pictures, graphs, models, and/or words
SC01 S6C2 PO1 Identify evidence that the Sun is the natural source of heat and light on the Earth (e.g., warm surfaces, shadows, shade)
SC01 S6C3 PO2 Analyze how the weather affects daily activities

M01 S2C1 PO1 Formulate questions to collect data in contextual situations
M01 S2C1 PO2 Make a simple pictograph or tally chart with appropriate labels from organized data
M01 S2C1 PO3 Interpret pictographs using terms such as most, least, equal, more than, less than, and greatest
M01 S2C1 PO4 Answer questions about pictographs using terms such as most, least, equal, more than, less than, and greatest
M01 S2C1 PO5 Formulate questions based on graphs, charts, and tables
M01 S2C1 PO6 Solve problems using graphs, charts, and tables

Teacher Background
Water will increase in temperature in the shade but typically does not reach as high a temperature as in direct sunlight. Placing a colored piece of paper over the container of water will affect the rate of temperature increase of the water. By giving students the opportunity to investigate how color increases or decreases temperature students can then apply that knowledge to what colors they should wear at different times of the year.

Materials (per student group)
(8) containers labeled A, B, C, D, E, F, G, and H of water at room temperature
Thermometers
(8) 4-inch square pieces of colored paper (2-white, 2-black, 2-red, 2-pink)
Recording Sheet (below)

Procedure/Exploration

1. Students will take the temperature of each container while still in the classroom.
2. Students will take the eight containers of water outside to a level, safe location on the playground. Four will be placed in the sun and four in the shade
3. Place a colored piece of paper over the top of each container. (white, black, red and pink in the sun and the other set in the shade)
4. Allow the containers to set for 10 minutes.
5. Take the temperature of each container after 10 minutes and record.
6. Back in the classroom have the students share their data for each color.
7. Create a class graph (tie to Math Standards)
8. Analysis the data by determining which color absorbed the most solar energy and which absorbed the least.
9. Using this information, have the students draw and color pictures of the clothes they would wear in the winter and those they would wear in the summer.

Use the following table to record your data:

Recording Sheet

Color	Beginning Temperature	Final Temperature
Black (sun)		
White (sun)		
Red (sun)		
Pink (sun)		
Black (shade)		
White (shade)		
Red (shade)		
Pink(shade)		

Fossil Fuels

First Grade
Activity: 4
Time: 1 Class Period

General Description
Students will create their own correct definition of fossils fuels.
Students will understand how their lives would be impacted if all fossil fuels were gone.
Students will brainstorm ways to conserve fossil fuels.

Objectives
Students will identify those things in their life that use fossil fuels, identify the need to conserve, identify some simple things they can do to conserve, and plan how they can put their ideas into action.

Arizona State Standards
SC01 S1C2 PO2 Participate in guided investigations in life, physical, Earth and space sciences
SC01 S6C1 PO3 Identify common uses of basic Earth materials
SC01 S6C1 PO5 Identify ways to conserve natural resources(e.g., reduce, reuse, recycle, and find alternatives)

Teacher Background
Students need to understand that fossil fuels, coal, oil, natural gas, are Earth materials which are limited. Helping students identify what objects use those resources will help them understand how to conserve. Don't forget that plastic is a product of oil. Providing opportunities for students to create their own definitions of complex words or ideas increases the likelihood they will retain the information. Giving students the opportunity to come up with solutions and putting those ideas into action helps them become more responsible citizens.

Materials (per student group)
Paper
Poster paper
Markers

Procedure/Exploration
1. The teacher will explain what fossils fuels are, where they come from, and what they are used for, electricity, plastics, beverage containers, and many other items.
2. Provide time for the students to take that information and put it into their own words and create illustrations that have meaning for them.
3. Students will brainstorm what items use fossil fuels in their homes and classrooms.
4. Pick the one thing that uses fossil fuels that they would miss the most.
5. Brainstorm ways to conserve fossil fuels.
6. Put one into place as a classroom practice

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Sources of Energy

First Grade
Activity: 5
Time 1: Class Period

General Description

The class will investigate how the sun is the main source of the earth's energy by observing different plants and determining which have the most stored energy.
Students will accomplish this by planting seeds and recording what happens to those plants that receive sunlight versus those that do not.

Objectives

Students will identify the sun as the primary source of the earth's energy.
Students will compare those plants that receive sunlight versus those that do not and explain what happens to them.
Students will record data and make connections between those plants that receive light and those that do not.

