

CONCEPT 1

Electrical energy has many applications.



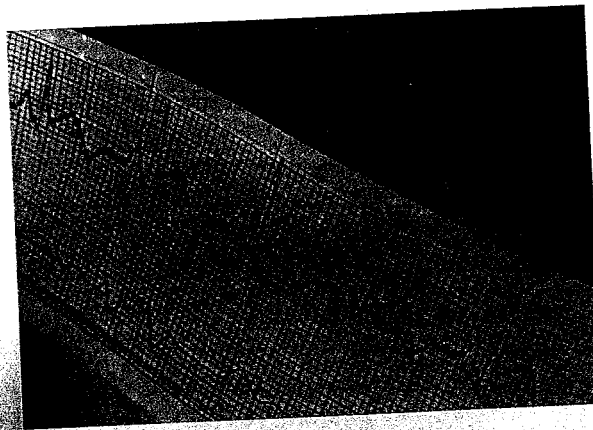
Activity

Power Failure!

What would a day in your life look like without electrical energy? What problems would you encounter, and how would you deal with them? (Yes, boredom is a problem.) Brainstorm with your group. Use your ideas to create a video or skit of what a typical day would be like if the power failed in your community for 48 hours or more.

From the first ring of your morning alarm clock to when you turn the light off to go to bed, your day is filled with different applications of **electrical energy**. Many of these are familiar, like your clock and a light bulb. Others may surprise you. For instance, **Figure 3.1** shows how several functions of the human body use electrical energy. It also explores how this energy is harnessed by different types of technology, from robots to levitating trains to neon signs.

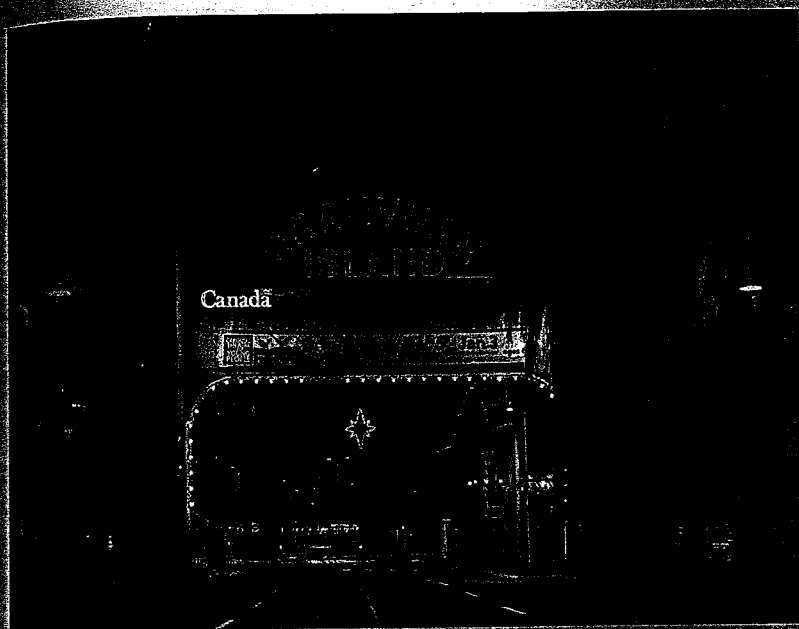
Figure 3.1 Some applications of electricity.



You could not read this book without the help of electrical energy, even in the daytime. Moving your eyes to read the page relies on electrical signals in your muscle and nerve cells. Breathing and maintaining a heart beat do, too!

Most touch-sensitive screens are resistive screens. These work a lot like transparent keyboards. The pressure from a touch command completes an electrical pathway. A computer chip inside the tablet then determines the command to be carried out. Other screens, called capacitive screens, actually make your finger part of the electrical pathway. When your finger touches the screen, a tiny electrical charge passes through it. This completes a pathway, and the command is carried out.

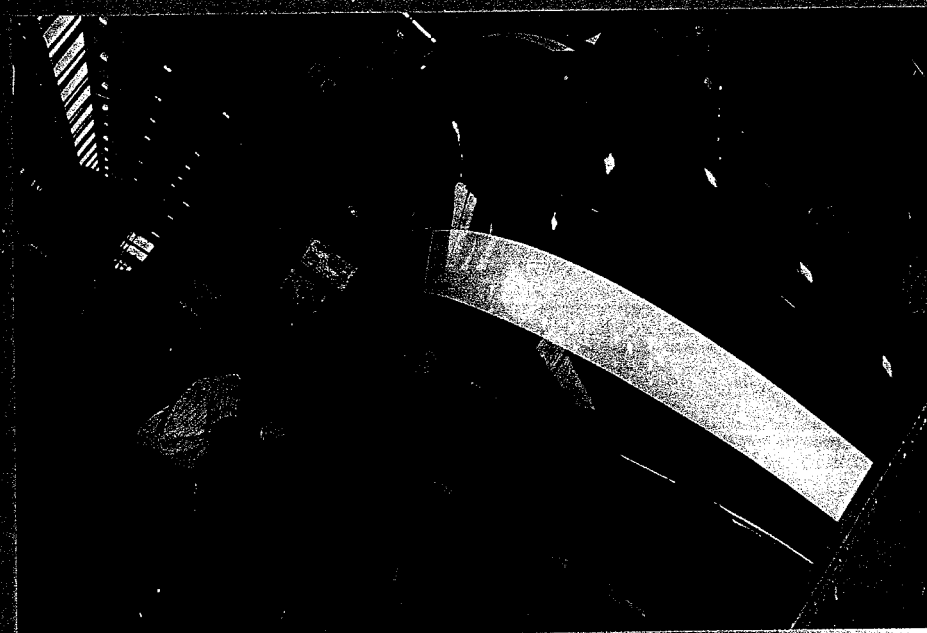




Neon signs are familiar sights in most urban centres. In this photo, the bright red colour is unique to neon gas. When electrical energy causes electrons to pass through neon gas, the electrons collide with neon atoms, transferring energy to them. The atoms then give off some of this energy as visible light of a specific colour, orange-red. Other gases, such as helium, argon, and xenon, are also used in neon signs. The atoms of each gas give off a different colour of light.



Robots are becoming more like humans every day thanks to technology that reacts to electrical signals like your muscles do. Using a flexible plastic that expands and contracts slightly in response to electrical energy, scientists are able to create robots with hand and facial movements that are really human.



Train travel at 500 km/h, without an engine, is a reality in many countries, including Japan and Germany. Maglev trains levitate (hover) above electrified coils that run along tracks. The coils create magnetic fields that repel large magnets under the train, causing it to levitate. With no friction between the train and the tracks, the train can travel at very high speeds.

Before you leave this page . . .

1. Describe three ways that you have depended on electrical energy since you woke up this morning.