

SCIENCE
FUSION Physical Science
HOLT McDUGAL

PowerNotes

Unit 2 Lesson 1 Work, Energy, and Power

Work It Out

What is work?

- **Work** is the use of force to move an object some distance.
- You do work only when you exert a force on an object and move it.
- Work is done only by the part of the force that is in the same direction as the motion.



How is work calculated?

- You can calculate the work a force does if you know the size of the force applied to an object and the distance over which the force acts.
- Work equals force multiplied by distance: $W = F \cdot d$
- The standard unit for measuring work is either the newton-meter (N·m) or the joule (J).



Energizing

How are work and energy related?

- **Energy** is the ability to do work.
- Energy and work are both measured in the same unit: the joule.
- When a person does work on an object, the person can transfer energy to that object.



How are work and energy related?

- In a wind turbine, wind does work by moving the blades so that they spin.
- Inside the turbines, more energy transfers occur so that the energy of the blades is transformed into electrical energy, which can be used at home.



Superpower

What is power?

- **Power** is the rate at which work is done.
- Because work is also a measure of energy transfer, you can think of power as the rate at which energy is converted from one form to another.



How is power calculated?

- Power can be calculated from energy and time.
- To calculate power, divide the amount of energy used by the length of time for which it is used:
$$P = E/t$$
- Power is often measured in joules per second. The unit of measurement for power is the watt (W). One watt is equal to one joule of energy transferred in one second.

