



Kurdistan Regional Government - Iraq  
Ministry of Education - Directorate General of Curricula and Printables



# SCIENCE

# 2

## Grade Two

### Student Book







# Contents

<b>Unit 1</b>	<b>Life Science</b>	<b>5</b>
	Chapter 1 Animals and Plants Grow and Change	8
	Chapter 2 People Grow and Change	22
	Chapter 3 Living Things Need Each Other	40
	<b>Activities for Home or School</b>	<b>58</b>
<b>Unit 2</b>	<b>Earth Science</b>	<b>59</b>
	Chapter 1 Earth's Resources	62
	Chapter 2 The Sky	82
	<b>Activities for Home or School</b>	<b>94</b>
<b>Unit 3</b>	<b>Physical Science</b>	<b>95</b>
	Chapter 1 Observing and Measuring Matter	98
	Chapter 2 Changes in Matter	112
	Chapter 3 Sound	128
	<b>Activities for Home or School</b>	<b>142</b>
	<b>Health</b>	<b>143</b>
	<b>Glossary</b>	<b>149</b>

# **UNIT 1**

## **LIFE SCIENCE**

### **Unit Experiment** **7**

---

### **Chapter 1** **Animals and Plants Grow and Change** **8**

Lesson 1 — What Are Some Animal Life Cycles? 10

Lesson 2 — How Do Plants Grow and Change 16

Chapter Review 20

---

### **Chapter 2** **People Grow and Change** **22**

Lesson 1 — How Will I Grow? 24

Lesson 2 — How Does Food Help Us Grow? 28

Lesson 3 — How Do My Heart and Lungs Work? 32

Chapter Review 38

---

### **Chapter 3** **Living Things Need Each Other** **40**

Lesson 1 — How Do Animals and Plants Help Each Other? 42

Lesson 2 — How Do People Need Plants and Animals? 46

Lesson 3 — What Are Some Animal Adaptations? 50

Chapter Review 56

---

### **Activities for Home or School** **58**



# **UNIT 2**

## **EARTH SCIENCE**

### **Unit Experiment** **61**

---

### **Chapter 1** **Earth's Resources** **62**

Lesson 1 — What Are Natural Resources? 64

Lesson 2 — Where Is Water Found? 68

Lesson 3 — Where Is Air on Earth? 72

Lesson 4 — How Do We Take Care of Resources? 76

Chapter Review 80

---

### **Chapter 2** **The Sky** **82**

Lesson 1 — What Do We See in the Sky? 84

Lesson 2 — How Do Day and Night Occur? 88

Chapter Review 92

---

### **Activities for Home or School** **94**

# **UNIT 3** PHYSICAL SCIENCE

## **Unit Experiment 97**

---

### **Chapter 1 Observing and Measuring Matter 98**

Lesson 1 — What Is Matter? 100

Lesson 2 — How Do We Measure Matter? 104

Chapter Review 110

---

### **Chapter 2 Changes in Matter 112**

Lesson 1 — How Does Water Change Form? 114

Lesson 2 — How Does Matter Change? 120

Chapter Review 126

---

### **Chapter 3 Sound 128**

Lesson 1 — What Is Sound? 130

Lesson 2 — What Are the Sounds That Musical  
Instruments Make? 136

Chapter Review 140

---

## **Activities for Home or School 142**

---

## **Health 143**

---

## **Glossary 149**

---



# Life Science







# **UNIT 1**

## **LIFE SCIENCE**

**Chapter 1** Animals and Plants Grow and Change .....8

**Chapter 2** People Grow and Change .....22

**Chapter 3** Living Things Need Each Other .....40

Activities for Home or School .....58

### **UNIT EXPERIMENT**

Prepare a booklet in which you show how seeds grow or how animals grow.



# CHAPTER 1

## Vocabulary

life cycle

larva

pupa

tadpole

dissolved

salts

seed coat

seedling

# Animals and Plants Grow and Change

## Did You Know?

Silkworm is only one stage in the **life cycle** of the silkmths. The silkworm spends all its time feeding on mulberry leaves as it grows. Then it changes into the next stage of the life cycle.



## Did You Know?

The part of a popcorn that sticks between your teeth is the **seed coat**.





# LESSON 1

## What Are Some Animal Life Cycles?



### Investigate

## Life Cycle of the Frog

You will need



picture cards



- 1 Put the picture cards in sequence. Show how you think a frog changes as it grows.

- 2 Tell why you put your cards in the order you did.

### Science Skill

When you **sequence** the cards, you show what happens first, next, and last.





# How Animals Grow and Change

The baby elephant and the ducklings will grow up to look like their parents. Together, all the stages of an animal's life from birth to death make up its **life cycle**.



elephants



ducks



## How a Butterfly Grows

The butterfly is an insect that changes several times before it becomes an adult with colourful wings. The butterfly begins life as an egg. A **larva** grows inside the egg. Then it hatches and comes out. The larva eats plant leaves as it grows.

**1** a cluster of eggs



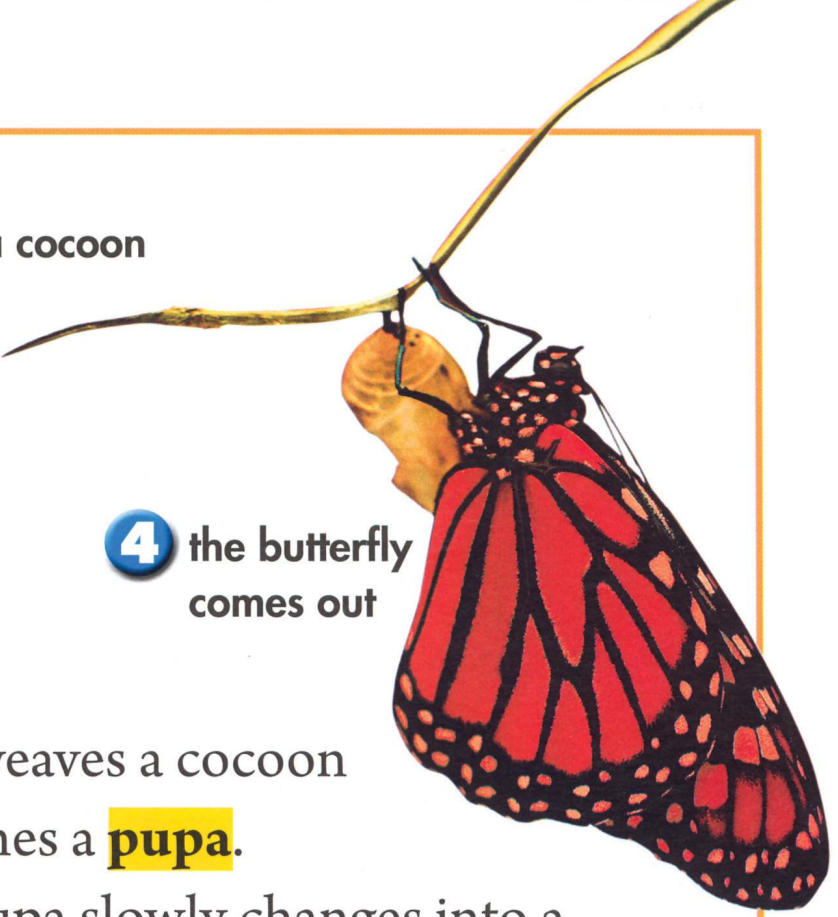
**2** larva







**3** pupa inside a cocoon



**4** the butterfly comes out

The larva stops eating, weaves a cocoon around itself, and becomes a **pupa**.

Inside the cocoon the pupa slowly changes into a butterfly. The butterfly comes out and flies away. Then the butterfly lays eggs and the life cycle begins again.

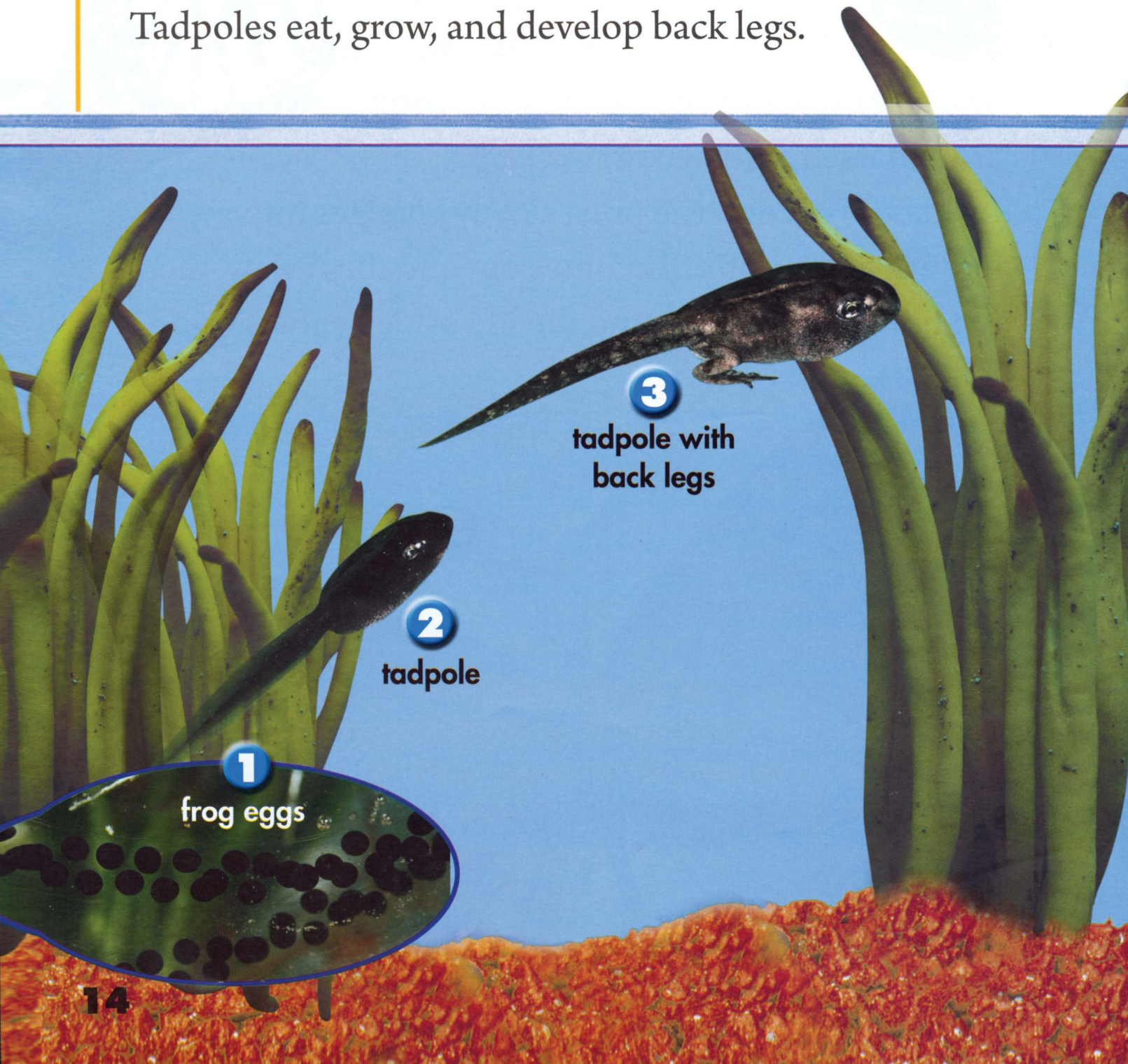


**5** adult butterfly



## How a Frog Grows

A frog is an amphibian. It changes many times before it becomes an adult frog. Frogs lay their eggs in the water. Young frogs, or **tadpoles**, hatch from the eggs. They have tails to swim and gills to breathe in water. Tadpoles eat, grow, and develop back legs.



1

frog eggs

2

tadpole

3

tadpole with  
back legs



Tadpoles keep changing. They grow front legs and develop two lungs to breathe air. Their tails get smaller little by little. When the tails disappear, tadpoles look like little frogs. They climb onto land and grow bigger. Then the frogs lay eggs and the life cycle begins again.

### Think About It

1. List in sequence the stages of the butterfly life cycle.
2. What body parts does a tadpole have that a frog does not have? And what are their roles?

4

the front legs of a tadpole will grow and its tail will disappear little by little.

5

adult frog



# LESSON 2

## How Do Plants Grow and Change?



### Investigate

### What Plants Need

You will need



2 potted plants



cup of water

What Happens to a Plant?		
Plant with water	Plant with no water	date

chart



pencil

- Put both plants in a sunny place. Water the soil of only one plant. Predict what will happen.



- Observe both plants every day for one week. Record your observations on the chart.

### Science Skill

When you **observe** plants, you use your senses of sight, touch, and smell.





## Learn About

# What the Parts of a Plant Do

A plant needs light, air, and water to grow. It also needs **dissolved salts**, or minerals, from the soil. When a plant gets what it needs, it can grow and change.

- What does each part of a plant do?

Flowers make fruits that hold seeds.

Stems hold up the plant and move water and salts through it.

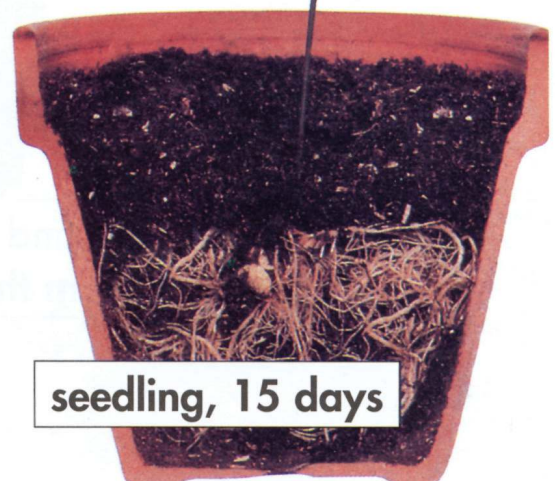
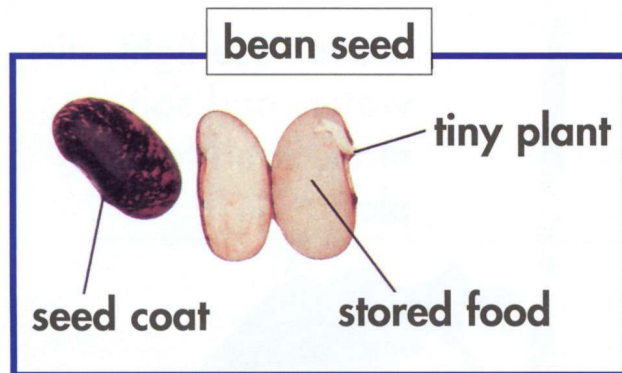
Leaves use light, air, water, and salts to make food for the plant.

Roots fix the plant and take in water and salts from the soil.



## How Plants Grow From Seeds

Seeds have different parts. Most seeds have a covering called a **seed coat**, which protects the seed. The seed is made up of stored food and a tiny plant. The tiny plant uses the stored food to grow. When a seed gets water and warmth, it may germinate, or start to grow. First the roots grow down. Then a stem grows up. The young plant is called a **seedling**.





As the seedling grows, it changes. It makes more leaves and stems. When the plant is fully grown, its flowers make fruits that hold seeds.



plant, 45 days



adult plant with seeds

## Think About It

1. What do plants need to grow?
2. What are the different parts of a seed?





## Tell What You Know

1. What is the life cycle of the animal on the right?
2. How did the plant on the right grow from a seed?



## Vocabulary

Choose the word or term that completes the sentence.

**larva - pupa - seed coat - seedling - tadpole - life cycle**

1. A \_\_\_\_\_ is the way that animals grow and change.
2. The \_\_\_\_\_ hatches out of the egg of the butterfly.
3. When the larva makes a hard covering around itself, it changes into a \_\_\_\_\_.
4. The \_\_\_\_\_ hatches out of the egg of the frog.
5. Most seeds have a covering for protection called \_\_\_\_\_.
6. The young plant that grows when a seed germinates is a \_\_\_\_\_.

## Using Science Skills

- 1. Sequence** A bird changes as it grows. Put these pictures in sequence to show the life cycle of a bird.



**A**



**B**



**C**

- 2. Observe** Make a chart like this one. Tape seeds from different plants onto the chart. Observe the seeds, and write your observations in the chart. Then write what plant each seed comes from.

Seed	Observations	Plant



## CHAPTER 2

### Vocabulary

permanent  
teeth

energy

heart

lungs

# People Grow and Change

### Did You Know?

Your **heart** beats more than  
66 times a minute.



**Did You Know?**

The **permanent teeth** of an adult human are 32.





# How Will I Grow?



## Investigate

### How Hands Grow and Change

You will need



paper and pencil



- 1** Trace your hand on the left side of your paper.



- 2** Predict what your hand will look like when you grow up. Draw a picture of it.

- 3** Compare the two hands. Tell how they are alike and different.

#### Science Skill

When you **predict**, you use what you know to make a good guess about what will happen.





## Learn About

# How Your Body Grows and Changes

Your body grows and changes in many ways. You get bigger and taller. You get stronger and heavier. How has Kawa in these pictures grown and changed?

**Kawa, 8  
years old**



**Kawa, 4  
years old**



**Kawa, 4  
months old**



## All People Grow and Change

All people grow and change. First, you were a baby. Now, you are a child. Later on, you will be a teenager. After that, you will become an adult like your parents.

When you are an adult, you will change in other ways. As you get older, your hair may turn gray or white. Your skin will get wrinkles.

- Predict what the three children in this family will look like after five years.





## Growing in Other Ways

Growing is more than getting bigger. You also change in other ways as you grow. When you were a baby, your milk teeth grew first. Now you are losing those teeth. New adult teeth, called **permanent teeth**, are growing in to take their place.

Learning is another way you grow and change. Some things you learn can also help you grow strong and stay healthy.



## Think About It

1. How do people grow and change?
2. How can you help yourself grow and change?



# How Does Food Help Us Grow?



## Investigate

### Your Food

You will need



pencil

	rice bread pastry	beans meat eggs	fruits	vegetables	milk and dairy	other foods
breakfast						
lunch						
dinner						

chart

- 1 Remember what you ate yesterday.
- 2 Put a mark (✓) in the appropriate place in the chart.
- 3 Compare your chart with the charts of your classmates.

### Science Skill

When you **compare** between two charts you discover the similarities and the differences between them.





## Learn About

# Food Helps You Grow

Healthful foods give your body what it needs in order to grow and give it energy too. **Energy** is what the body needs in order to move, work, and grow.



