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K-4 Supplement Overview

Evidence of energy is all around us. Heat, light, sound, wind, and movement are examples of energy that can be observed in the classroom, school building, schoolyard, home, and community. Energy plays an essential role in the lives of people, including schoolchildren. Whether children are playing, studying, walking to school, or eating lunch, energy is involved. It is important that students have a fundamental knowledge of the nature of energy and appreciate how their lifestyles depend on energy. Increasing students' energy literacy is more important than ever in the twenty-first century as we face energy-related environmental, social, and political challenges as a global society.

Young learners often have difficulty understanding what energy is because it is intangible and takes many forms. The *Know the Flow of Energy in Your School* supplement uses the school as an educational tool to connect energy directly to the lives of students. It also helps kindergarten through fourth grade teachers introduce this challenging concept to students. Connecting energy to everyday situations facilitates the learning process and makes the lessons pertinent to students. Energy from the Sun, Energy from the Wind, Energy from Food, and Energy from Electricity engage students in hands-on activities where they illustrate evidence of energy and its flow in their immediate surroundings.

Know the Flow of Energy in Your School can be completed as a comprehensive unit, or activities within the unit can be conducted separately. If you choose to complete the entire unit, you might want to conclude with "Energy Use in an Ecosystem" from Theme 1: We Need Energy in the *KEEP Energy Education Activity Guide*. This theme is an advanced lesson that can be used as an assessment tool to gauge students' understanding of the overall unit.

Objectives

Students will be able to illustrate how:

- sunshine flows through their school
- the wind flows through their school
- energy in food flows through their school
- electricity flows through their school

Making Connections: A Comprehensive Assessment

Wouldn't it be nice to have an assessment tool that monitors student progress within the activities and ties each activity together at the end of the unit? ***Know the Flow of Energy in Your School*** provides teachers with two tools in the form of an ***Energy Learning Log*** and ***Energy Flow Mural***. Look for references to these tools throughout the supplement.

Energy Learning Log

An ***Energy Learning Log*** is beneficial because it helps teachers organize and plan a project and monitor student progress. It also aids the learner because it can be used as a reflective tool. It is recommended that an ***Energy Learning Log*** portfolio be used throughout this unit as a formative and summative assessment tool. The ***Energy Learning Log*** will be used to track energy flow throughout the school by documenting patterns in solar energy, wind movement, food chains, and electrical flow. It will also help to re-create student findings for a comprehensive mural activity (see instructions below). An ***Energy Learning Log*** can be of any format, such as an accordion folder, a spiral or loose-leaf notebook, etc. Invite the students to personalize the outside of their logs with drawn or cut-and-paste illustrations relating to energy.

Energy Learning Logs as a Vehicle for Pre-assessment

Prior to any instruction on energy, invite students to write about energy for 15 minutes or so. They should write down anything that comes to mind, keeping their pen or pencil to the paper at all times. If their mind is blank, suggest they write the word energy over and over again until they think of something related to energy, or they can write about why they can't think of anything related to energy. After students are done writing, ask them to summarize what they wrote by writing down three statements that they think they know about energy, and three questions that they have about energy. These questions can be discussed as a class, shared with the teacher on an individual basis, or kept private. At the end of the energy unit, have students revisit these questions and statements and answer or rewrite them as needed.

Energy Learning Logs as a Reflective Tool and to Monitor Progress

Use the Energy Learning Log to link different energy concepts students have learned. When students are learning new

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concepts, encourage them to refer to previous information. Allow time at the end of each energy education activity for students to summarize and interpret what they experienced. They should view these writing opportunities as a means to express their personal insights. They are striving to make the energy activity meaningful and to apply it to their own lives. By relating what they have observed in their own words, students will discover gaps that need to be filled, make connections among existing thoughts, and raise questions that require further exploration. Students may wish to use parts of the log as a diary. They can record their personal reflections, wishes, and frustrations in a special section of the log, in code, or in a separate journal. In some cases, this section will be designated as writing not to be viewed by the teacher.

Energy Learning Logs to Report and Evaluate Results

An Energy Learning Log can be used to document the results of a project or activity. Actual samples of student work can be part of the log. Samples include artwork, videos, poetry, draft writings, calculations, and test results. One strategy involves having students use the log to show what they think is their best work. Reflective questions should accompany this presentation. For example, students can be asked to explain why they think this is their best work, what they did to make the project successful, what they would do differently, and how this applies to their overall development as a current and future energy consumer.

Adapted from The Watercourse and Western Regional Environmental Education Council (WREEC). "Water Log" pp. 19-21 in Project WET. Bozeman, Mont.: The Watercourse and Western Regional Environmental Education Council (WREEC), 1995. Used with permission. All rights reserved.

Energy Flow Mural

As a summative assessment activity, have students create a mural of the flow of energy through the schoolyard and classroom using the data they collect in their **Energy Learning Logs**. The mural can depict energy flow around the schoolyard and classroom through illustrations of sunny and shaded areas, wind patterns, food chains, and electrical flow.

This comprehensive unit activity acts as a review and ties the unit concepts together. Teachers can also use the mural as a formative assessment tool by having the students create the mural in layers as they progress through the various unit activities.