Arizona State Standards

SC01 S1C1 PO1 Compare common objects using multiple senses
SC01 S1C1 PO3 Predict results of an investigation based on life, physical, Earth and space sciences (e.g., animal life cycles, physical properties, Earth materials)
SC01 S1C2 PO1 Demonstrate safe behavior and appropriate procedures (e.g., use of instruments, materials, organisms) in all science inquiry
SC01 S1C2 PO2 Participate in guided investigations in life, physical, Earth and space sciences
SC01 S1C2 PO4 Record data from guided investigations in an organized and appropriate format (e.g., lab book, log, notebook, chart paper)
SC01 S1C4 PO1 Communicate the results of an investigation using pictures, graphs, models, and/or words
SC01 S4C1 PO1 Identify the following as characteristics of living things:
- growth and development
- reproduction
- response to stimulus

SC01 S6C2 PO1 Identify evidence that the Sun is the natural source of heat and light on the Earth (e.g., warm surfaces, shadows, shade)

W01 S1C1 PO1 Generate ideas through prewriting activities (e.g., brainstorming, webbing, drawing, writer's notebook, group discussion)
W01 S1C1 PO2 Draw a picture or storyboard about ideas generated

M01 S2C1 PO1 Formulate questions to collect data in contextual situations
M01 S2C1 PO2 Make a simple pictograph or tally chart with appropriate labels from organized data
M01 S2C1 PO3 Interpret pictographs using terms such as most, least, equal, more than, less than, and greatest

M01 S2C1 PO4 Answer questions about pictographs using terms such as most, least, equal, more than, less than, and greatest
M01 S2C1 PO5 Formulate questions based on graphs, charts, and tables
M01 S2C1 PO6 Solve problems using graphs, charts, and tables

LS F1 Use effective vocabulary and logical organization to relate or summarize ideas, events and other information
LS F2 Give and follow multiple-step directions
LS F3 Prepare and deliver information by generating topics; identifying the audience; and organizing ideas, facts or opinions for a variety of speaking purposes such as giving directions, relating personal experiences, telling a story or presenting a report

Teacher Background

After the plants have grown, discuss the differences in the plants: Which plants have more stored energy? Where will the stored energy be used? Students should keep a picture log or a graph to record the plants' growth.

Materials

Potting soil
Small paper cup
Seeds (grass, radish)
Craft sticks
Markers
Ruler

Procedure/Exploration

1. Brain storm and list what plants need to grow.
2. Provide students with a cup. Allow the students to fill the cups with soil and then plant their seeds.
3. Give the students the option to place their containers in the sunlight or in the dark. You will want to guide students without demanding that about 50% of the class's plants be placed in the dark and the others in the sunlight. You may want to have extra plants to put in the dark.
4. Record the first day's measurement at 0. Take a measurement every day for two weeks.
5. Watch the plants grow; students will write down or draw their observations of the plants.
6. Periodically ask the students if there is a difference in plant growth of those in the dark and in the light? Which seems to be growing faster? Are the leaves fuller on one plant over the other?
7. Discuss with the students the chain of energy: Cows eat the grass. People eat hamburgers. People need to eat to have energy; can they get energy from the sun by eating meat?
8. Visually show the student that they receive energy from the sun via the food they eat.
9. Extension: Have students brainstorm how else they use the energy from the sun.

What is Energy?

First Grade
Activity: 6
Time: 1 Class Period

General Description
Students will classify objects in the classroom based on observable characteristics of temperature and/or movement.

Objectives
Students will classify objects in the classroom that use energy.
Students will identify objects that use energy by what objects change temperature and/or move.

Arizona State Standards
SC01 S1C1 PO1 Compare common objects using multiple senses
SC01 S1C2 PO1 Demonstrate safe behavior and appropriate procedures (e.g., use of instruments, materials, organisms) in all science inquiry
SC01 S1C2 PO2 Participate in guided investigations in life, physical, Earth and space sciences
SC01 S1C2 PO4 Record data from guided investigations in an organized and appropriate format (e.g., lab book, log, notebook, chart paper)
SC01 S1C4 PO1 Communicate the results of an investigation using pictures, graphs, models, and/or words
SC01 S5C1 PO1 Classify objects by the following observable properties:

- shape
- texture
- size
- color
- weight
- length
- temperature

Teacher Background
Have the students explore the items that produce heat, cool off, or have motion, including themselves. Have students classify objects as either using energy or not. Conclude the lesson by stating that energy produces temperature change and or motion.

