

# Conserving Electricity: Turn It Off



## Target Grade Levels

First - Third

## Time

30 minutes

## Materials

None

## Knowledge and Skills (TEKS)

- Science:
  - Classify, order, and sequence data; and
  - The student shall be given opportunities to classify matter and forces, organisms, actions, and events from the environment according to similarities and differences.
- Language Arts:
  - Ask and answer relevant questions; and
  - Make contributions to small or large group discussions.

## Overview

To discuss how the production of electricity causes air pollution and thus encourage reducing electrical use.

## Background Information

Most of our electricity is produced in steam turbines. A power source, such as coal, gas, or oil, heats water in a boiler to produce hot, high-pressure steam. This steam expands against the blades of a turbine. A turbine is a device that spins when air or water is forced against it. You can think of it as a kind of enclosed windmill. The hot, expanding steam forces the turbine to spin. The spinning turbine then operates a generator that produces electricity.

## Procedure

### 1) Vocabulary

- |                  |                |
|------------------|----------------|
| a) electricity   | f) boiler      |
| b) steam turbine | g) turbine     |
| c) coal          | h) generator   |
| d) gas           | i) pollution   |
| e) oil           | j) fossil fuel |

### 2) Activities

- a) Tell the class you are going to tell a story about a wise old owl and his young pupil. Warn them that the story ends with a question that you will hope they will be able to answer.

b) Story:

One night, wise old Professor Owl was flying over a town with Ollie Owl, one of his pupils.

As they looked down, they could see so many lights shining in the windows of all the houses.

"The lights look pretty," said Ollie.

"They may look nice," said Professor Owl, "but I wish those humans would turn some of those lights off."

"How come?" asked Ollie. "They don't do any harm, do they?"

"They certainly do," said the professor. "They cause a lot of air pollution."

"You mean that yucky stuff that stinks and makes me cough? How could electric lights do that?"

- i) Stop the story here, and ask the students how they think Professor Owl will answer. Explain that most of our electricity, like almost all the energy we use, starts with a fire. At the power plant, the heat from the fire boils water and turns it into steam. The steam operates a giant machine called a turbine that makes electricity, which then travels through wires to a local power station and to our homes. Tell them that air pollution comes from the fires and fuels we have to burn to make electrical energy.
- ii) Remind the class that the answer makes sense because the energy to heat the water, keep the lights burning, and keep our homes warm starts with a fire. Burning fuel causes air pollution.
- iii) Tell the class that you are going to ask three questions that all have the same answer. They will have one minute to guess the answer.
  - (1) Why should we not let the hot water run when we're not using it?
  - (2) Why should we not leave the lights on when we're not using them?
  - (3) Why should we not keep the heat turned up high instead of wearing sweaters when it's cold?

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Adapted from: "Conserving Electricity: Turn it off" *Texas Commission on Environmental Quality*. [www.tnrcc.state.tx.us/air/monops/lessons/lesson\\_plans.html](http://www.tnrcc.state.tx.us/air/monops/lessons/lesson_plans.html).

Reference: Environmental Science, 1984, CBS College Publishing

Acknowledgment: Linda Abbott, Stephen F. Austin University, Nacogdoches, Texas. TES Course, 1994