Know the Flow of Energy in Your Home and Community

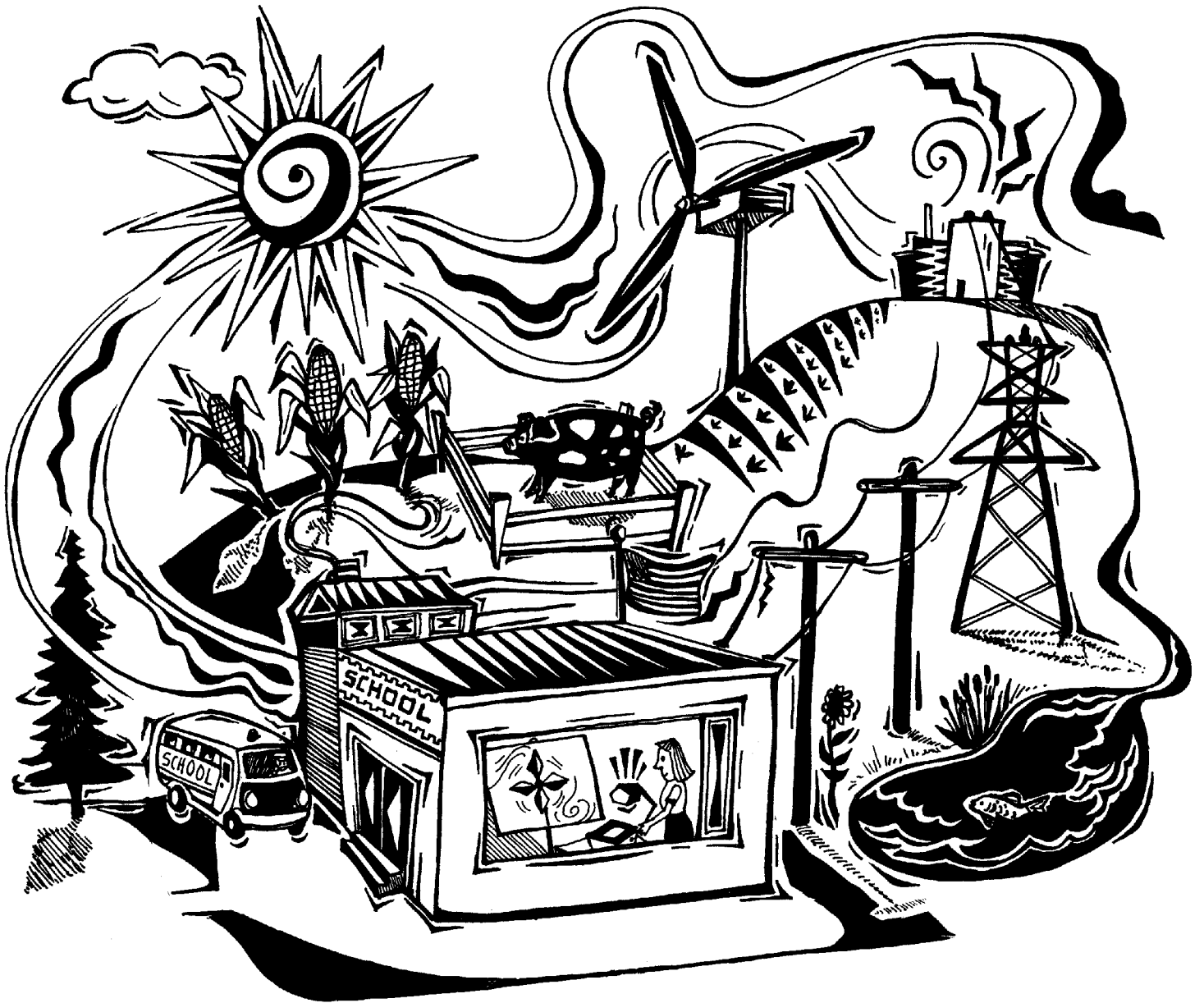
Teachers can extend student understanding of energy flow from the school to the home and community by encouraging students to involve their parents in many of the activities in this supplement. Through these activities, students and their families can identify how energy from the sun, wind, food, and electricity is transferred to, through, and from their homes. For example, if students work with their parents mapping wind (or drafts) in their home and examining electricity use, the family can learn to appreciate the role of energy in their lives and can use this information to make decisions about their energy consumption.

If the class is creating an **Energy Flow Mural**, students can place their homes and various businesses on the mural. Investigating energy flows in the school, homes, and community and illustrating the flows on the mural is an ideal way for students to examine their lifestyles and the interrelationships among community members. Teachers can invite local utility representatives to speak to the class and use the mural as a visual aid to diagram power lines and discuss safety issues. The mural provides an ideal background for illustrating community transportation and energy-related connections among careers. Community energy connections lead to many other possibilities of study, including career opportunities, community development, and lifestyle analysis. Since energy plays such an integral role in student home life and the community, taking energy lessons beyond the school to the home and community is an ideal strategy to making classroom learning relevant and meaningful to students and their families.

Children's Literature and Energy

Through storybooks, many aspects of energy come to life for students. Whether children are learning about the sun, wind, food, or electricity, the tales and pictures found in children's literature will provide examples and illustrations of energy and how it is used.

Sample Energy Flow Mural



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