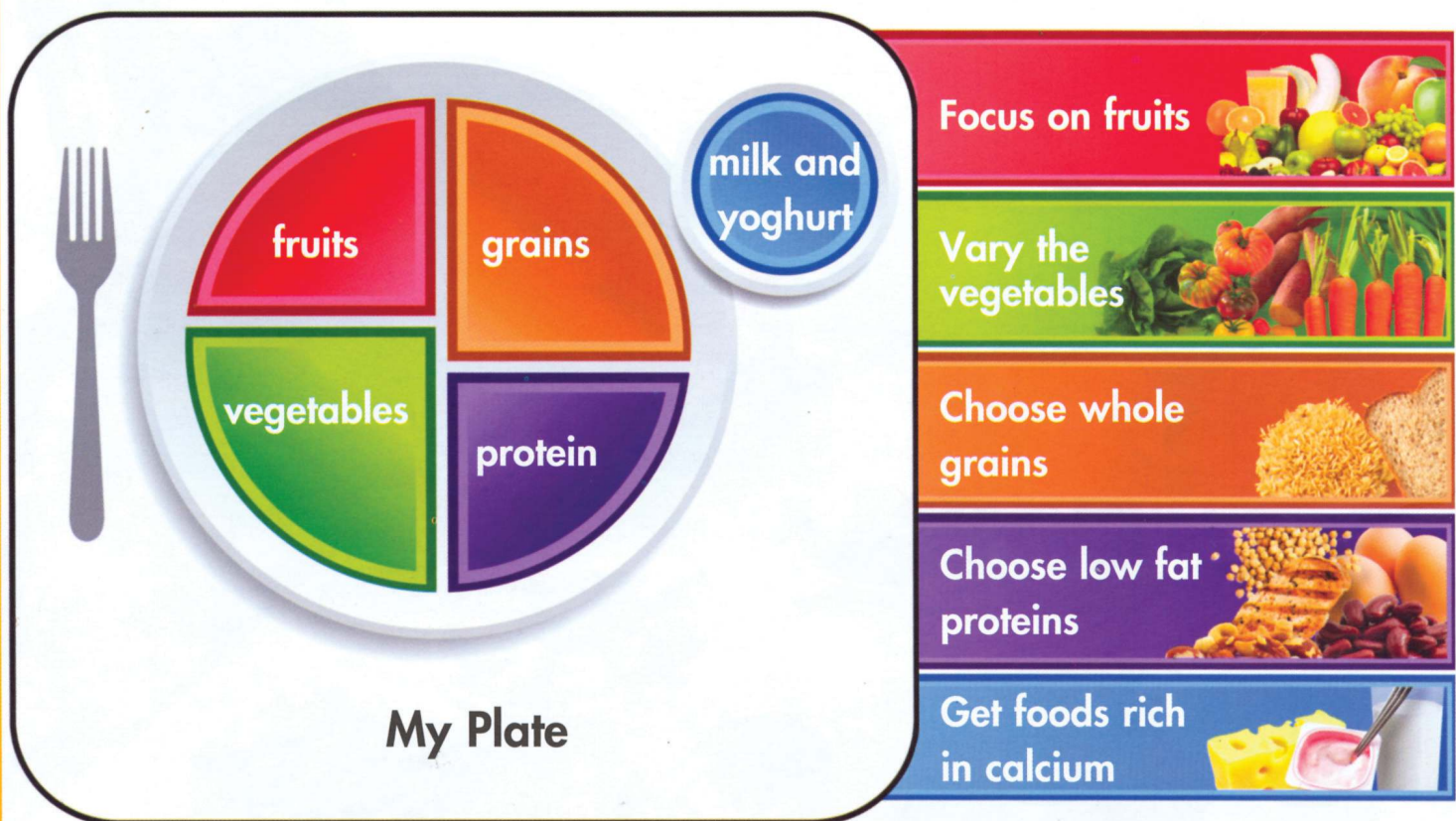


## Healthful Foods

You need to eat different kinds of foods every day. Eating just one kind of food will not give your body everything it needs.

“My Plate” has all the foods that our meal must have and their amounts.

Vegetables and fruits make half “My Plate”, while grains and proteins make the other half. Besides, there is a cup of milk or yoghurt or cheese.





Water is necessary for your health. You should drink six to eight glasses of water a day. You get some of the water your body needs from juice, milk, fruits, and vegetables.



Snacks that you eat between meals give you extra energy to work and play.

Healthful snacks are: fruits, juice, sandwiches, and milk.



## Think About It

1. Tell what are some healthful foods you should eat more of.
2. Tell what amount of water you should drink per day.



LESSON  
**3**

# How Do My Heart and Lungs Work?



## Investigate

### A Heartbeat

You will need



paper cup with  
bottom cut out



**1** Work with a partner. Your partner will use the cup to listen to your heartbeat.

**2** Jump up and down while your partner counts to 10

**3** Your partner will observe your heartbeat again. Is it faster or slower? Trade places

### Science Skill

When you **observe** you may use tools along with your senses.



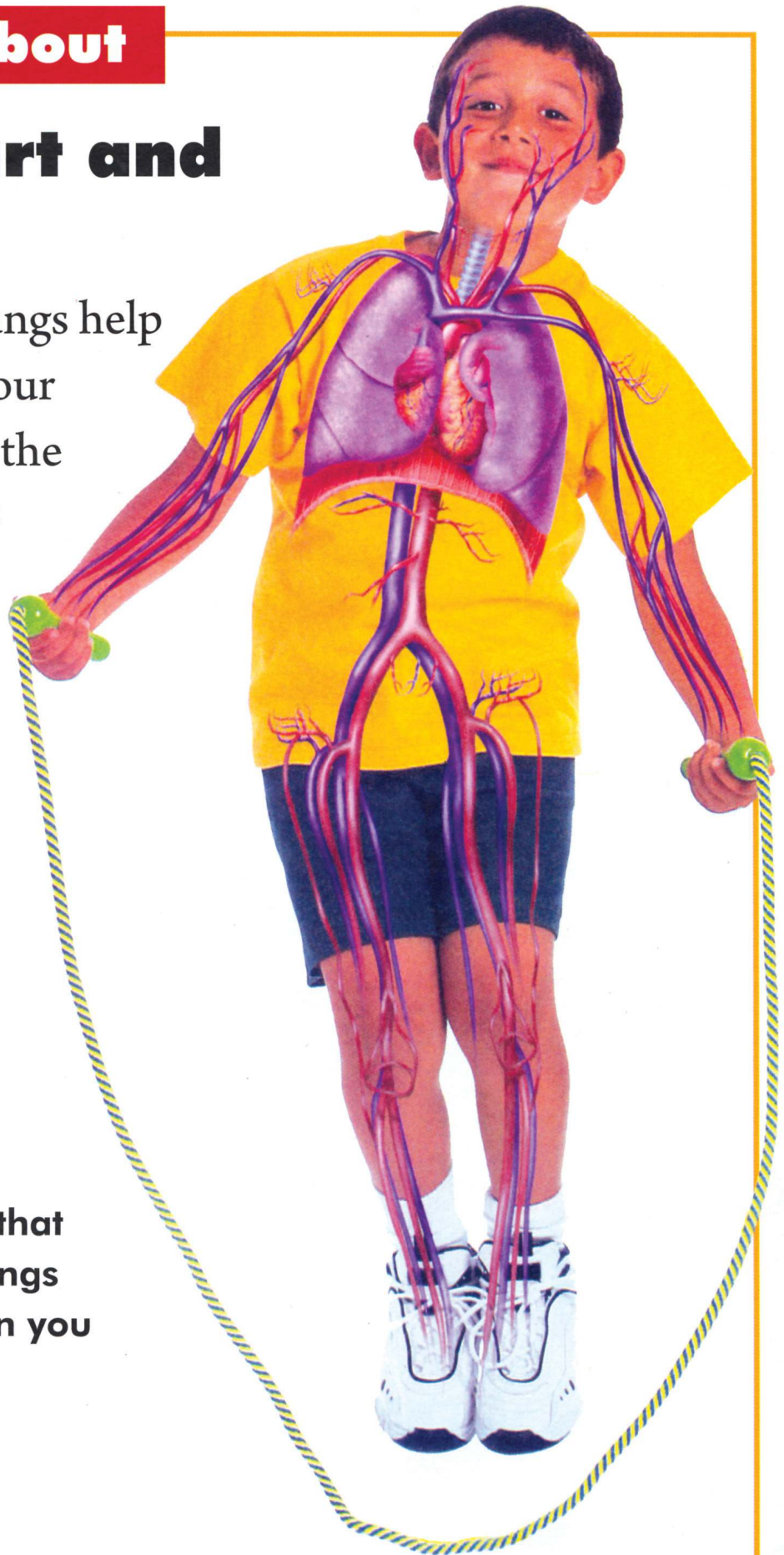


## Learn About

# Your Heart and Lungs

Your heart and lungs help keep you alive. Your **heart** is a part of the body that pumps blood to all other parts of your body. Your **lungs** are body parts that help you breathe the air you need to live.

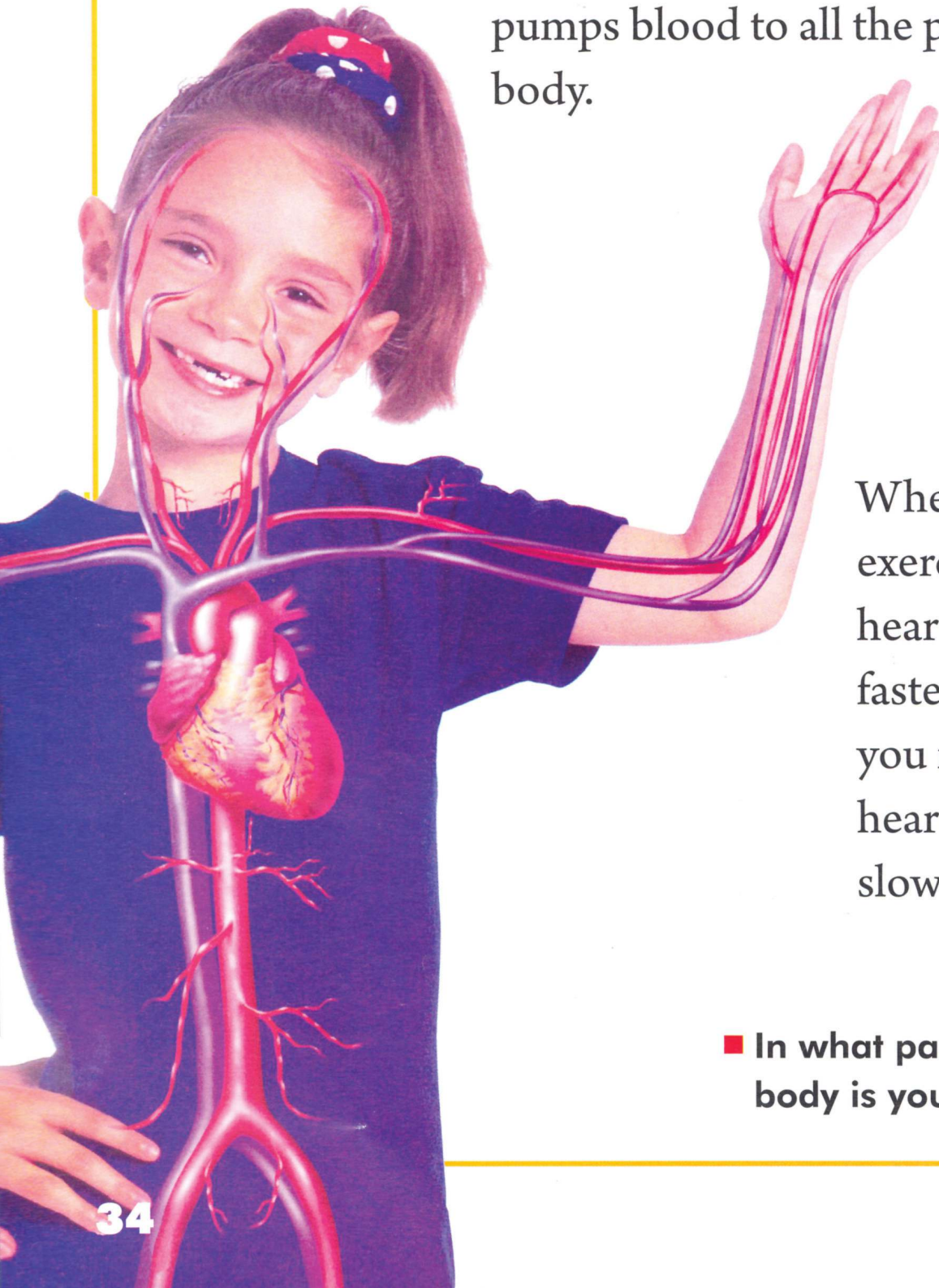
- How can you tell that your heart and lungs work harder when you exercise?





## How Does Your Heart Work?

Your heart is about the size of your fist. Each time your heart beats, it pumps blood to all the parts of your body.



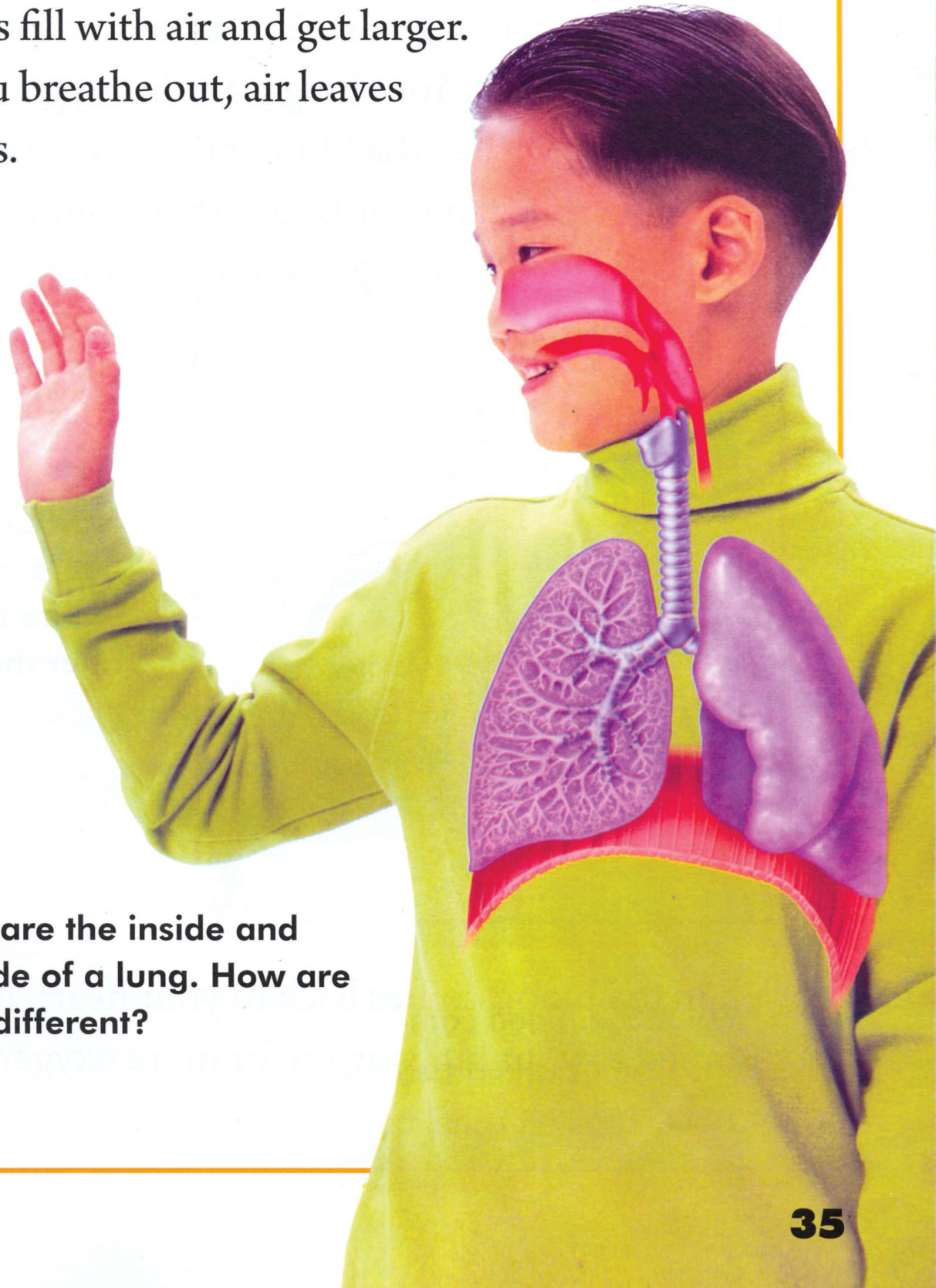
When you exercise your heart beats faster. When you rest, your heart beats slower.

- In what part of your body is your heart?



## How Do Your Lungs Work?

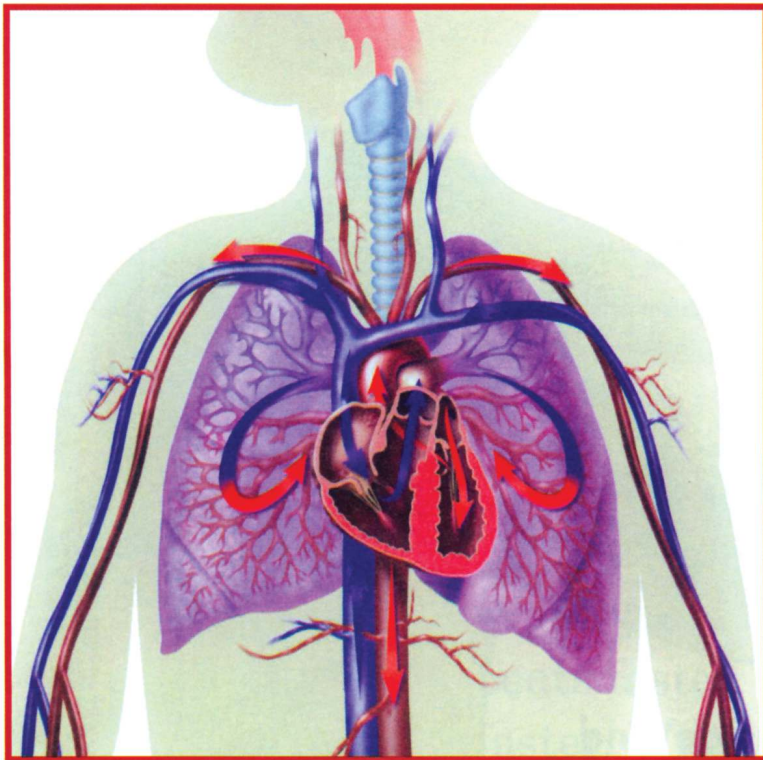
You have two lungs inside your chest. When you breathe in, the air moves down a tube into your lungs. Your lungs fill with air and get larger. When you breathe out, air leaves your lungs.



- compare the inside and outside of a lung. How are they different?

## Your Heart and Lungs Work Together

Your heart and lungs work together to get your body the oxygen it needs. Your heart pumps blood first to your lungs. Your lungs take in oxygen from the air you breathe. The blood picks up the oxygen and takes it back to your heart. Then your heart pumps the blood to all parts of your body.



- How does blood get to your lungs? where does it go after that?

When the blood comes back to your heart, it is pumped to your lungs again for more oxygen.





- How is this boy keeping his heart and lungs healthy?