Materials (per student)
Pencils
Paper
Coloring materials

Procedure/Exploration

1. Model to students an object that uses energy in the classroom based on temperature change or movement.
2. Allow the students to find things in the room that move, or change a temperature.
3. Have children run or skip around the playground.
4. Have students put a hand on their stomach or under their arms. Ask them what they feel.
5. As a class list all the objects the students came up. Correct misconceptions here.
6. Have the students draw objects in the classroom on a poster and classify those that use energy and those that do not.
7. Have students explain how they know the objects that they classified as using energy actually use energy. (Simple sentences such as "The fan went round and round" would be acceptable).

Suggestion: Complete Whirling Windmills (Activity 7) with this lesson.

Whirling Windmills

First Grade
Activity: 7
Time: 1 Class Period

General Description
Students will explore wind as a source of energy by constructing their own windmills.

Objectives
Students will explain how windmills demonstrate the use of energy.
Students will identify objects that use energy by what objects change temperature or move.

Arizona State Standards
SC01 S1C1 PO1 Compare common objects using multiple senses
SC01 S1C2 PO1 Demonstrate safe behavior and appropriate procedures (e.g., use of instruments, materials, organisms) in all science inquiry
SC01 S1C2 PO2 Participate in guided investigations in life, physical, Earth and space sciences
SC01 S1C2 PO4 Record data from guided investigations in an organized and appropriate format (e.g., lab book, log, notebook, chart paper)
SC01 S1C4 PO1 Communicate the results of an investigation using pictures, graphs, models, and/or words
SC01 S5C1 PO1 Classify objects by the following observable properties:

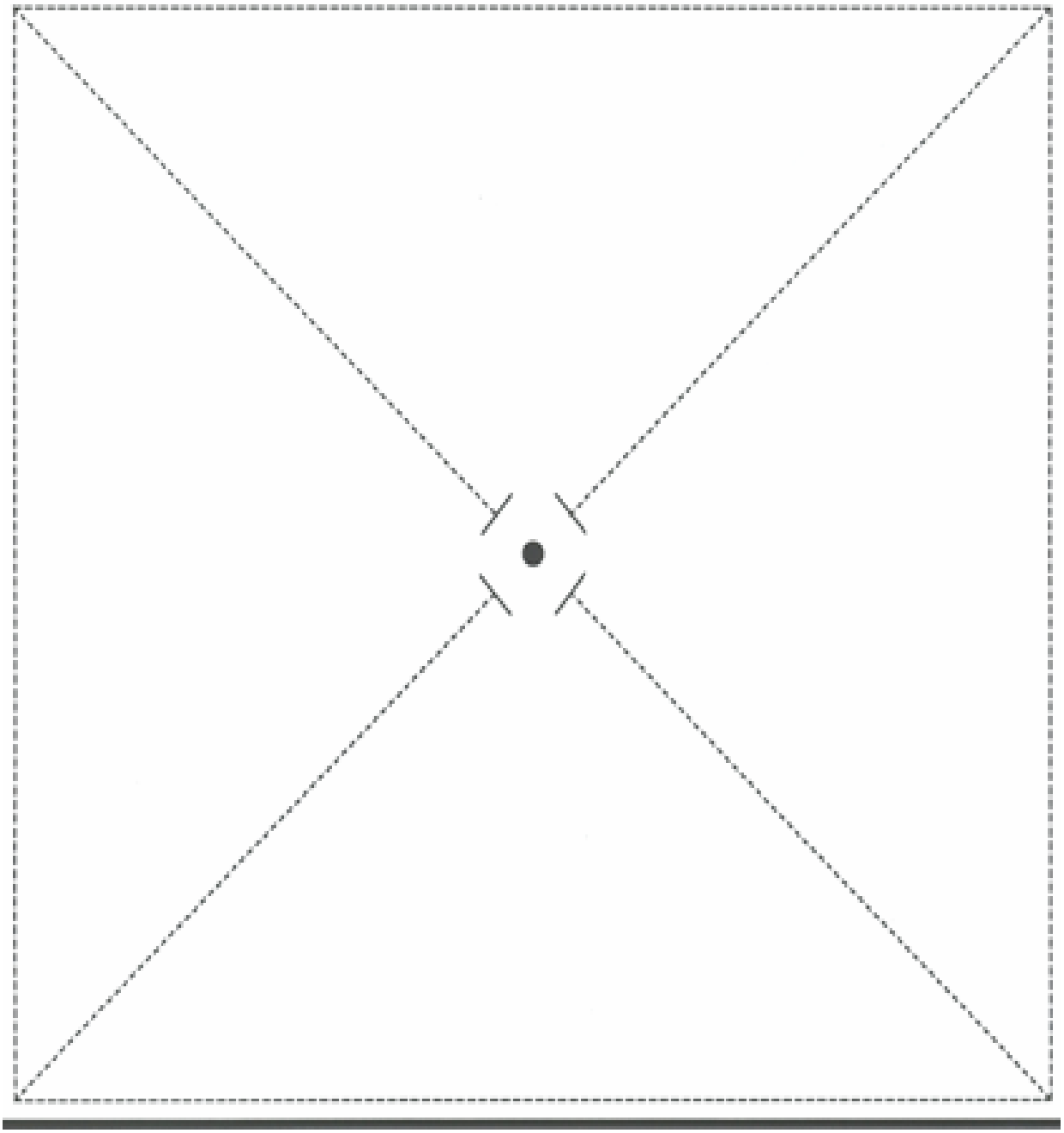
- shape
- texture
- size
- color
- weight
- length
- temperature

