

Thermal Energy



Focussing Questions

- Think of a situation related to heating or cooling where you solved a problem without knowing the science behind it. Now think of a situation where you *did* know the science. What were the differences?
- What is the source of thermal energy released by a fire?
- How are the concepts of heat and thermal energy related?

and Work



These campers are using two technological problem-solving strategies for staying warm. First they are getting close to an open fire — a source of thermal energy. Second, they are insulating their bodies to prevent their body heat from escaping too quickly. When they are not near the fire, the campers probably do work to generate heat by rubbing their hands together. People have used open fires, furs, and blankets for centuries to solve the problem of staying warm.

The thermal energy that warms your body comes from energy stored in food. As you digest the food, energy is released and some of the energy is used to heat your body. What is the source of the thermal energy in your school that keeps you warm? The technology of keeping a building warm depends on producing and controlling the transfer of thermal energy.

How to cook food is another problem humans have solved by using technology to control thermal energy. A pot of water on an open campfire eventually gets hot, enabling the campers to cook food. The gas burner on a kitchen stove is a more effective technology for cooking food. It is faster and easier to control than an open campfire.

In this chapter, you will investigate thermal energy transfer and technology. The steam engine is one of the most fascinating examples of technology driven by thermal energy. The original invention was relatively simple compared to the powerful steam locomotive shown in the photograph.

You will follow the development of several forms of technology that use thermal energy. As you read, notice how the developments in technology and the formulation of the scientific theories of thermal energy progressed hand in hand.



Look ahead to page 248, "Building an Energy-Conversion Device." In this project you will develop, build, test, and measure the results of your own energy-conversion device. You will then suggest improvements to make it more efficient. As you read this chapter, begin your preparation for the project by:

- practising your technological problem-solving skills by completing Problem-Solving Investigation 4-A: Turbine-Powered Hoist
- using the Internet and other resources to research different sources of energy, energy conversions, and energy-conversion efficiencies
- developing electronic and paper files for articles you find pertaining to your ideas about the project