## **Keeping Your Heart and Lungs Healthy**

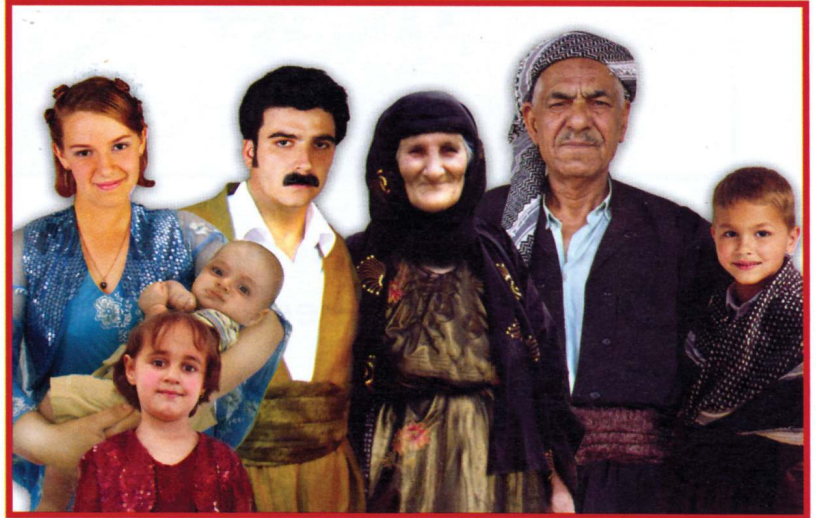
It is important to keep your heart and lungs healthy. Exercise helps your heart and lungs work harder and get stronger.

### **Think About It**

1. How do your heart and lungs work together?
2. How can you keep your heart and lungs healthy?

## Tell What You Know

1. Use the picture to tell how people grow and change.



## Vocabulary

Choose the appropriate terms to fill in the blanks.

**permanent teeth - energy- heart - lungs**

1. \_\_\_\_\_ are new perfect teeth that grow in to take the place of milk teeth.
2. Healthful foods help your body grow and stay healthy, and give it the \_\_\_\_\_ it needs to move and work.
3. When you breathe in, air moves down a tube into your \_\_\_\_\_.
4. The \_\_\_\_\_ pumps blood to all the parts of your body.



## Using Science Skills

**1. Observe** For two days, observe what you do to be healthy. Make a list of your observations. Then use your list to talk about how you help yourself be healthy.

**2. Compare** Look at baby photos of yourself. Fill in the chart. Compare how you were as a baby with how you are now.

	Me	
	As a Baby	Now
Hair Color		
Eye Color		
Teeth		
Other Things		



A clownfish with orange, white, and blue stripes is swimming among green, branching coral. The background is a deep blue, suggesting an underwater environment.

## CHAPTER 3

### Vocabulary

nectar  
shelter  
fertilize  
product  
adaptation  
camouflage  
migrate

# Living Things Need Each Other

### Did You Know?

Some animals such as the clownfish use other animals for **shelter**.



### Did You Know?

Chairs and tables are **products** made of the woods of trees.





# LESSON 1

# How Do Animals and Plants Help Each Other?



## Investigate

### How Seeds Stick to Animal Bodies

you will need

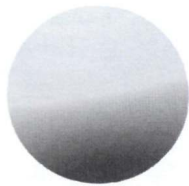
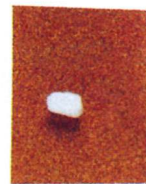


table tennis ball



glue



cotton and sandpaper



- 1** Look at this picture. Why do these seeds stick to animal bodies?
- 2** Plan a model of a seed that may stick. Glue a piece of sandpaper on the table tennis ball.
- 3** Put the ball on the piece of cotton. The ball represents the seed, and the cotton represents animal fur.

### Science Skill

You **make a model** to help you understand how seeds stick to an animal's body.





## Learn About

# Animals and Plants Need Each Other

Bees and flowers show one way animals and plants help each other.

The bee helps the flower make seeds.

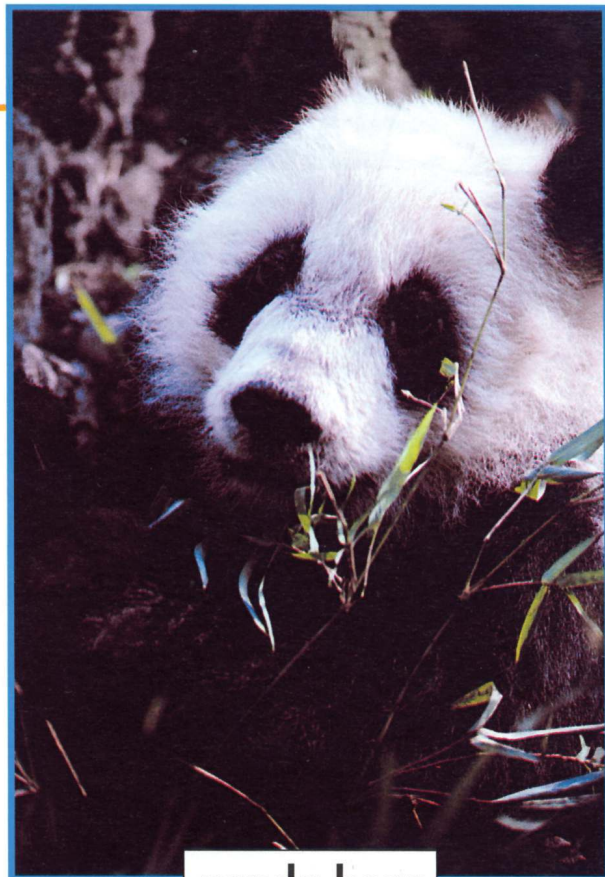
The flower makes a sweet liquid called **nectar** that is food for the bee.





## Plants Help Animals

Many animals eat plant parts.  
Birds eat seeds and fruits.  
Pandas and many other animals  
eat leaves and stems.  
Animals also use plants for  
shelter. A **shelter** is a place  
where an animal can be safe.



panda bear



raccoon

- How does this tree help the raccoon stay safe?

Many birds use twigs,  
leaves, and grass to build  
nests.





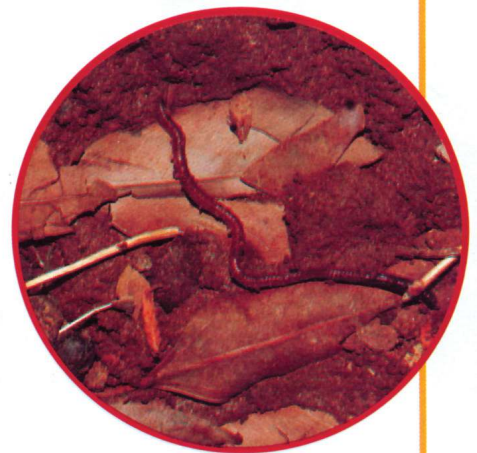
## Animals Help Plants

Animals help plants by carrying their seeds to new places. Birds eat fruits that have seeds inside. When the seeds fall to the ground in the birds' waste, they may grow into new plants far away from the plant they came from.



seeds of spiny fruit

Seeds also stick to animal fur. When the animal moves, it carries the seeds with it to new places. When the seeds fall off, they may land in soil, germinate and grow. A worm eats dead plants. Its wastes help **fertilize** soil and make it better for plants to grow.



## Think About It

1. Give an example of how plants help animals.
2. Give an example of how animals help plants.



# LESSON 2

# How Do People Need Plants and Animals?



## Investigate

### Things People Use

You will need



picture cards

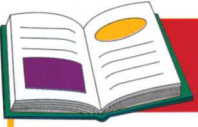


- 1** Which pictures show things made from plants? Which pictures show things made from animals?
- 2** Classify the cards. Sort them into groups.
- 3** Share your sorted cards with your classmate. Tell why you classified your cards the way you did.

#### Science Skill

When you **classify** the things on the cards you group them to show ways they are the same.



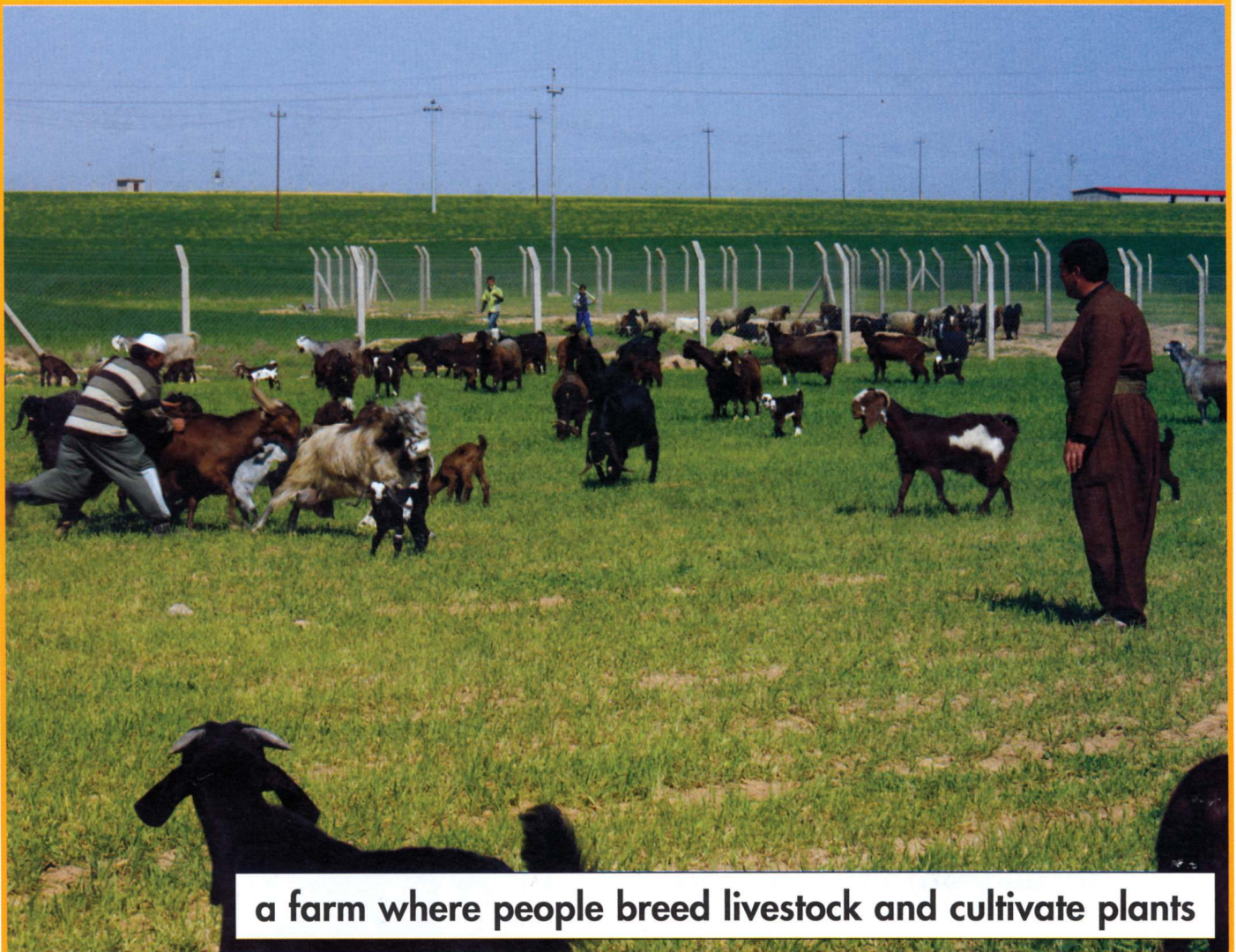


## Learn About

# How People Need Animals and Plants

People need animals and plants for food, clothing, and shelter.

Animals and plants also add beauty to places where people live.



a farm where people breed livestock and cultivate plants



## What People Need Plants For

People need shelter and clothing. They use plants to make many products. A **product** is something people make from other things.



People eat parts of plants. People eat the leaves of lettuce. They get flour from wheat.

■ What kinds of plants do you like to eat?

People also use plants to make products they need for building houses and making furniture.

■ Where do we get wooden boards from for building?





## What People Need Animals For

People need animals for food. Many people eat beef, camels, sheep, chicken, and fish, in addition to eggs and milk.



- Tell which foods shown in this picture come from animal sources, and which come from plant sources.



People use wool from sheep to make clothes such as coats, and jackets.



## Think About It

1. What do people need animals for?
2. What do people need plants for?



# LESSON 3

## What Are Some Animal Adaptations?



### Investigate

#### How Color Helps an Ant

You will need



red and black squares

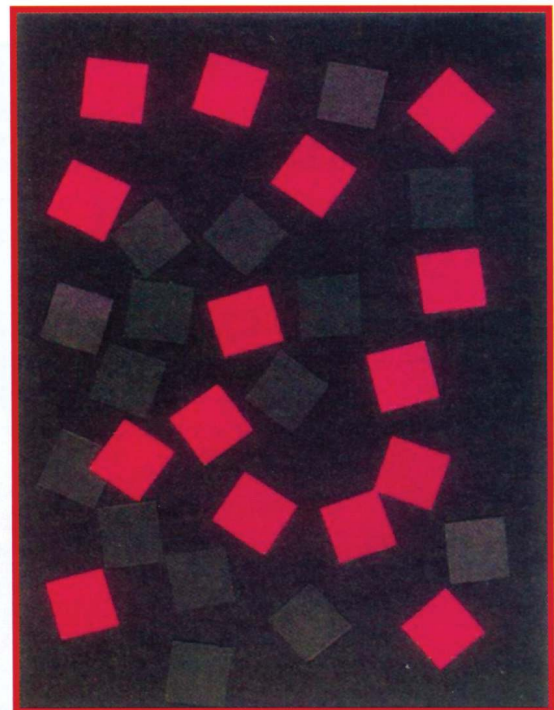


black paper



clock

- 1 Place the same number of red and black squares on the black paper. Form a hypothesis about which squares will be easier to see and count.
- 2 Count red squares for 5 seconds. Count black squares for 5 seconds. Record the number.
- 3 Which squares were easier to see and count? Was your hypothesis correct? What can you infer about how color can help an ant?



#### Science Skill

When you form a **hypothesis**, you make a statement about something you can test.





## Learn About

# Animal Adaptations

An animal's color may help protect it in its environment. An animal's body covering may also help. The ways an animal moves and behaves may help, too. An **adaptation** is anything about an animal that helps it live in its environment.

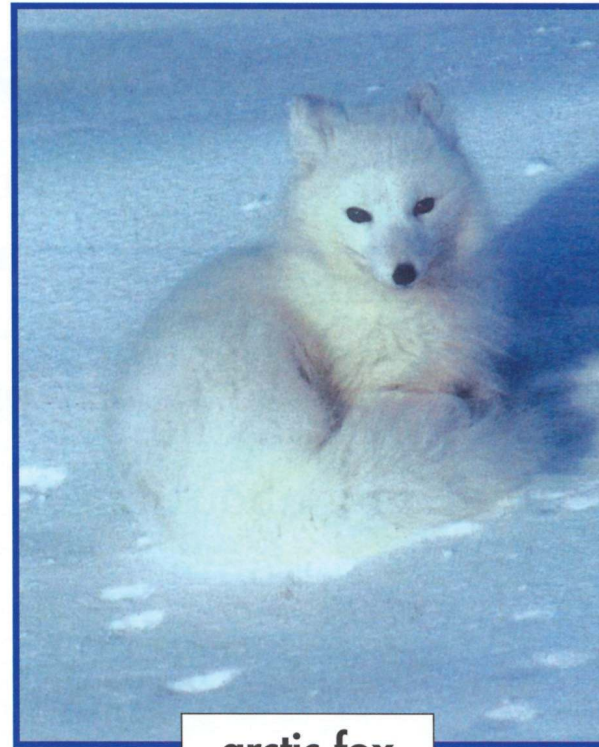


chameleon



## Camouflage

One animal adaptation is camouflage. **Camouflage** is a way an animal looks that helps it hide. The color of an arctic fox's fur in winter helps it hide in its environment. Some fish have shapes that look like the tall, thin plants where they live.



arctic fox

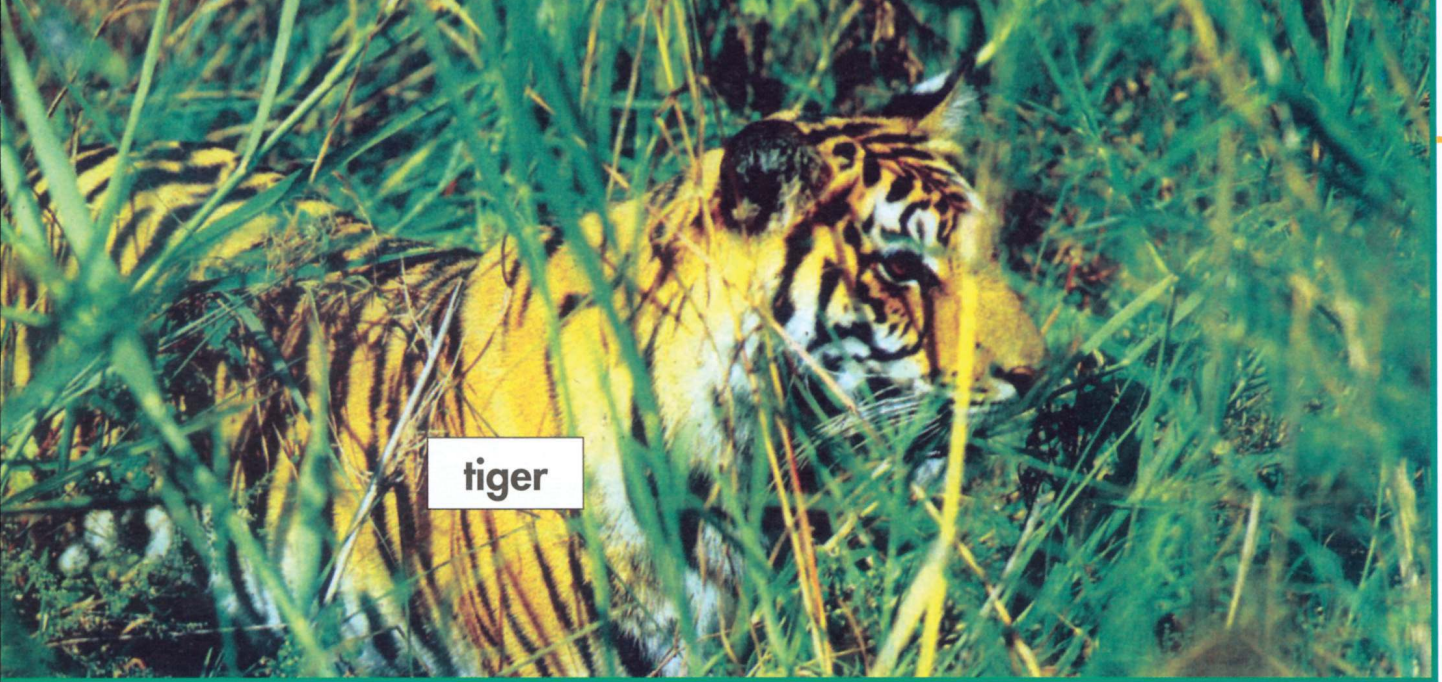
■ How does camouflage help these animals?



razor fish







tiger

Some animals can hide because of patterns in their fur. A tiger's stripes help it hide in the tall grass. A zebra's stripes make it hard for other animals to pick out one zebra from the herd.



zebras



## Movement and Migration

Animals move to find food or to get away from danger. The way an animal moves, such as by running or swimming, is an adaptation.