Materials (per student)
Pencils or straws
Tacks
Activity Card 1-7

Procedure/Exploration
1. Using Activity Card 1-7 cut out the square on the paper along the dotted lines and fold.
2. Attach the pinwheel to the eraser using a tack.
3. Blow on the pinwheel.
4. The class will discuss the results. Invite the students to explain how they know the windmill is using energy.

Whirling Windmills

First Grade
Activity: 7
Activity Card: 1-7



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Where Does It Get Its Energy?

First Grade
Activity: 8
Time: 1 Class Period

General Description
Students will match pictures of energy users to the energy source.

Objective
Students will match energy source to the energy being used using pictures and words.

Arizona State Standards
SC01 S1C2 PO2 Participate in guided investigations in life, physical, Earth and space sciences
SC01 S1C2 PO4 Record data from guided investigations in an organized and appropriate format (e.g., lab book, log, notebook, chart paper)
SC01 S1C4 PO1 Communicate the results of an investigation using pictures, graphs, models, and/or words
SC01 S6C2 PO1 Identify evidence that the Sun is the natural source of heat and light on the Earth
SC01 S6C1 PO4 Identify the following as being natural resources
- Air
- Water
- Soil
- Trees

SC01 S6C1 PO5 Identify ways to conserve natural resources (Energy is a natural resource which students need to be able to identify before understanding how to conserve.)

W01 S1C1 PO1 Generate ideas through prewriting activities (e.g., brainstorming, webbing, drawing, writer's notebook, group discussion)
W01 S1C1 PO2 Draw a picture or storyboard about ideas generated

LS F2 Give and follow multiple-step directions

Teacher Background
Students must understand what energy sources are in order to be able to think about how to conserve those energy sources.

Materials (per student)
Activity Cards 1-8a, 1-8b, and 1-8c
Scissors
Crayons

Procedure/Exploration

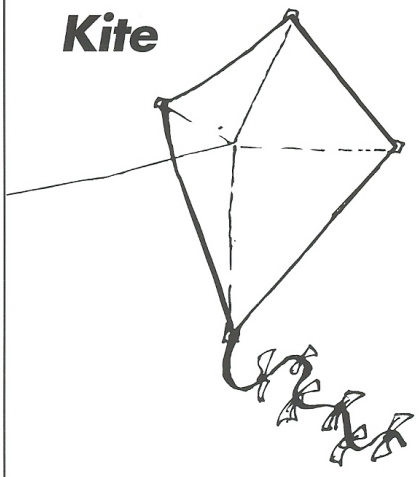
1. Have the students brainstorm some energy source words and write them on the board.
2. Brainstorm examples of how each energy source is used in their school, home, or neighborhood.
3. Have the students color and complete the handouts
4. Have the students share their answers, discuss and create a class poster.

Where Does It Get Its Energy?

