

# EXPLORING ENERGY

Grades 3-6

## *Key idea:*

The concept of energy in all its forms – including flowing water, wind, and sunlight – is the basic foundation for much of our understanding of the physical world.

## *Specific Learning Objectives*

### Unit 1: Energy and “People Power”

#### **Exploration 1: How We Use Energy to Get Things Done**

- Energy is “the capacity to do work.”
- Work is done when an object moves in the direction of the force exerted on it.
- Work cannot be done without a source of energy.
- How fast the work is done depends on how rapidly energy is used.
- Power is the rate at which energy is used.

### Unit 2: Using the Energy of Flowing Water

#### **Exploration 2: Building a Water Reservoir**

- On the Earth, water flows from a higher place to a lower place.
- A reservoir can be used as a continuous source of flowing water in experiments.

#### **Exploration 3: Can Flowing Water Push Things?**

- Flowing water is a natural source of energy which can be used to do useful work.
- Flowing water can move objects such as sand and stone.

#### **Exploration 4: Building a Waterwheel**

- The energy of flowing water can be used to turn a waterwheel.

#### **Exploration 5: What Can Flowing Water Do for Us?**

- The energy of flowing water can be harnessed to do useful work.
- A waterwheel is a machine that can use flowing water to lift objects and do other useful things.

### Unit 3: Catching the Wind’s Energy

#### **Exploration 6: Where Is the Wind?**

- Wind cannot be seen but its effects can be observed by using the senses of sight, sound and touch and by tracking bubbles that are carried by the wind.

#### **Exploration 7: Making Wind Observations**

- The speed of wind can be measured by an anemometer.
- Wind can push objects in its path.
- Information on wind speed can be used to make decisions about techniques and locations for harnessing the wind.

## ***Important content:***

- Definition of “energy” and “work”
- Relationship between energy and work
- The energy of flowing water
- Wind as an energy source
- Sunlight as energy
- Using energy to do useful work



### **Exploration 8: Catching Wind Energy with a Pinwheel and a Windmill**

- The wind can be used to turn pinwheels and windmills.
- A windmill is a machine that uses the wind to do useful work.

### **Exploration 9: What Can the Wind Do for Us?**

- Wind (bulk motion of air) has energy which is used by windmills to do useful work.
- Windmills harness the wind to do work such as turning wheels or lifting water.

## **Unit 4: Using the Energy of Sunlight**

### **Exploration 10: What Does Sunlight Do?**

- Sunlight can warm objects and materials.
- Sunlight provides nearly all the energy we use on Earth.

### **Exploration 11: The Effects of Sunlight on Temperature**

- The temperature of a material exposed to sunlight is affected by the color of the material.
- From differences in the temperature of different materials exposed to sunlight in the same way, we infer differences in the amount of sunlight absorbed by these materials.
- The temperature of aluminum foil and black paper will be different after the same period of exposure to sunlight.

### **Exploration 12: Building a Solar Cooker**

- A solar cooker uses sunlight to cook food.

### **Exploration 13: Using the Solar Cooker**

- Sunlight can be harnessed to cook food.
- A solar cooker uses sunlight to warm or cook food.
- The position in which a solar cooker receives the maximum amount of sunlight results in faster cooking.