Many animals **migrate**, or travel to faraway places.

Ducks and many other birds migrate to warmer places to find food in winter

■ Why are these ducks migrating?







## Body Coverings

An animal's body covering is another adaptation. An armadillo has a covering of hard plates. The plates protect the soft parts of its body.



## Think About It

1. What are some animal adaptations?
2. What is the importance of the tiger's stripes?



## Tell What You Know

1. Tell how people can use these plants to meet their needs.



## Vocabulary

Write under each picture the word which goes with it.

1. nectar



2. fertilize



3. shelter



4. product



5. camouflage



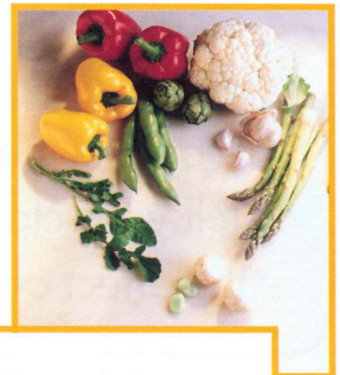
6. migrate





## Using Science Skills

- 1. Classify** Collect pictures of different kinds of foods. Put the foods that come from plants in one group, and put the foods that come from animals in another group.



- 2. Make a Model** Get an empty box. Collect some grass, twigs and shrub branches. Build a bird's nest and put toy birds in it.





# Activities for Home or School

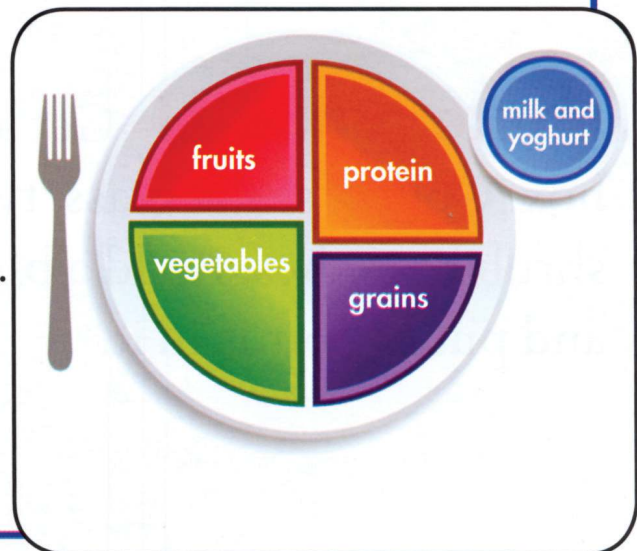
## The Effect of Light

1. Put a green plant in a place where it can receive light from the sun.
2. Water the plant regularly.
3. Observe the plant after 10 days.
4. Tell your classmates what you observe about the effect of sunlight on the plant.



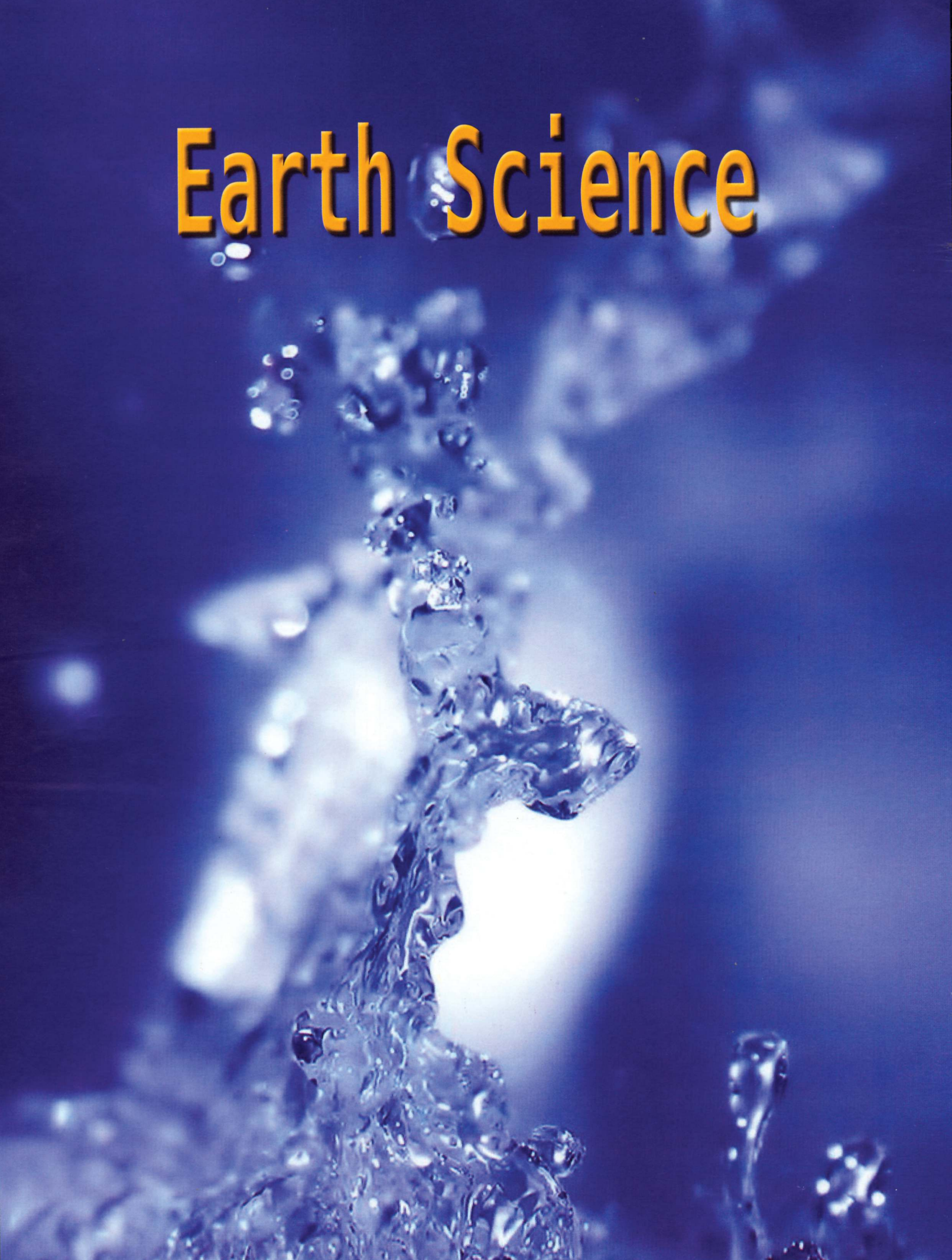
## My Plate

1. Draw an empty "My Plate".
2. Search in magazines for pictures of different kinds of foods.
3. Classify the foods into groups.
4. Stick the pictures in their appropriate place on the plate.
5. Compare the plate you made with the one your classmate has made.





# Earth Science









## **UNIT 2**

## **EARTH SCIENCE**

**Chapter 1** Earth's Resources ..... 62

**Chapter 2** The Sky ..... 82

Activities for Home or School ..... 94

### **UNIT EXPERIMENT**

#### **Land and Water**

Prepare a mural that shows how people use land, air, and water.



# CHAPTER 1

## Vocabulary

natural  
resources

forest

soil

ocean

lake

river

air

oil

reduce

reuse

# Earth's Resources

## Did You Know?

The Nile River is the longest **river** in the world. Its length is about 6500km. This is equivalent to 25 times the distance between Dahok and Sulaimaniyah.



## Did You Know?

The Amazon **forests** are the largest in the world. They cover an extensive area that is about 140 times larger than Kurdistan region.





# LESSON 1

## What Are Natural Resources?



### Investigate

### Nature Around You

You will need



pencil

Things I See Outdoors	
Animals	
Plants	
Water	
Soil	

chart

- 1 Observe what is found around the school.



- 2 Put the mark (✓) in the right place in the chart to record what you observe.

Things I See Outdoors	
Animals	
Plants	
Water	
Soil	

### Science Skill

When I **observe** things around the school, I use my senses of sight, touch and smell.





## Learn About

# Natural Resources

**Natural resources** are everything found in nature and used by man.

Plants, animals, rocks, soil, water, and air are all natural resources.

rocks, water, plants, and air are all natural resources in Kurdistan region

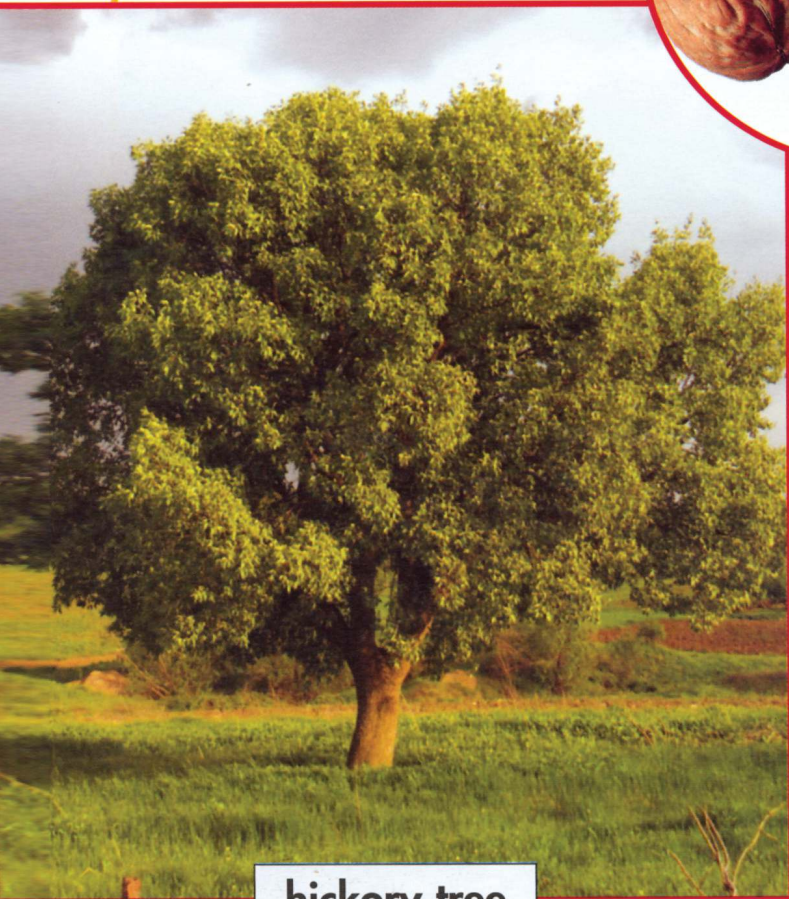




## Forests

**Forests** are a natural resource. People use the wood from many trees to make furniture. Some trees give us fruits that are good to eat.

hickory  
nuts



hickory tree



a chair made of  
hickory wood



## Soil

**Soil** is a natural resource. Soil is made from tiny fragments of rock and the remains of dead animals and plants.

arable soil in  
Erbil governorate



People use soil to grow crops for food.

### Think About It

1. What are some natural resources?
2. How do people use soil?





# Where Is Water Found?



## Investigate

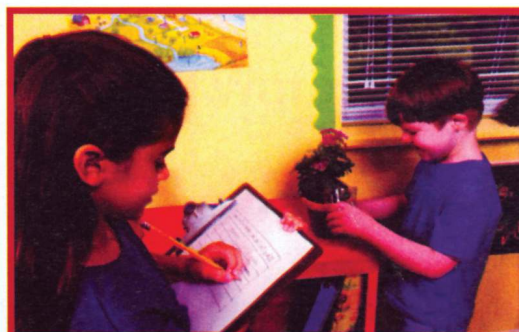
### Ways of Using Water

You will need



paper and pen

- 1** List the ways you and your classmates use water in one day.
- 2** Record the data in a chart like this one. Put a tally mark each time one of you uses water.
- 3** Count the tally marks at the end of the day.
- 4** Draw conclusions about how you and your classmates use water in one day.



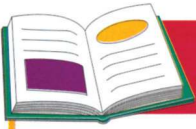
Ways the class uses water in one day

How Our Class Uses Water	How Many Times
Washing hands	

### Science Skill

Collecting data is one way to draw a **conclusion** about how I use water at home.





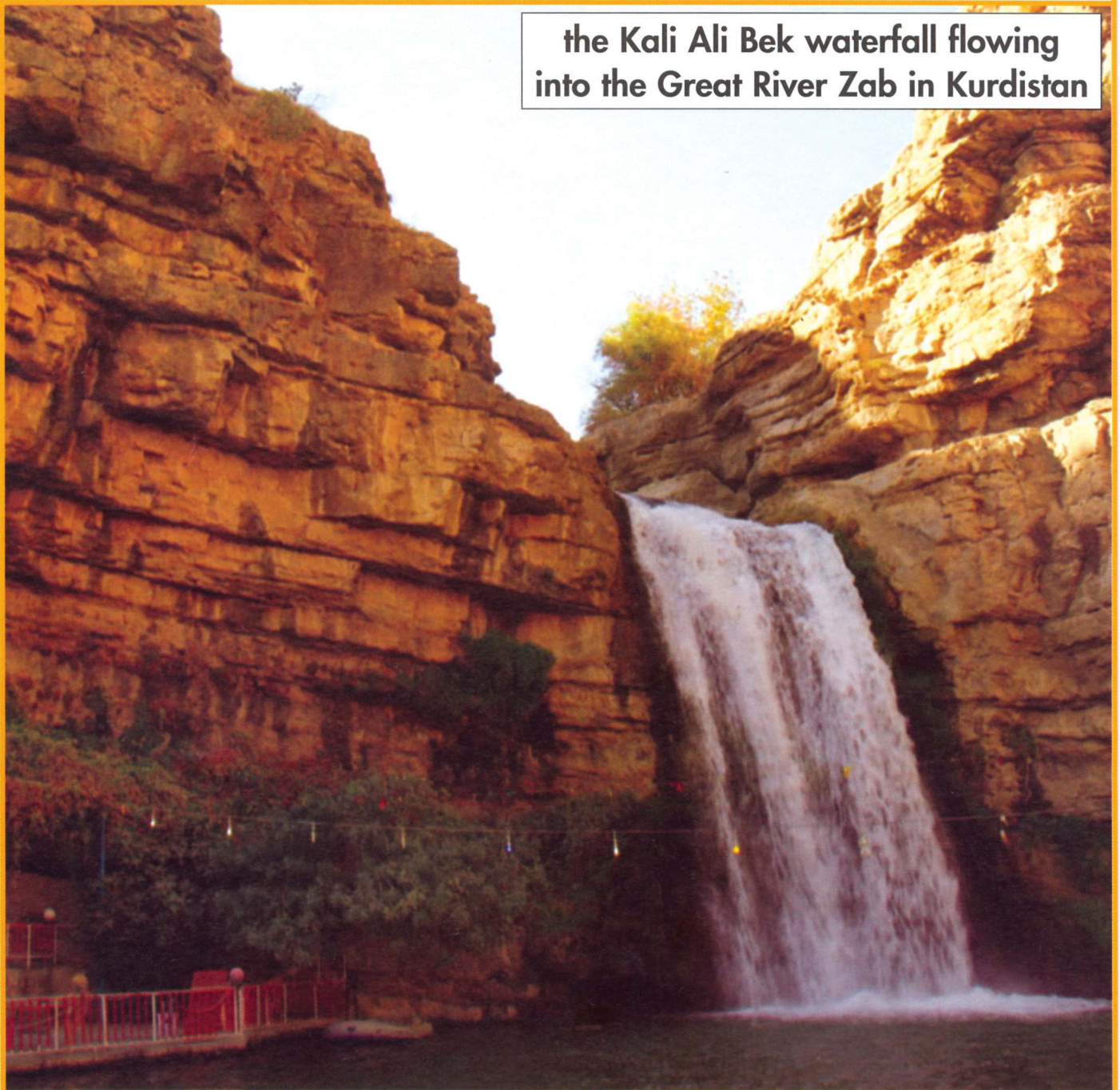
## Learn About

# Water on Earth

Water is a natural resource.

Water is found in many places such as oceans, lakes, and rivers.

the Kali Ali Bek waterfall flowing  
into the Great River Zab in Kurdistan



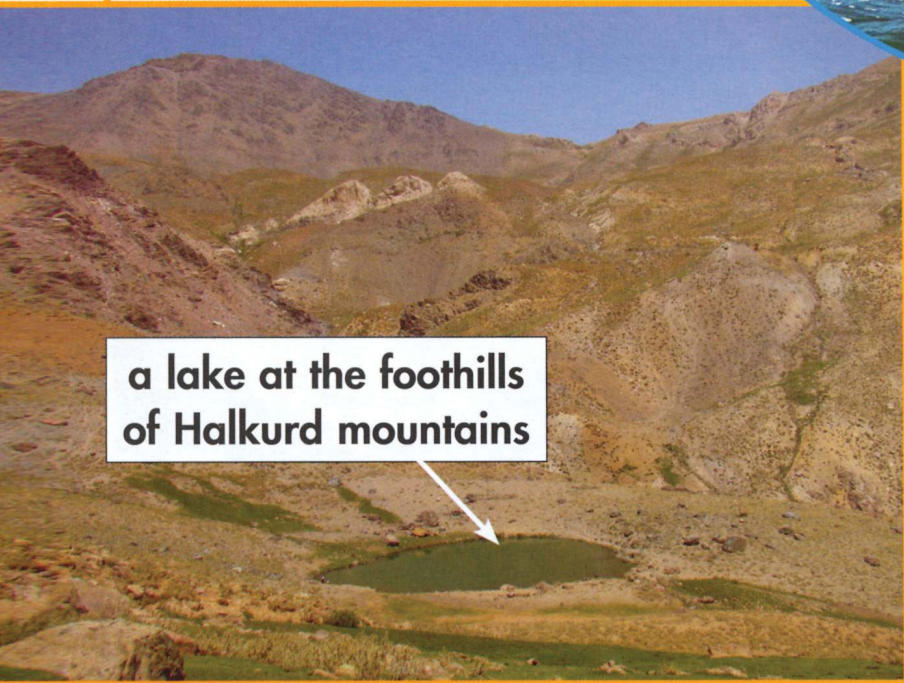


## Ocean

An **ocean** is a very wide and deep area of salt water.



ocean



a lake at the foothills of Halkurd mountains

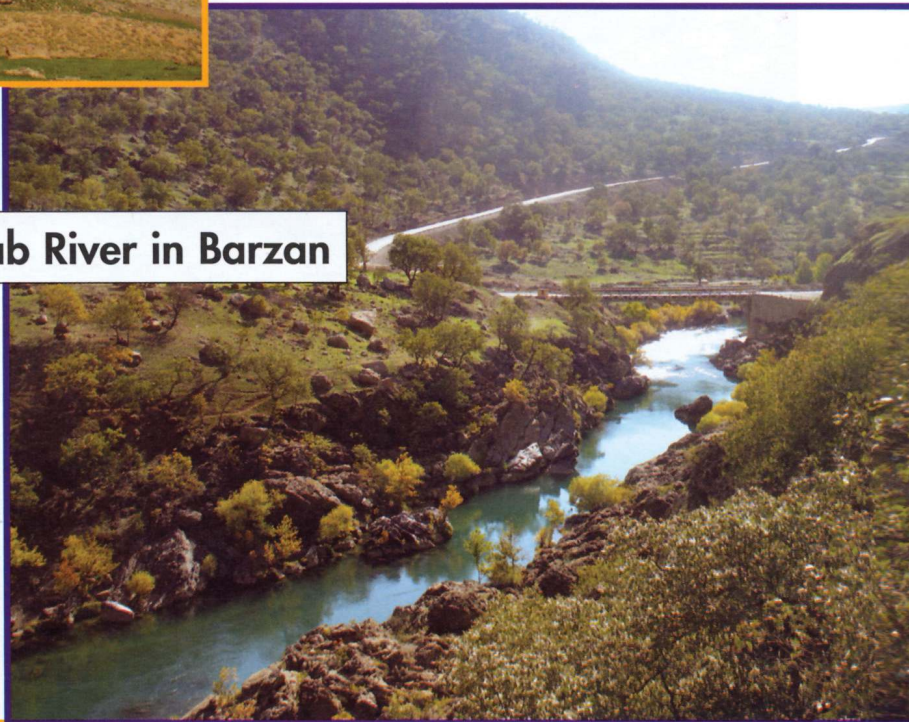
## Lake

A **lake** is a large area of calm water surrounded by land.

the Great Zab River in Barzan

## River

A **river** is a very large body of flowing freshwater.





