

Energy Conservation vs. Energy Efficiency

Target grades:

3 -5

AK GLEs:

Technology

E 1,2,6,7,8

Extension: Writing

[3] 1.1.1

[3] 1.1.2

[4/5] 2.1.1

[4/5] 2.1.2

[5] 2.1.3

[5] 2.1.4

Set up time:

15 minutes

Class time:

One class period

Overview:

Students decipher between activities that conserve energy versus ways to be more energy efficient so they can apply these options to their own lives.

Objectives:

This lesson plan is designed to help students learn the distinction between **energy conservation** and **energy efficiency**, both important ways of reducing overall energy use.

Materials:

Conservation vs. Efficiency student worksheet

Pencils

Background:

Why is it beneficial to use less energy? We use energy in many forms: electricity, heat, and fuel (e.g. gas, diesel, propane, etc.) every day. This energy comes at a high cost in Alaska, especially during the cold winters.

Energy conservation and energy efficiency are both ways to reduce consumption of energy, bringing the cost of electric bills down, and making less impact on the environment since lower energy use means fewer greenhouse gas emissions and conservation of non-renewable resources.

Energy conservation is a behavior change that results in not using energy at a time when one might normally. For example, riding a bike instead of driving a car, unplugging computers and other electronics at night or when not in use, or turning off the lights when you leave a room.

Energy efficiency is an improvement in technology that makes an existing use of energy more efficient, i.e. allows us to do more with less. Examples of energy efficiency include replacing incandescent light bulbs with compact fluorescents (CFLs) or LEDs, adding extra insulation to a house, or using Energy Star® appliances that have power-saving measures installed.

**Vocabulary List:**

consumption - using a resource.

energy conservation - reducing energy use through a behavior change that results in not using energy at a time when one might normally. For example, riding a bike instead of driving a car, unplugging computers and other electronics at night or when not in use, or turning off the lights when you leave a room.

energy efficiency - reducing energy use through an improvement in technology that makes an existing use of energy more efficient, i.e. allows us to do more with less. Examples of energy efficiency include replacing incandescent light bulbs with compact fluorescents (CFLs) or LEDs, adding extra insulation to a house, or using Energy Star® appliances that have power-saving measures installed.

greenhouse gas (GHG) - a gas in Earth's atmosphere that absorbs and emits radiation, contributing to the greenhouse effect by trapping energy in the atmosphere. The primary greenhouse gases are water vapor, carbon dioxide, methane, nitrous oxide, and ozone. Heavy use of fossil fuels has increased the amount of carbon dioxide in the atmosphere, contributing to changes in climate and weather patterns.

non-renewable energy resource - an energy resource that cannot be grown, produced, or generated at a rate that can sustain its consumption. The three main types are petroleum, natural gas, and coal.

renewable energy resource - an energy resource that can be replenished through biological or natural processes at a rate that can sustain its consumption; examples are wind, hydro, geothermal, biomass, and solar.

Gear Up:

Ask students to think of how they use energy during the day. One gear up option is the **AK EnergySmart** lesson *My Electric Footprint* (geared towards students in Grades 3-5 and available at <http://www.akenergysmart.org/lessons35.html>). After describing energy conservation and energy efficiency, ask students to brainstorm ways that they could apply these energy saving measures to their daily activities.

Activity:

Hand out the *Conservation vs. Efficiency* student worksheet, and ask students to identify which activities listed on the first page are examples of conservation and which are examples of efficiency. Together as a class, go through the the list, compare answers, and have students defend how they categorized the activities. Some activities may fit into both categories - conservation and efficiency.

Next, have students write three sentences describing how they can conserve energy and write three sentences about how they can use energy efficiently.



Extension:

Have students write a short paragraph explaining why it is beneficial to conserve energy and use it efficiently.

Additional Resources:

Alliance to Save Energy

This website provides news on energy efficiency and ways to empower students to make a difference in the way their schools use energy.

<http://ase.org/resources/green-team>

Texas's Watt Watchers

Free lesson plan *Energy Conservation Energy Efficiency: What's the Difference?* for students in Grades 5-8.

<http://wattwatchers.org/Assets/kisp/consvseff.pdf>

Energy Efficiency and Conservation from the Tribal Energy and Environmental Information Clearinghouse

This website is a clearinghouse of information for tribal energy development.

<http://teeic.anl.gov/er/consERVE/index.cfm>

Alaska Grade Level Expectations addressed:

Alaska General Content Standard addressed

Technology Performance Standards

E) A student should be able to use technology responsibly and understand its impact on individuals and society.

A student who meets the content standard should:

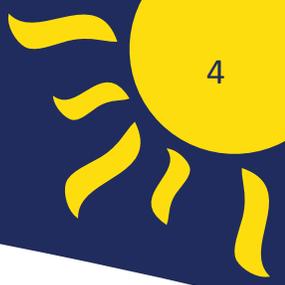
- 1) evaluate the potentials and limitations of existing technologies;
- 2) discriminate between responsible and irresponsible uses of technology;
- 6) evaluate ways that technology impacts culture and the environment;
- 7) integrate the use of technology into daily living; and
- 8) recognize the implications of emerging technologies.

Extension:

Writing Performance Standards

The student writes about a topic by:

- [3] 1.1.1 Writing complete sentences with a subject and a predicate.
- [3] 1.1.2 Writing a paragraph on a single topic with two or more supporting details.



[4] 2.1.1 Writing a paragraph that maintains a focused idea and includes details that support the main idea.

[4] 2.1.2 Organizing ideas logically.

[5] 2.1.1 Writing more than one paragraph stating and maintaining a focused idea and including details that support the main idea of each paragraph.

[5] 2.1.2 Using paragraph form: indents or uses paragraph breaks.

[5] 2.1.3 Organizing ideas logically to establish clear relationships within and between paragraphs (e.g., using transition words or phrases that reveal order or chronology).

[5] 2.1.4 Writing a concluding statement.

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