First Grade
Activity: 8
Activity Card: 1-8a

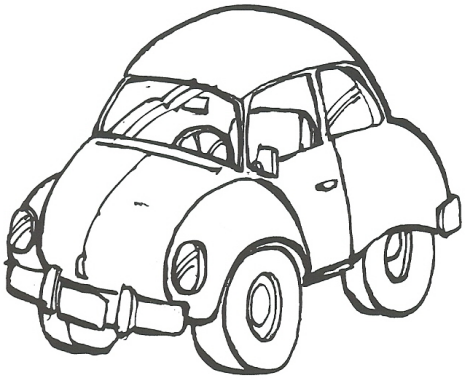
Student's Name: **Date:**

Kite



Lamp

Car



Dog

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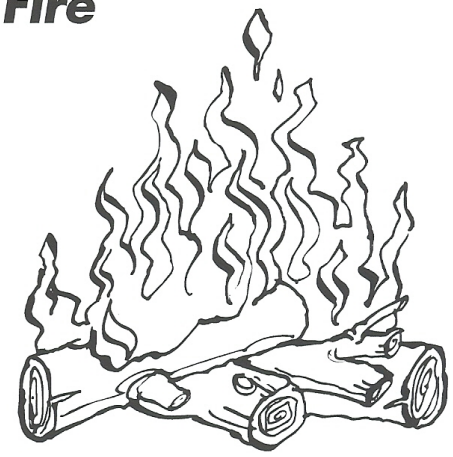
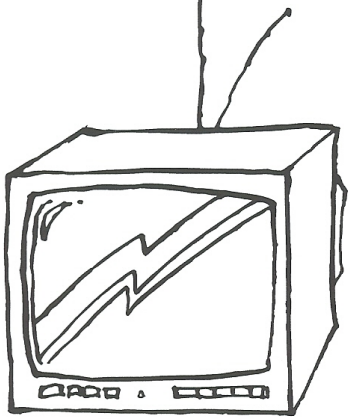
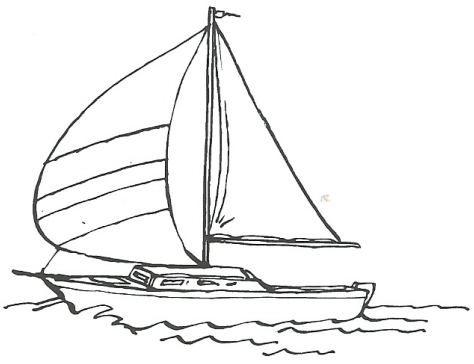
Where Does It Get Its Energy?

First Grade
Activity: 8
Activity Card: 1-8b

Student's Name: **Date:**

Tree 	**Fire** 
Television 	**Sailboat** 

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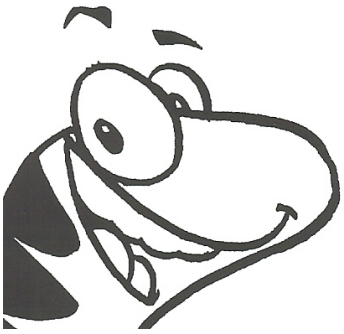
Where Does It Get Its Energy?

First Grade
Activity: 8
Activity Card: 1-8c

Student's Name: **Date:**

Gasoline	Sun
Wind	Electricity
Wind	Food
Electricity	Wood



"Cut out the energy words and paste them below the pictures they match."

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Mouse House Surprise

First Grade
Activity: 9
Time: 1 Class Period

General Description
Students will identify what happens when there is a loss of power either at school or at home.

Objectives
Students will explain what happens when there is a loss of power and develop a plan of how to be prepared for when the power does go out.

Arizona State Standards
SC01 S3C2 PO1 Identify various technologies(e.g. automobiles, radios, refrigerators)
SC01 S1C4 PO1 Communicate the results of an investigation using pictures, graphs, models, and/or words

W01 S1C1 PO1 Generate ideas through prewriting activities (e.g., brainstorming, webbing, drawing, writer's notebook, group discussion)
W01 S1C1 PO2 Draw a picture or storyboard about ideas generated

Teacher Background
The students and teacher will join together in a shared book experience. The teacher will read aloud from the big book, *Mouse House Surpris*e. Students will join in on the repeated pattern. The class will then discuss what happens when the power goes off. They will be asked the following questions: what technologies need electricity to run? What could they use in place of those things that normally use electricity from a plug to do a similar job? For example; wet clothes can be hung outside to dry instead of using the dryer.

Materials (per student)
Pencils
Science journals
Mouse House Surprise Big book; call APS for a copy at 602-250-2291

Procedure/Exploration
The class will read the shared story *Mouse House Surprise.*

Discuss the following questions:

1. What is the repeated pattern?
2. What happened at the Mouse House?
3. Has this ever happened at your house, what did you do during that time the electricity was out?
4. What uses energy in your house?
5. What could you use if the electricity goes out to do things like cooking, listening to the radio, etc.
6. Have students draw a picture of something they could do differently during a power outage.