## How People Use Water

People need clean fresh water for drinking, bathing, and washing, and for swimming and playing. People also need water for watering plants.



## Think About It

1. What is the difference between river water and sea water?
2. How do people use water to meet their needs?



# Where Is Air on Earth?



## Investigate

### Air in a Bag

You will need



plastic bag



- 1** Pull a bag toward you. Then hold the top of the bag closed.



- 2** Squeeze the bag. What do you observe?

- 3** Poke a hole in the bag. What was in the bag?

### Science Skill

When you **observe** you use the senses of sight, touch, and smell.





## Learn About

# Air on Earth

**Air** is a natural resource. We cannot see, taste, or smell it.



air blows the branches of trees.



# Air Is All Around

Air is in the tyre of the bike.



Air blows the branches of trees.

■ How do you know air is in this picture?





## How People Use Air

People need air to live, and to meet many of their needs.



- How do people use air in these pictures?



## Think About It

1. How do you know that air is around us?
2. What is the importance of air to people?



# LESSON 4

## How Do We Take Care of Resources?



### Investigate

### How to Reuse Things

You will need



colored markers



used things

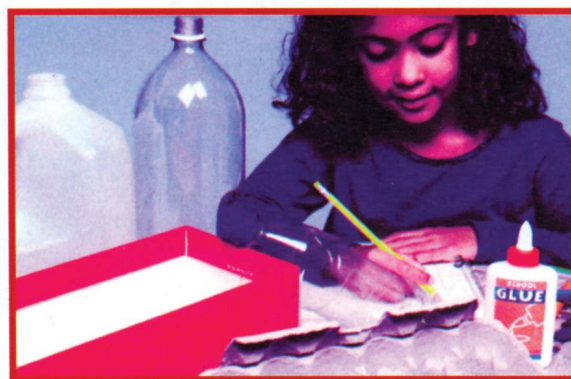


newspaper



glue

- 1** How can you make something useful from used things? Plan an investigation to find out.
- 2** Write the steps you need to take.
- 3** Follow your steps to make a useful object. Then communicate to your classmates how you made your object.
- 4** Is there another way you could have used the materials?



### Science Skill

When you **plan an investigation** about something you communicate and test ways to answer the questions.

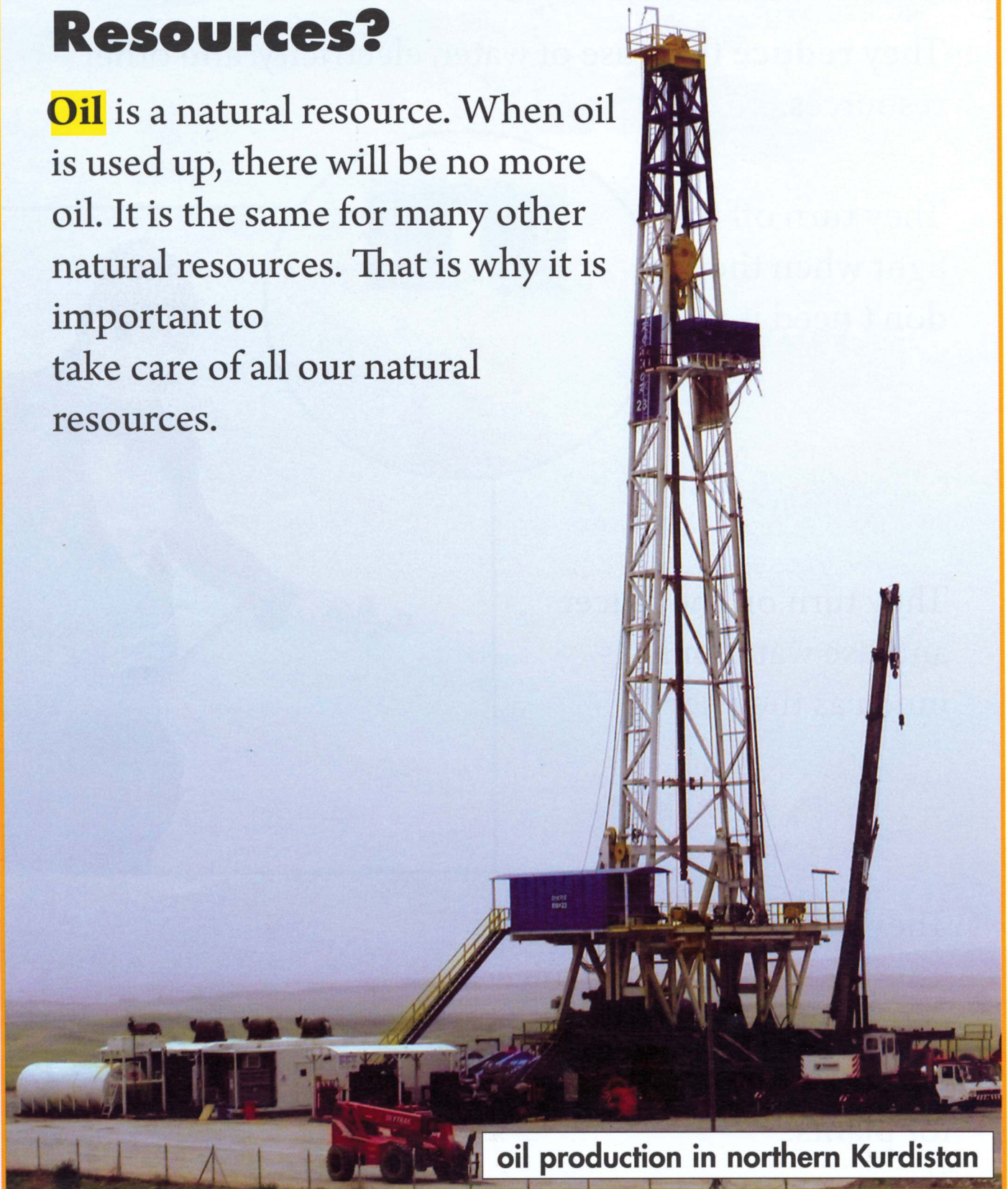




## Learn About

# Why Do People Take Care of Resources?

**Oil** is a natural resource. When oil is used up, there will be no more oil. It is the same for many other natural resources. That is why it is important to take care of all our natural resources.



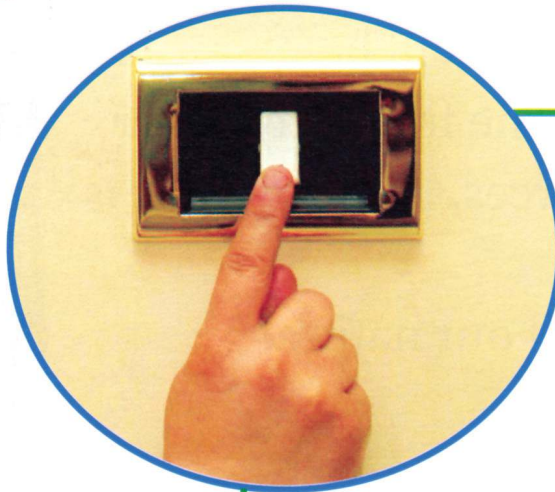
oil production in northern Kurdistan



## What Are Ways People Can Take Care of Resources?

They **reduce** their use of water, electricity, and other resources.

They turn off the light when they don't need it.



They turn on the faucet and use water only as much as they need.



They **reuse** things.  
These containers were juice cartons. When emptied, they were reused as pots for plants.





# How Do we Take Care of the Places Where we Live?



- How to take care of the places where we live.



## Think About It

1. How do we take care of resources?
2. Why do we take care of the places where people, plants, and animals live?



## Tell What You Know

1. Tell what you know about each picture.



## Vocabulary

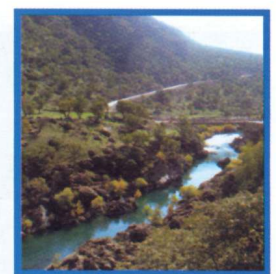
Place under each picture the number of the word that fits.

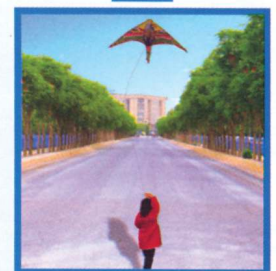
ocean 1

lake 2

river 3

air 4

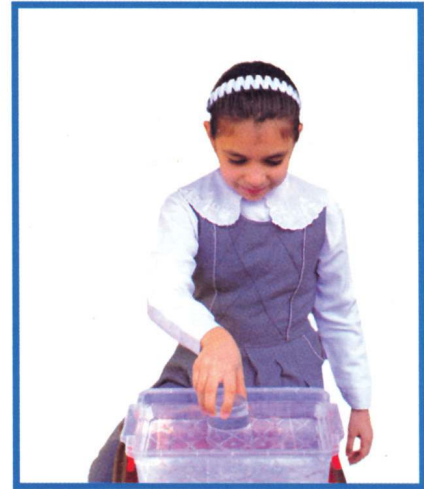

☐

☐

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## Using Science Skills

1. **Infer** Hold a cup upside down. Push it under the water to the bottom. Then tip it to one side. Observe and infer what was in the cup?

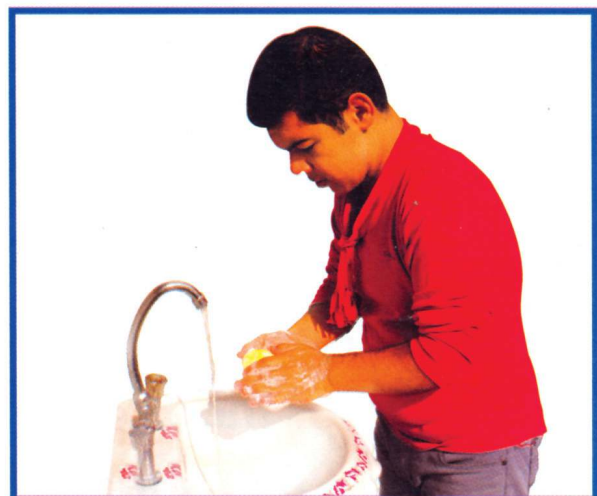


2. **Collect Data/Communicate**

Make a chart to show ways people use three resources. Draw or cut out pictures that show some ways each resource is used. Glue your pictures on the chart. Then share your chart with your classmates.

How People Use Resources		
Soil	Plants	Water

3. **Observe** Look at this picture. Tell what the boy is doing.





## CHAPTER 2

# The Sky

### Vocabulary

stars

sun

moon

planets

### Did You Know?

The size of the **planet** Jupiter is about one thousand times the size of planet Earth.



### Did You Know?

The light from the **sun** takes eight minutes to cross the distance to Earth, whereas a jet airplane needs 17 years to cross the same distance.





# LESSON 1

## What Do We See in the Sky?



### Investigate

### The Sky

You will need



paper and pencil

The Sky	
Date	What You Saw



- 1** You can communicate about what you see in the sky. Make a chart similar to this one above.
- 2** Go outdoors with your teacher. Observe the sky.
- 3** Draw pictures and write words to communicate what you see.

### Science Skill

When you **communicate** you can use a chart to tell about what you observe.





## Learn About

# What We See in the Sky

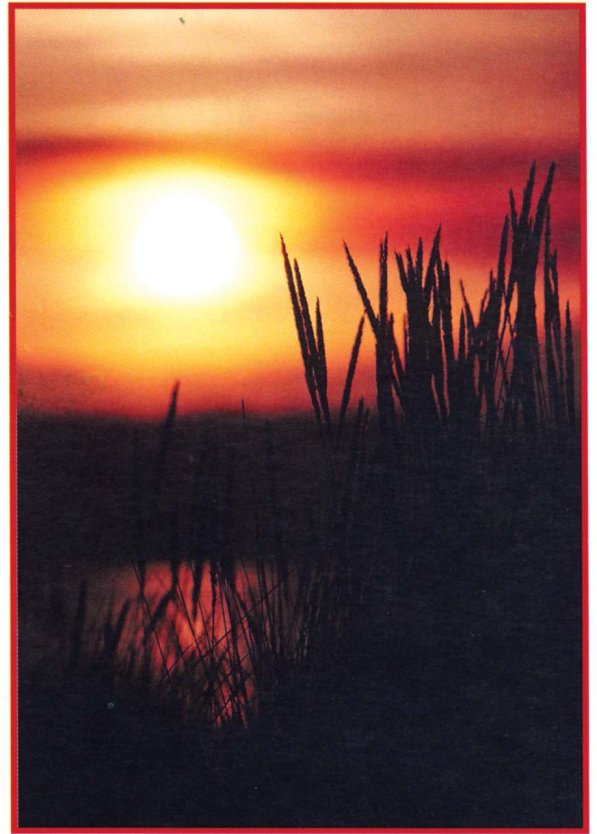
There are many things to see in the sky in the daytime. You can see birds, clouds, or airplanes. You see different things at night.





## Observing the Sky

At night you can see many stars in the sky. **Stars** are objects in the sky that give off light. The **sun** is a star, and it is the closest star to Earth.



- What can you see in the sky only during daytime?

Other stars are much farther away than the sun. On many nights, you can also see the **moon**. The moon is the brightest object in the sky at night.



Venus as seen through magnifying instruments



Venus as seen with the naked eye. Observe its size compared to the size of the moon

On some nights you can see Mars and Venus in the sky. Mars and Venus are planets. Earth is a planet too. **Planets** are large bodies revolving around the sun.

Mars as seen through magnifying instruments



Mars as seen with the naked eye. Observe its size compared to the size of the moon

## Think About It

1. What can you see in the sky at night?
2. What are planets? Name three of them.



# LESSON 2

## How Do Day and Night Occur?



### Investigate

### Day and Night

You will need



globe



flashlight

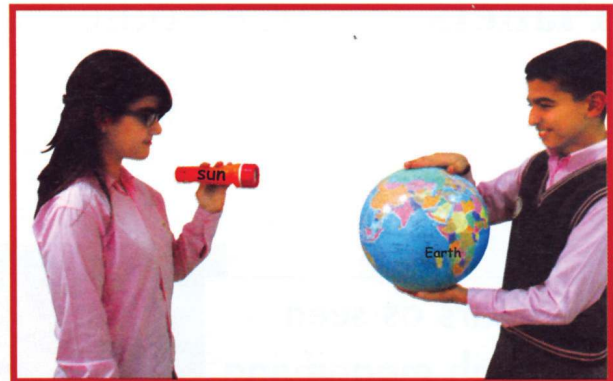
Earth

the sun

two labels



tape



- 1 Make a model of the sun and Earth. The flashlight is the sun. The globe is Earth. Tape on the labels.
- 3 Tell how the model helps you see why we have day and night.

- 2 Ask a partner to hold Earth. Shine the flashlight on Earth. The side facing the sun is having day, and the other side is having night.

### Science Skill

When you **make a model**, you can use it to find out why something happens.





## Learn About

# Sun

The sun gives off heat and light. The sun's heat warms Earth's land, air, and water. The sun's light makes the sky bright in the daytime.



land forms in Kurdistan in the bright blaze of daytime.



## Day and Night on Earth

Earth is always moving. Our planet rotates . This means it spins like a top. It takes 24 hours for Earth to rotate one time.





As Earth rotates, sometimes the side we live on faces the sun. The sky is bright. We have daytime. Sometimes our side of Earth faces away from the sun. The sky is dark. We have night.



## Think About It

1. Why do we have day and night?
2. How does the spinning of Earth around itself give us day and night?



## Tell What You Know

1. Tell what you know about each picture.



## Vocabulary

Choose the right term to fill in the blank space.

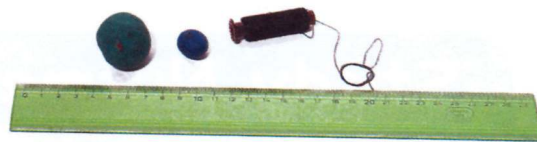
**sun - planet - stars - moon**

1. \_\_\_\_\_ are objects in the sky that give off light.
2. \_\_\_\_\_ is the closest star to Earth.
3. \_\_\_\_\_ is the brightest object in the sky at night.
4. Earth is a \_\_\_\_\_ that rotates around itself and revolves around the sun.



## Using Science Skills

**1. Make a Model** Make a model to show the size of Earth and the moon, and the distance between them.



- Prepare a ball of clay one centimeter in diameter to represent the moon.
- Prepare a ball of clay 4 centimeters in diameter to represent Earth.
- Cut a thread 110 centimeters long and lay it out on the table. The length of the thread represents the distance between the moon and Earth.
- Place one of the balls at one end of the thread and the other ball at the other end.

**2. Communicate** Prepare a chart to show what you do in daytime and at night. Draw or cut pictures. Glue the pictures on the chart.

Tell your classmates about what you do.

What you Do in Daytime	What you Do at Night

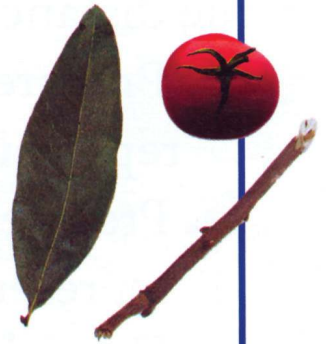


# Activities

## for Home or School

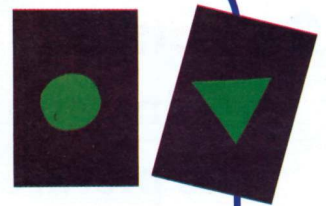
### Study Nutrients in Soil

1. With an adult, collect once-living things such as a small tomato, a dry stick, and a leaf.
2. Bury each item in a hole in the ground about 10 cm deep and mark each spot.
3. Check these items once a week for four weeks.
4. Record what you observe.
5. Draw a conclusion.



### Make Sun Prints

1. Cut two shapes from construction paper.
2. Place each shape on a sheet of black paper.
3. With an adult, go outdoors. Leave one sheet of black paper in the shade and the other one in the sun.
4. After several hours, remove the cutouts from the black papers. Observe the result. Why do you think this happened?





# PHYSICAL SCIENCE









## **UNIT 3**

## **PHYSICAL SCIENCE**

**Chapter 1** Observing and Measuring Matter ..... 98

**Chapter 2** Changes in Matter ..... 112

**Chapter 3** Sound ..... 128

Activities for Home or School ..... 142

### **UNIT EXPERIMENT**

#### **Make a Model**

Make a model from sand, water, clay, and other materials. Talk about the materials that you used.



CHAPTER  
**1**

# Observing and Measuring Matter

## Vocabulary

matter

mass

solid

gram

centimeter

liquid

milliliter

gas

## Did You Know?

A **gas** called propane is burned to heat the air in a hot-air balloon and make it rise in the air.



## Did You Know?

A **solid** object on the moon would weigh about 6 times less than it weighs on Earth.



on Earth



on the moon



# LESSON 1

## What Is Matter?



### Investigate

## Matter

You will need



paper and pencil



3 balls



- 1** Observe how the balls are alike and different.
- 2** Think of ways to classify the balls. Write your ideas.
- 3** Choose one way to classify the balls into groups.
- 4** Explain to a classmate how you classified the balls.

### Science Skill

When you **classify**, you look for ways that things are alike. Then you put the things that are alike into a group.





## Learn About

# Matter

Everything around you, like trees, milk, and air is made of matter.

**Matter** is what all things around us are made of.



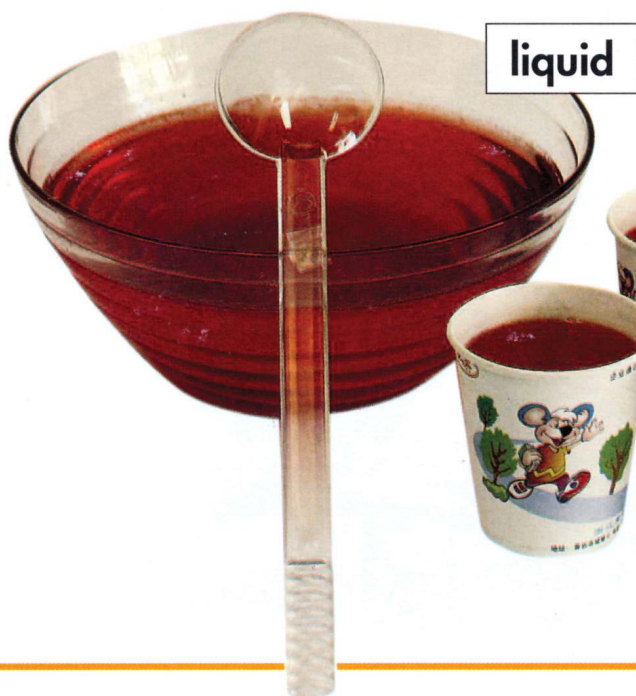


## Forms of Matter

Matter has three forms. It can be a solid, a liquid, or a gas. The party hats, the bowl, the cups, and the chair are solids. The juice is a liquid. The air in the balloons is a gas.



solids



liquid



## Properties of Matter

Matter has certain properties like color, size, and shape.

Another property of matter is mass. An object's **mass** is the amount of matter it has.



## Think About It

1. What is matter, and what are its forms?
2. What are some properties of matter?





# How Do We Measure Matter?



## Investigate

### Liquids

You will need



marker



3 cups of colored water

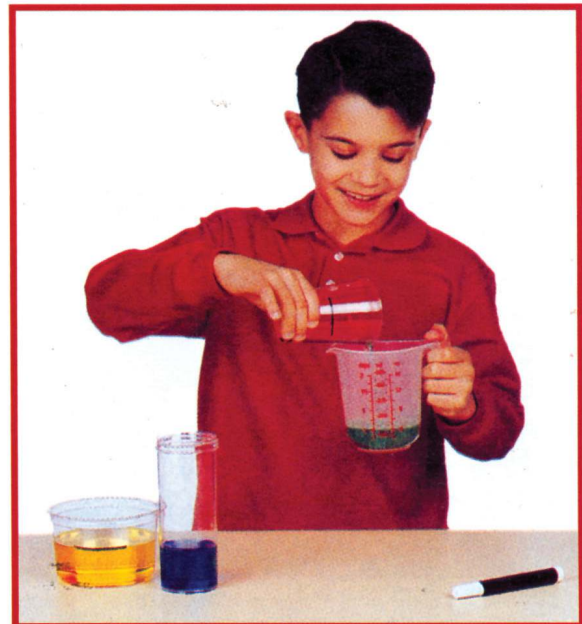


measuring cup



3 containers

- 1** Draw a line to the same height along the side of each of the 3 containers. Fill each container with colored water up to the level marked by the line.
- 2** Pour the water of one container into the measuring cup. Measure the amount of water, and record.
- 3** Repeat Step 2 with the other two containers.
- 4** Compare the readings. What can you infer?



### Science Skill

You can use a measuring cup to **measure** the amount of a liquid.

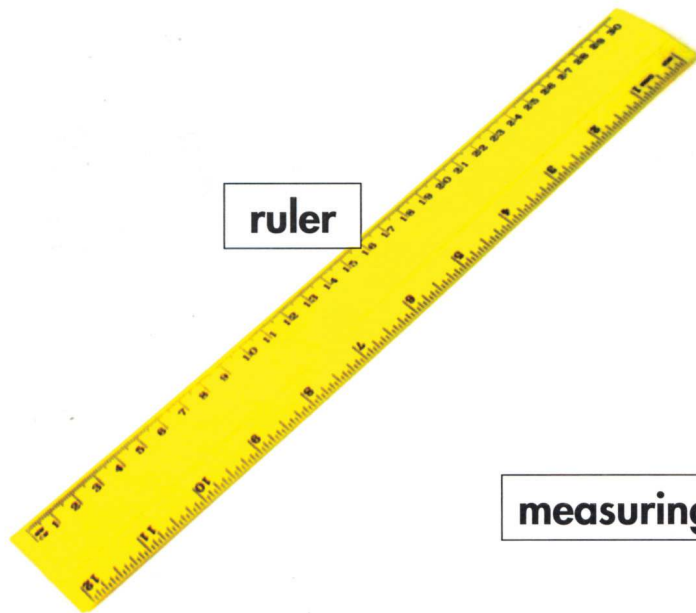




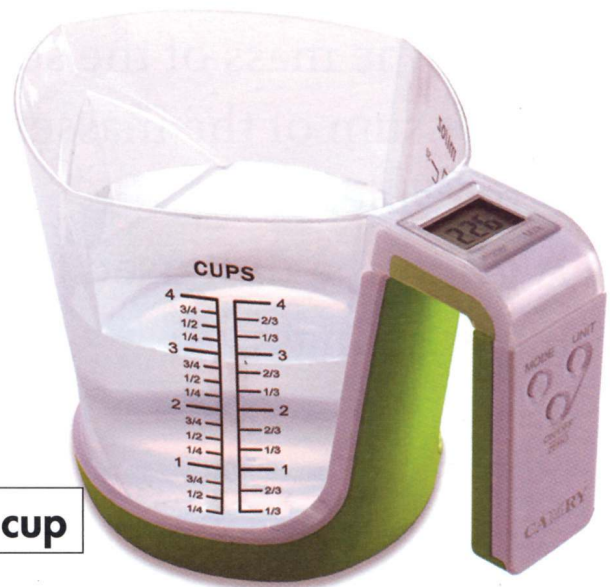
## Learn About

# Measuring Matter

You use measuring tools to measure some properties of matter like mass, volume, and length. A balance, a measuring cup, and a ruler are measuring tools.



ruler



measuring cup



balance



## Measuring Solids

A **solid** is the only form of matter that has a shape of its own. Like all matter, it has mass.

You use a pan balance to find out the mass of a solid. Put the solid on one side of the balance.

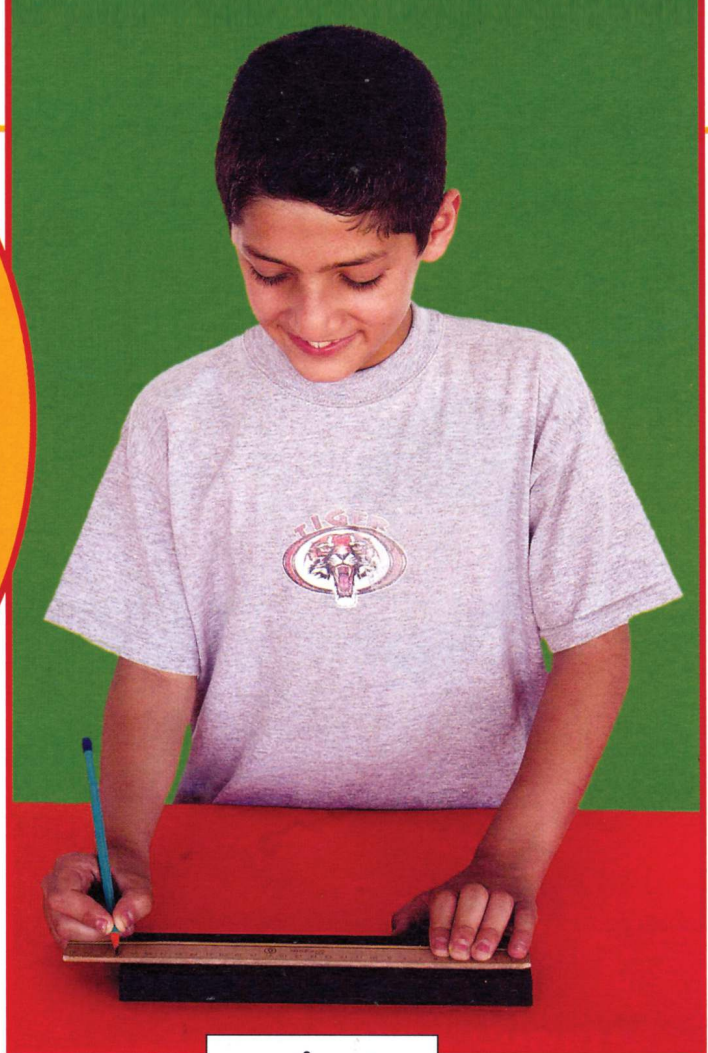
Add masses to the other side until the two sides are even. The mass of the solid is equal to the sum of the masses on the other side.

A **gram** is a unit used to measure mass.

- What is this girl using to measure the mass of the toy?







centimeter

Use a ruler to measure how long or wide a solid is.  
A **centimeter** is a unit used to measure length.

How Many Centimeters Long?	
Object	Number of Centimeters
Box	30
Piece of Wood	27





## Measuring Liquids

A **liquid** is a form of matter that does not have its own shape. It takes the shape of its container. A liquid has mass. You can measure the mass of a liquid by using a pan balance.

- Which cup has more mass? How do you know?

You can also measure the volume of a liquid. A **milliliter** is a unit used to measure the volume of a liquid.

- Which container contains the bigger volume of liquid?





## Measuring Gases

**Gases** are a state of matter. Gases spread out to fill any empty space it is in. Like liquids, gases take the shape of the container they are in. Gases have mass. You can measure the mass of a gas by tying a blown up balloon to one end of a rod and another similar but deflated balloon to the other end.

Observe the rod.

The mass of the balloon filled with air is heavier than the mass of the balloon with no air.

- How do you know the balloon filled with air is heavier?

## Think About It

1. How can you measure the mass of a solid?
2. How can you measure the volume of a liquid?





## Tell What You Know

1. What are the properties of each state of matter?



**solid**



**liquid**



**gas**

## Vocabulary

Write the letter of the word that best completes each sentence.

1. A \_\_\_\_\_ fills a balloon.
2. A balance measures the \_\_\_\_\_ of an object.
3. A \_\_\_\_\_ takes the shape of its container.
4. The volume of liquids may be measured in \_\_\_\_\_.
5. An object's length may be measured in \_\_\_\_\_.
6. A chair is a \_\_\_\_\_ because it keeps its shape.
7. The mass of a solid may be measured in \_\_\_\_\_.

- a.** gas
- b.** liquid
- c.** centimeters
- d.** solid
- e.** mass
- f.** milliliters
- g.** grams



## Using Science Skills

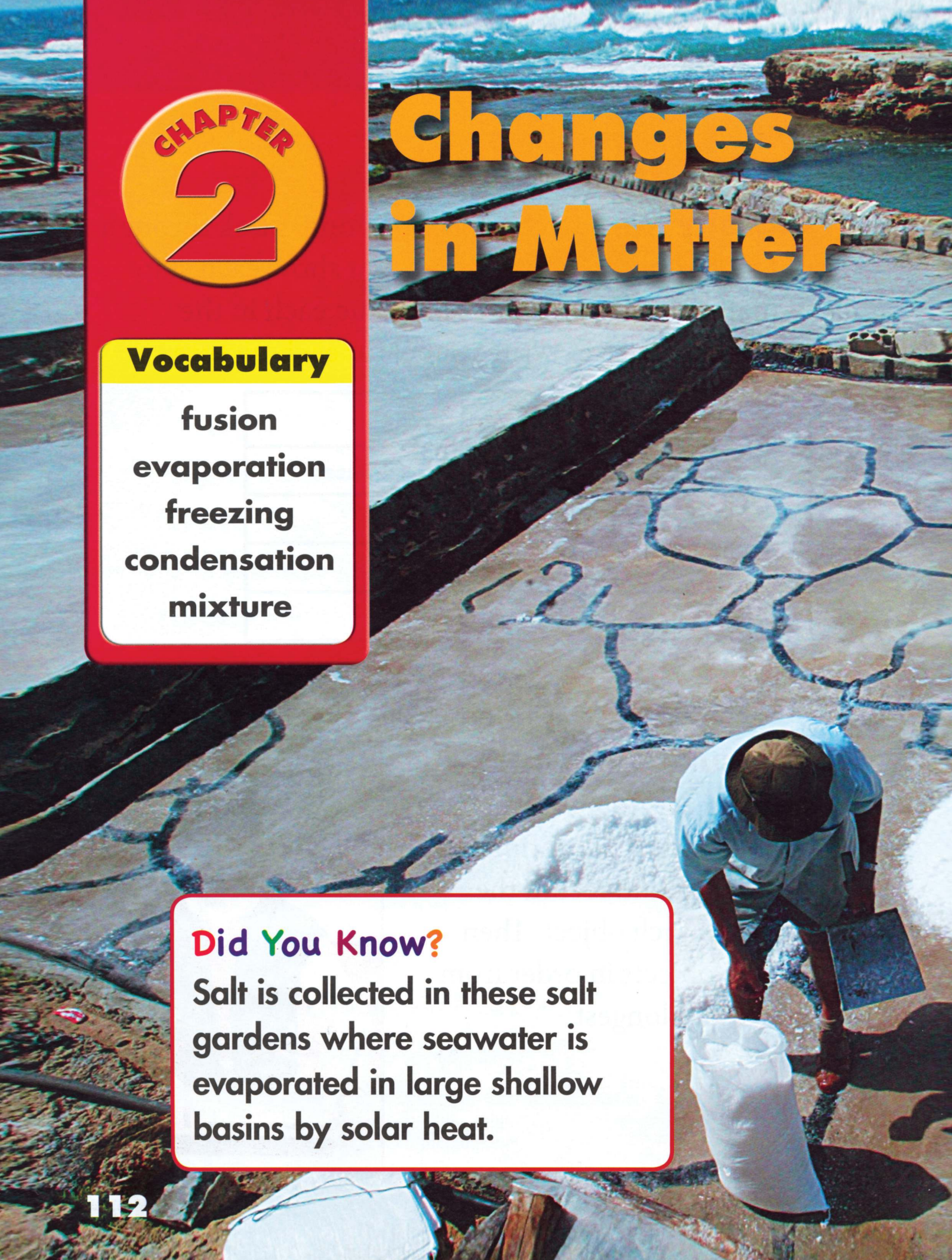
- 1. Classify** Make a chart like this one. Look through old magazines to find pictures that show each state of matter. Cut the pictures and glue each in the appropriate place. Write a label for each picture.

States of Matter		
Solids	Liquids	Gases

- 2. Measure** Choose five small objects to measure. Use a ruler marked in centimeters, to measure and record the length of each object. Then put the objects in order from shortest to longest.





The background image shows a salt garden with large, shallow basins. A worker wearing a hat and light-colored clothing is bent over, harvesting salt from a basin. The salt is piled up in a large white bag. The basins are separated by low walls, and the salt is being collected from the basins. The sky is blue with some clouds.

## CHAPTER 2

# Changes in Matter

### Vocabulary

fusion  
evaporation  
freezing  
condensation  
mixture

### Did You Know?

Salt is collected in these salt gardens where seawater is evaporated in large shallow basins by solar heat.



**Did You Know?**

Air is a **mixture** of  
11 different gases.





# LESSON 1

## How Does Water Change?



### Investigate

## One Way That Water Changes

You will need



ice cubes



lamp



a piece of cloth



clock



**1** Write about some ways to make an ice cube melt faster.

**2** Plan an investigation for two of the ways. Carry out your plan.

**3** Record the time it takes each ice cube to melt.

**4** Communicate to a classmate which way melted the ice cube faster.

**CAUTION** Don't touch the bulb of the lamp.

### Science Skill

You can **plan** an investigation to see which way works the best.





## Learn About

# How Water Can Change

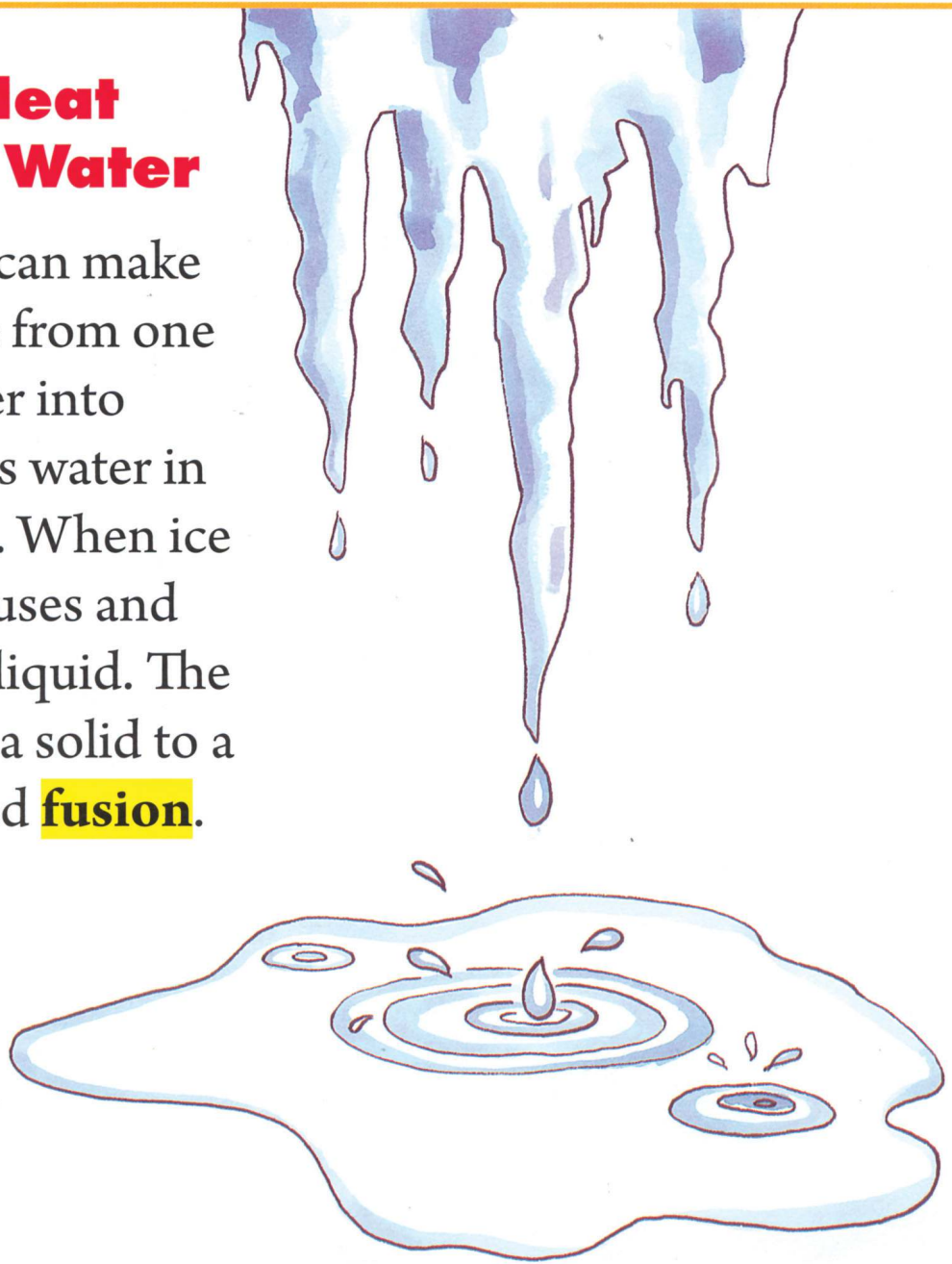
Water can be a solid, a gas, or a liquid. Water as a solid may be ice or snow. Water as a gas is water vapor. In this picture, heat from the Earth is changing water from one state into another.





## Adding Heat Changes Water

Adding heat can make water change from one state of matter into another. Ice is water in its solid state. When ice is heated, it fuses and changes to a liquid. The change from a solid to a liquid is called **fusion**.

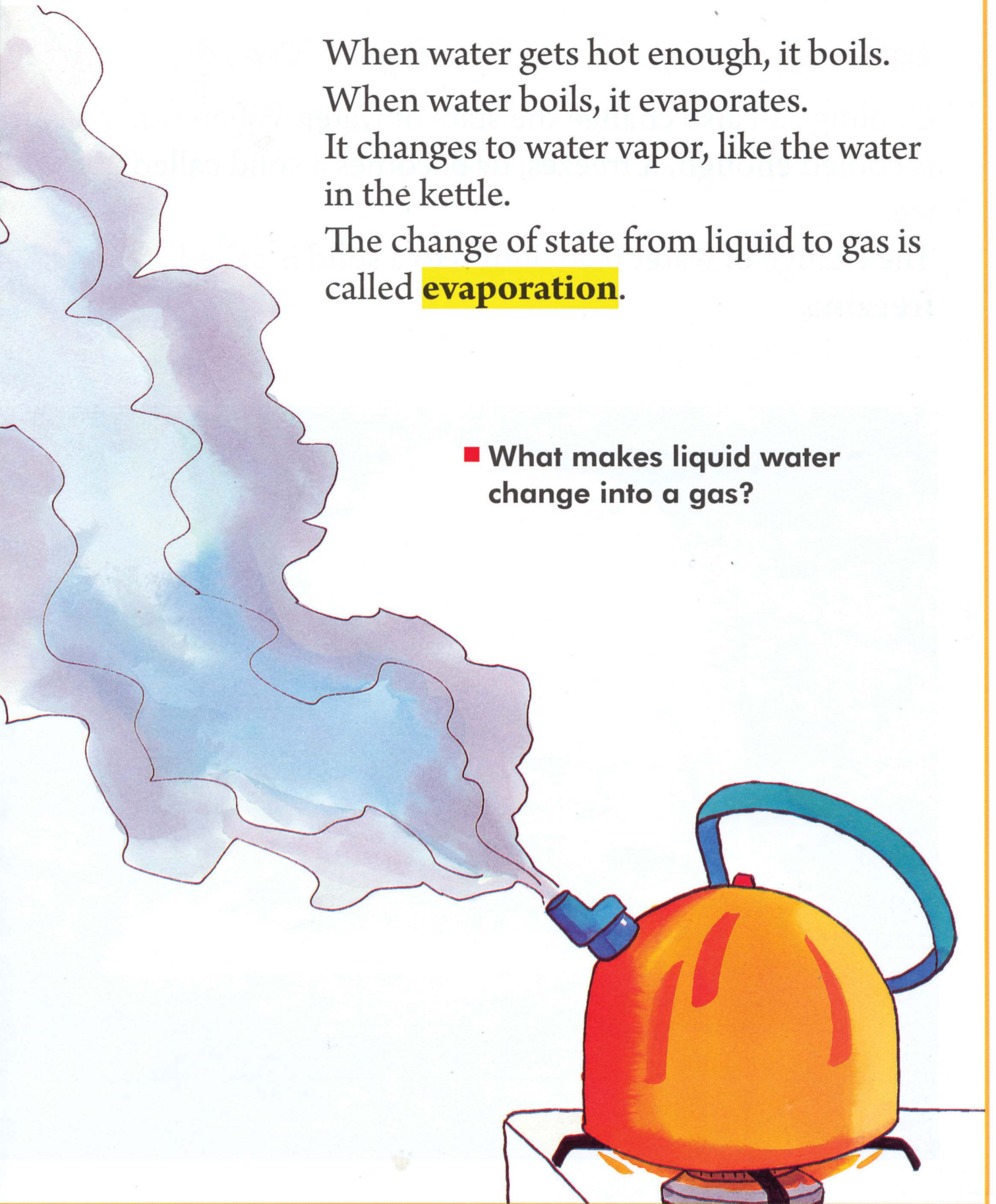


- What is fusion?
- When does ice fuse?



When water gets hot enough, it boils.  
When water boils, it evaporates.  
It changes to water vapor, like the water  
in the kettle.  
The change of state from liquid to gas is  
called **evaporation**.

■ What makes liquid water  
change into a gas?





## Taking Away Heat Changes Water

Cooling can also change the state of water. When water is cooled enough, it freezes, or becomes a solid called ice.

The change of water from liquid to a solid is called **freezing**.





When water vapor cools, it condenses and changes into liquid. The change of matter from gas to liquid is called **condensation**.

Clouds are formed of water droplets and may fall as rain.



■ How did the cloud form?



## Think About It

1. What are the three states of water?
2. What can make water change its state?



LESSON  
**2**

# How Does Matter Change?



## Investigate

### A Mixture

You will need



$\frac{1}{2}$  cup of warm water



spoon



salt



pan



**1** Add one tablespoon of salt to the water and mix well.

**2** Pour the salt and water mixture into the pan.

**3** Put the pan in a warm place. Predict what will happen.

**4** Observe in two days. Did you predict correctly?

### Science Skill

When you **predict**, you use what you know to make a good guess.





## Learn About

# Other Ways Matter Changes

Matter can change in different ways. How was the matter in this mixture changed?





## Cutting and Shaping Matter

Cutting is one way you can change matter. This loaf of bread has been cut into slices. The slices have a different shape from the loaf, but they are the same bread.



Bending is another way you can change the shape of matter . The shape of the lump of dough changes, but it is still dough.



## Mixing Matter

When you put different kinds of matter together, you make a mixture. A **mixture** is something made up of two or more kinds of things.



- What kinds of things are in the jar? Is this a mixture?

You can mix together some kinds of things and then separate them. Each thing would still be the same as it was before.



- How can you separate the paper clips from the other kinds of matter in this mixture?



## Burning and Cooking

Some changes to matter cannot be undone and matter changed back to how it was before. Fire and high heat often cause such changes to matter.



Burning causes wood to change to ashes, gases, and smoke. The ashes, gases, and smoke cannot be changed back to wood.



Cooking makes an egg change from a liquid to a solid. It also changes the egg's color, texture, and taste. A cooked egg cannot be changed back to a raw egg.



■ How did the egg change?



## Think About It

1. What changes when you cut an object?
2. What happens when you mix many kinds of matter?
3. What are some changes in matter that cannot be undone and matter changed back to how it was before?



## Tell What You Know

1. Tell how matter is changing in each picture.



## Vocabulary

Answer each question in the following space.

1. Which picture shows *fusion*? \_\_\_\_.
2. Which picture shows a *mixture*? \_\_\_\_.
3. Which picture shows *condensation*? \_\_\_\_.

a.



b.



c.





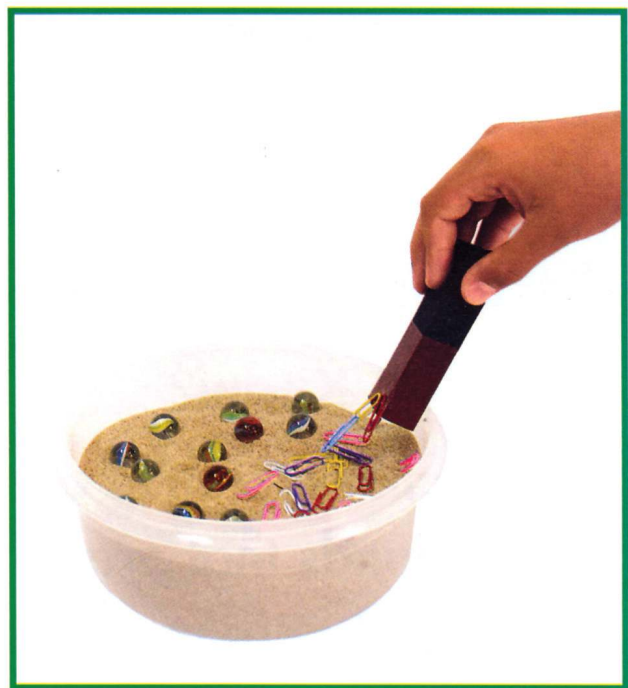
## Using Science Skills

### 1. **Plan and Conduct a Simple Investigation**

Plan a way to show how water can change from a liquid to a solid and back to a liquid. List the materials you will need. Draw pictures to show each step you will take. Predict what will happen, then follow your plan.



**2. Predict** that it is possible to separate sand, paper clips, and glass balls in a mixture. Plan to check your prediction. Prepare a mixture and the things you will need to investigate, including a bar magnet, then follow your plan. Did you predict correctly?





# CHAPTER 3

# Sound

## Vocabulary

sound  
vibrate  
loudness  
pitch  
musical  
instrument

## Did You Know?

Elephants can make and hear sounds that are so low in **pitch** that humans can't hear them.



## Did You Know?

Crickets hear **sound** through ears on their legs.



Ear



# LESSON 1

## What Is Sound?



### Investigate

## What Makes Sound

You will need



ruler



paper and pencil

- 1** Hold the ruler on a desk so one end hangs over the edge. Push that end down then let it go.
- 2** Observe and record what happens.
- 3** How could you change the sound? Plan an investigation.



### Science Skill

When you **plan** an investigation, you ask a question and test ways to answer the question.





## Learn About

# Sound

All that you hear is **sound**. You can hear the sound of the drumbeats, the sound of elephants, and other sounds. Sound is all around you.





## What Makes Sound

If you pluck a stretched rubber band, you may hear a sound. You may also see the rubber band move back and forth very fast. To move back and forth very fast is to **vibrate**.



When the rubber band stops vibrating, the sound stops.





Put your finger on your throat and hum. You can feel that something is vibrating inside your throat. Stop humming and the vibration stops.

Sound is made when things vibrate. When we blow the whistle, the ball inside the whistle vibrates, and we feel its vibrations





## Different Sounds

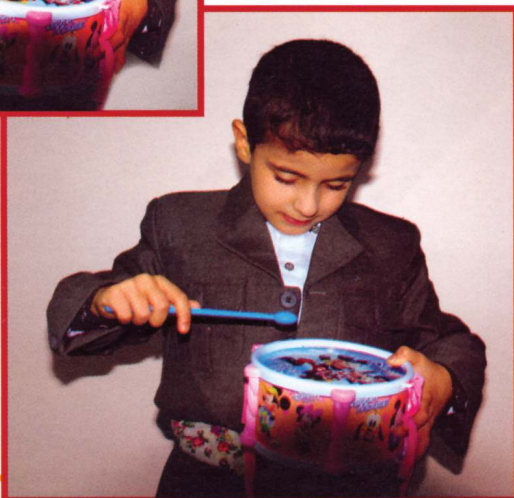
There are many kinds of sounds. Some sounds are soft, and some are loud. A small stream makes a soft sound. A waterfall makes a loud sound. **loudness** is how loud or soft a sound is.



waterfall



stream



When you beat a drum hard, it makes a loud sound. And when you tap the drum lightly, it makes a soft sound.



Some sounds are high and some sounds are low. The **pitch** of a sound is how high or low the sound is. The bark of a big dog is low-pitched. The bark of a small dog is high-pitched. A man's voice is low-pitched. A boy's voice is high-pitched.



## Think About It

1. What makes sound?
2. What is the difference between the sound of a small stream and that of a waterfall?
3. What is the difference between a man's voice and a boy's voice?



# LESSON 2

## What Are the Sounds Musical Instruments Make?



### Investigate

### Making a Drum

You will need



beans



a can with an opened top and bottom



balloon



rubber band



pencil with eraser



- 1 Stretch the balloon over the top of the can to make a drum. Put the rubber band on to hold the balloon in place. Then put the beans on your drum.
- 3 Test your predictions. Use the pencil to beat on the drum. Listen and observe.

- 2 Predict the sound of the drum when you beat it with a pencil. What kind of sound will it make? What will vibrate?

### Science Skill

When you **predict**, you think of what you already know and then say what you think will happen.





# Sounds of Musical Instruments

These boys and girls are playing music together.

**Musical instruments** are used for producing musical sounds. Each instrument makes a different kind of sound.





## Listening to the Sound of Musical Instruments

A musical instrument makes a sound when part of it vibrates. Some instruments have parts that vibrate very fast and make a high-pitched sound. Other instruments have parts that vibrate more slowly and make a low-pitched sound.



The low string of the 'oud is thin, and gives a high-pitched sound.

The high string of the 'oud is thick, and gives a low-pitched sound



Instruments are played in different ways. A drummer beats on a drum to make its covering vibrate. Players pluck the strings of stringed instruments to make them vibrate. A flutist blows the flute to vibrate the air inside.



## Think About It

1. In what way are all musical instruments alike?
2. In what way are musical instruments different?



## Tell What You Know

1. Tell what you know about each musical instrument.

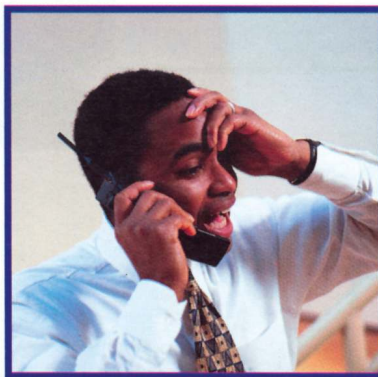


## Vocabulary

Use each word to tell about the picture.



1. vibration



2. sound



3. pitch



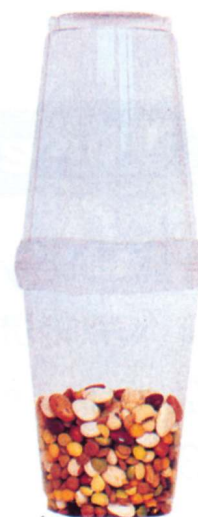
## Using Science Skills

- 1. Predict** Hold a bell from its handle. Use a spoon to hit the bell. Listen to the sound produced. Predict what will happen if you hold the bell itself and hit. Check your prediction.



- 2. Plan an Investigation** Plan an investigation to find out how the number of beans inside a shaker affects the kind of sound made by the shaker. Put 10 dry beans into a shaker like this one. Shake and listen to the sound. Predict how the sound made by the shaker will change when the number of beans changes. Record your findings.

Number of Beans				
The Sound Made by the Shaker				





# Activities

## for Home or School

### Disappearing Water

1. Pour an equal amount of water into two transparent cups of the same size and shape.
2. Use tape to mark the level of water in each cup.
3. Cover one cup with plastic wrap.
4. Leave the cups side by side for three days.
5. Write about what you observe. What happened to the water in the two cups? Why?



### Listening to Sounds

1. Close your eyes and sit quietly for one minute without moving or talking.
2. Listen carefully to sounds around you.
3. Draw pictures of the objects that caused the sounds you heard.
4. Compare with your classmate or a member of your family the sounds that you heard together.





# Health

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## Caring for Your Body

Respiratory System	144
Nervous System	145
Muscular and Skeletal Systems	146

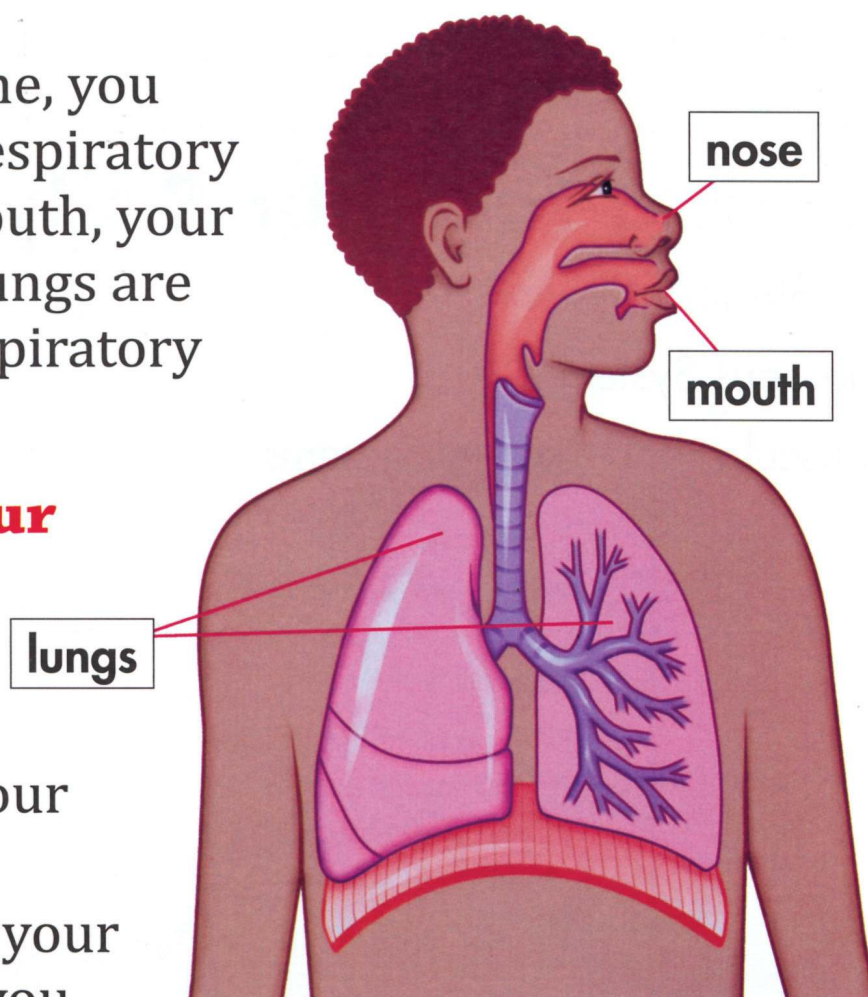


# The Respiratory System

When you breathe, you are using your respiratory system. Your mouth, your nose, and your lungs are parts of your respiratory system.

## Caring for Your Respiratory System

- Never put anything in your nose.
- Playing helps your lungs. When you climb or jump, you breathe harder. Breathing harder makes your lungs stronger.



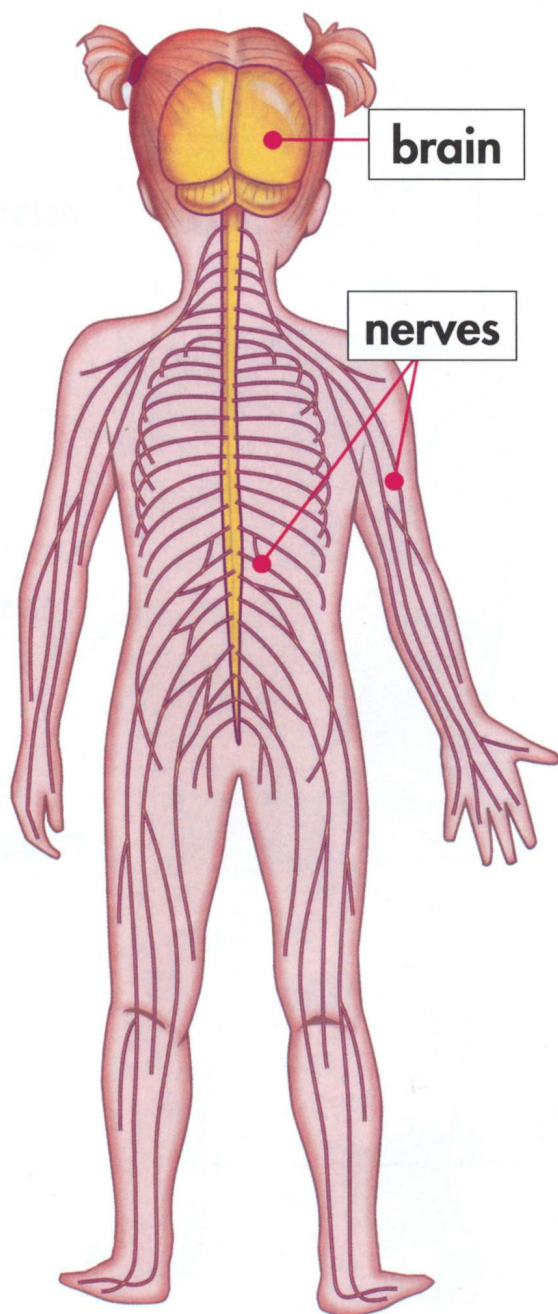
## ACTIVITIES

Try to say something while you are breathing in. Try to say something while you are breathing out. Which is easier?



# The Nervous System

Your nervous system makes your muscles work and tells you about your surroundings. Your brain and your nerves are parts of your nervous system.



## Caring for Your Nervous System

Get plenty of sleep.  
Sleeping lets your brain rest.

### ACTIVITIES

Have a classmate blindfold you and fill one cup with cold water and another cup with warm water. Dip your finger in each cup. Can you tell which is the cold water and which is the warm water?



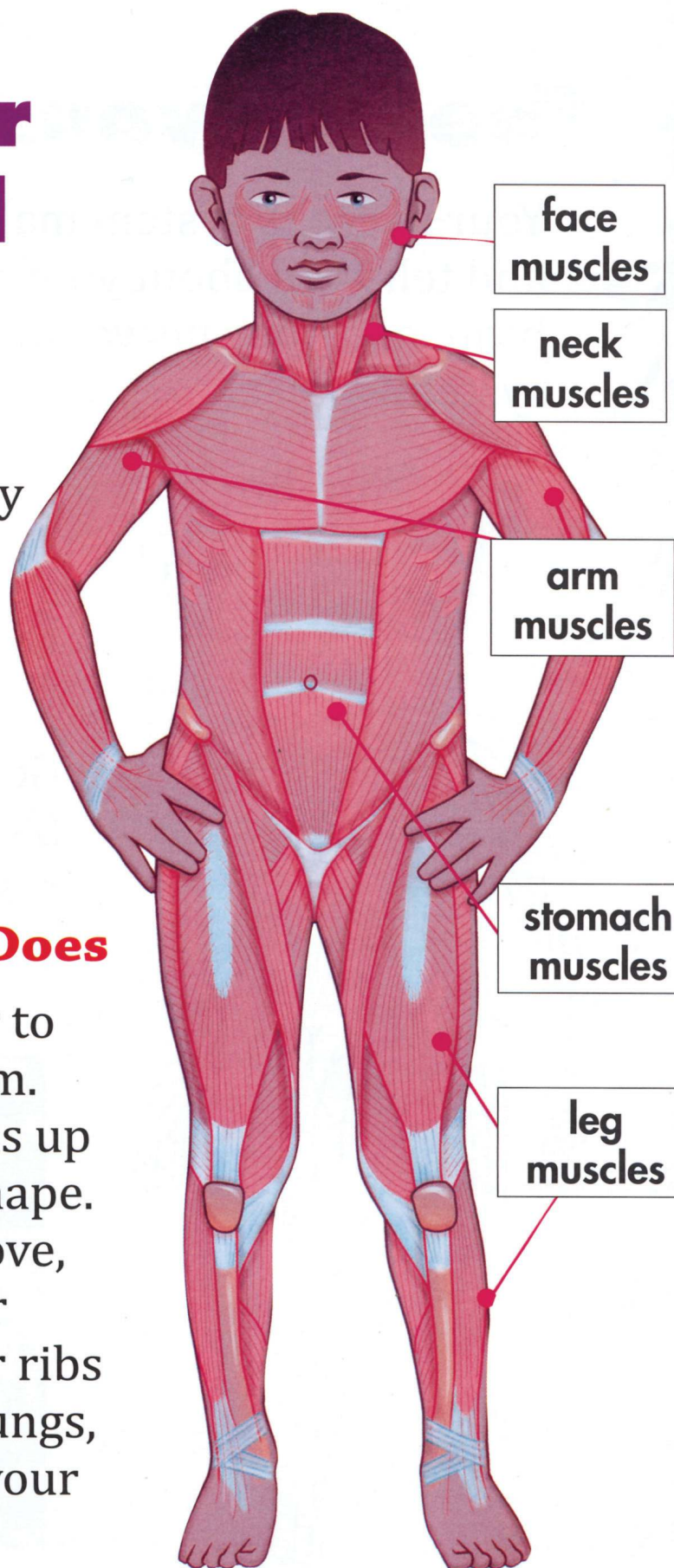
# The Muscular and Skeletal Systems

## The Muscular System

The Muscles in your body help you move. When you blink, you are using muscles. When you run, you are using muscles. Even when you eat, you are using muscles.

## What The Skeleton Does

Your bones join together to form your skeletal system. The skeletal system holds up your body and gives it shape. Some bones help you move, other bones protect your internal body parts. Your ribs protect your heart and lungs, and your skull protects your brain.



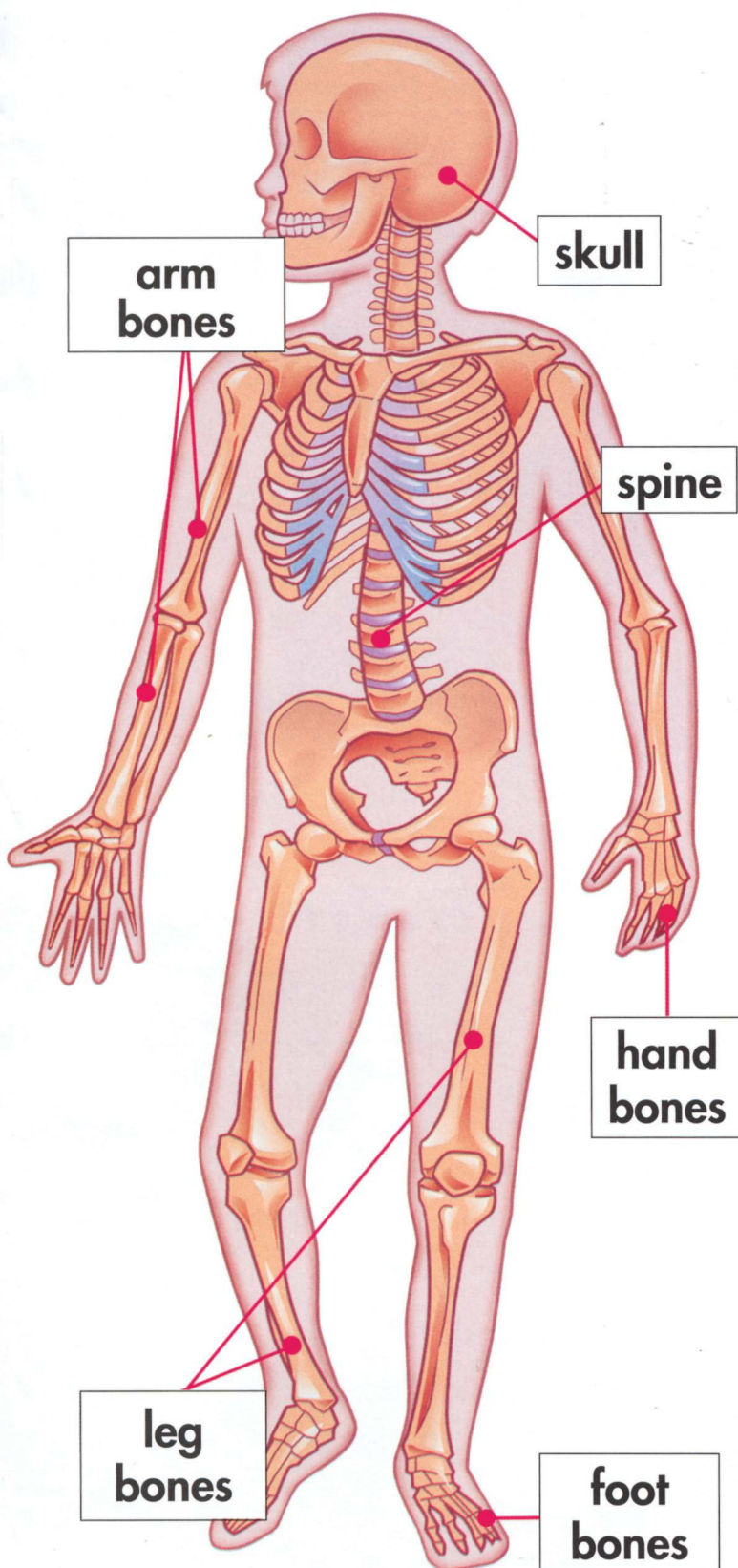


## Caring for Bones and Muscles

You can take care of the strength and health of your bones and muscles.

Do exercises every day. Exercise helps keep your bones and muscles strong.

Stretch your muscles before you use them for play or exercise. Healthful food keeps your bones and muscles healthy.



### ACTIVITIES

Wiggle your nose, stick out your tongue, wrinkle your forehead, smile. Do you use muscles?





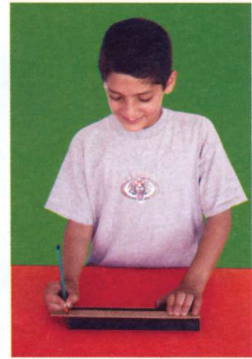


## A



### **adaptation**

Anything about an animal that helps it live in its environment. The way a chameleon changes its color is an adaptation. (51)



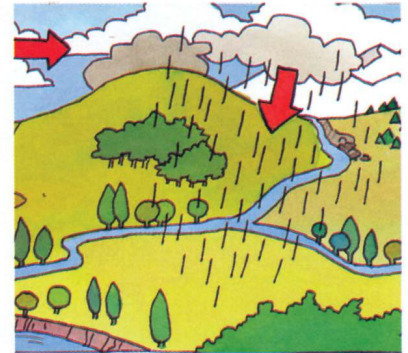
### **centimeter**

A unit for measuring length. A pencil is about 19 centimeters long. (107)



### **air**

What people breathe but cannot see, taste, or smell. (73)



### **condense**

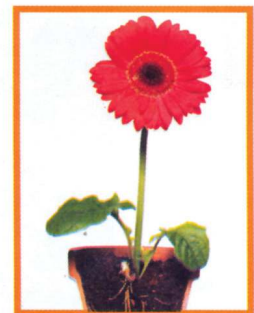
To change from water vapor into tiny drops of water. (119)

## C



### **camouflage**

What helps an animal blend in with its surroundings to hide from their prey or predators. (52)



### **dissolved salts**

Substances in the earth needed by plants to grow and change. (17)

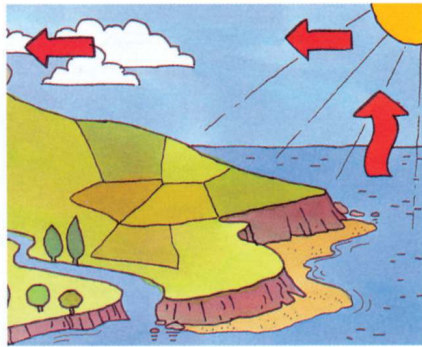


**E****energy**

What the body needs in order to move, work, and grow. (29)

**forest**

A place where many trees grow. (66)

**evaporate**

To change from water (liquid) into water vapor (gas). (117)

**freezing**

The change of water from liquid to a solid. (118)

**F****fertilize**

To make soil better for plants to grow. (45)

**fusion**

The change from a solid to a liquid. (116)



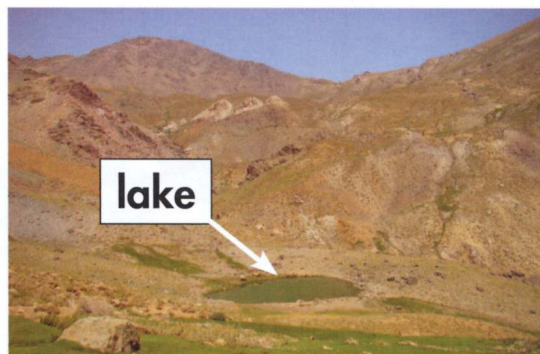
## G



### gas

The only kind of matter that always fills all the space it is in. Balloons are filled with gas. (109)

## L



### lake

A large area of still water surrounded by land. (70)

## gram



A unit for measuring mass. (106)

## larva



An insect in its first stage of growth just after it hatches. (12)

## H



### heart

A part of the body that pumps blood to all other parts. (33)



### life cycle

All the stages of an animal's life from birth to death. The life cycle of a bird has different stages. (11)





## liquid

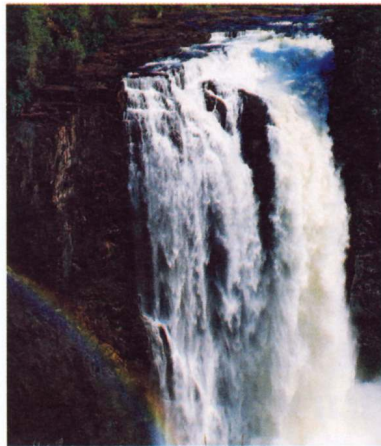
A form of matter that does not have its own shape. It takes the shape of its container. (108)

**M**



## mass

The amount of matter an object has. (103)



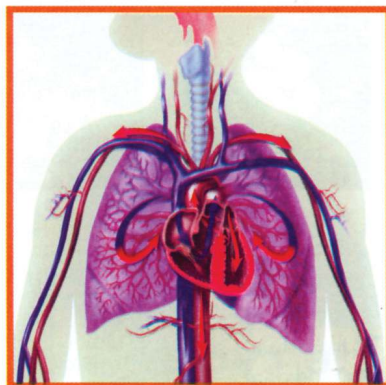
## loudness

A measure of how loud or soft a sound is. (134)



## matter

The material that all things are made of. (101)



## lungs

The body parts that help us breathe. When I breathe, air enters my lungs. (33)



## migrate

To move in groups to faraway places to find food. Some ducks migrate in winter. (54)





## milliliter

A unit for measuring the volume of a liquid. (108)



## musical instrument

An instrument used to make music. (137)



## mixture

Something made up of two or more kinds of things. (123)

## N



## natural resource

Something found in nature that people can use to meet their needs. (65)



## moon

The brightest object in the sky at night. (86)



## nectar

A sweet liquid that is produced by flowers. Bees feed on nectar. (43)



O



## **ocean**

A very wide and deep area of salt water. (70)

## **pitch**



How high or low a sound is. The pitch of a cat's mew is higher than the pitch of a lion's roar. (135)



## **oil**

One of Earth's natural resources. (77)



## **planet**

A large round object in space that moves around the sun. (87)

P



## **permanent teeth**

New adult teeth that take the place of first teeth. Adult humans have 32 permanent teeth. (27)



## **product**

Something that people make from other things. A shirt is a product made of cotton. (48)





## pupa

When the larva weaves a cocoon around itself it becomes a pupa. (13)



## river

A very large body of flowing freshwater. (70)

## R



## reduce

To lessen the use of a natural resource. (78)

## S



## seed coat

A covering that protects a seed and is part of the seed. (18)



## reuse

To use things again to help save natural resources. (78)



## seedling

A young plant that has grown from a seed. (18)



**shelter**

A place where an animal can be safe. (44)

**stars**

Objects in the sky that give off light. (86)

**soil**

The loose top layer of the Earth's surface. People use soil to grow food. (67)

**sun**

The star closest to Earth. (86)

**solid**

The only form of matter that has a shape of its own. A chair is a solid. (106)

**T****tadpole**

The young frog that hatches from the egg. (14)

**sound**

Everything you hear is sound. A sound can be loud or soft. (131)

**V****vibrate**

To move back and forth very fast. The strings of a guitar vibrate when you pluck them. (132)

