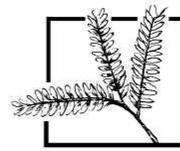




UNITED ARAB EMIRATES  
MINISTRY OF EDUCATION



YEAR OF TOLERANCE

2018 - 2019

McGraw-Hill Education  
**Integrated Science**

United Arab Emirates Edition



McGraw-Hill Education

# Integrated Science

United Arab Emirates Edition

GRADE 1 • VOLUME 3



Project: UAE Science Grade 1 Integrated, Year 3, Volume 3

FM. Front Matter, from Elementary Science NY, Grade 1 ©2016

13. Matter Everywhere, Chapter 2, from Elementary Science NY, Grade 1 ©2016

14. On the Move, Chapter 11, from Science, A Closer Look Grade 1 ©2011

15. Energy Everywhere, Chapter 12, from Science, A Closer Look Grade 1 ©2011

EM. End Matter, from Elementary Science NY, Grade 1, ©2016

COVER: Zoltan Molnar/Alamy Stock Photo

[mheducation.com/prek-12](http://mheducation.com/prek-12)



Copyright © 2019 McGraw-Hill Education

All rights reserved. No part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written consent of McGraw-Hill Education, including, but not limited to, network storage or transmission, or broadcast for distance learning.

Exclusive rights by McGraw-Hill Education for manufacture and export. This book cannot be re-exported from the country to which it is sold by McGraw-Hill Education. This Regional Edition is not available outside Europe, the Middle East and Africa.

Printed in the United Arab Emirates.

ePub Edition

ISBN: 978-1-52-688359-9 (*Student Edition*)

MHID: 1-52-688359-7 (*Student Edition*)

ISBN: 978-1-52-688361-2 (*Teacher Edition*)

MHID: 1-52-688361-9 (*Teacher Edition*)

ISBN: 978-1-52-688363-6 (*Student Edition*)

MHID: 1-52-688363-5 (*Student Edition*)

ISBN: 978-1-52-688365-0 (*Teacher Edition*)

MHID: 1-52-688365-1 (*Teacher Edition*)

1 2 3 4 5 6 7 8 9 XXX 22 21 20 19 18 17



"Extensive knowledge and modern science must be acquired. The educational process we see today is in an ongoing and escalating challenge which requires hard work. We succeeded in entering the third millennium, while we are more confident in ourselves."

**H.H. Sheikh Khalifa Bin Zayed Al Nahyan**  
President of the United Arab Emirates

# Table of Contents

## Be a Scientist

### LIFE SCIENCE

- Chapter 2: Plants are Living Things
- Chapter 3: Plants Grow and Change
- Chapter 4: All About Animals

### TECH KNOWLEDGE

- Chapter 5: Computer Basics
- Chapter 6: Keyboarding
- Chapter 7: Drawing and Graphics

### LIFE SCIENCE

- Chapter 8: Places to Live

### EARTH AND SPACE SCIENCE

- Chapter 9: Changes in Weather
- Chapter 10: The Sky

### SCIENCE, TECHNOLOGY, AND ENGINEERING

- Chapter 11: Word Processing
- Chapter 12: Internet

### PHYSICAL SCIENCE

- Chapter 13: Matter Everywhere
- Chapter 14: Motion
- Chapter 15: Energy Everywhere

## Program Authors

### Dr. Jay K. Hackett

Professor Emeritus of Earth Sciences  
University of Northern Colorado  
Greeley, CO

### Dr. Richard H. Moyer

Professor of Science Education and  
Natural Sciences  
University of Michigan–Dearborn  
Dearborn, MI

### Dr. JoAnne Vasquez

Elementary Science Education Consultant  
NSTA Past President  
Member, National Science Board  
and NASA Education Board

### Mulugheta Teferi, M.A.

Principal, Gateway Middle School  
Center of Math, Science, and Technology  
St. Louis Public Schools  
St. Louis, MO

### Kathryn LeRoy, M.S.

Chief Officer  
Curriculum Services  
Duval County Schools, FL

### Dr. Dorothy J. T. Terman

Science Curriculum Development Consultant  
Former K–12 Science and Mathematics Coordinator  
Irvine Unified School District, CA  
Irvine, CA

### Dr. Gerald F. Wheeler

Executive Director  
National Science Teachers Association

### Bank Street College of Education

New York, NY

### MaryJo Fante Milburn, M.Ed.

Instructional Technology Specialist  
Jefferson County Public Schools  
Louisville, KY

## Contributing Authors

### Dr. Sally Ride

Sally Ride Science  
San Diego, CA

### Lucille Villegas Barrera, M.Ed.

Elementary Science Supervisor  
Houston Independent School District  
Houston, TX

### American Museum of Natural History

New York, NY



## Contributing Writer

### Ellen C. Grace, M.S.

Consultant  
Albuquerque, NM

## Content Consultants

### **Paul R. Haberstroh, Ph.D.**

Mohave Community College  
Lake Havasu City, AZ

### **Timothy Long**

School of Earth and Atmospheric  
Sciences  
Georgia Institute of Technology  
Atlanta, GA

### **Rick MacPherson, Ph.D.**

Program Director  
The Coral Reef Alliance  
San Francisco, CA

### **Hector Córdova Mireles, Ph.D.**

Physics Department  
California State  
Polytechnic University  
Pomona, CA

### **Charlotte A. Otto, Ph.D.**

Department of Natural Sciences  
University of Michigan-Dearborn  
Dearborn, MI

### **Paul Zitzewitz, Ph.D.**

Department of Natural Sciences  
University of Michigan-Dearborn  
Dearborn, MI

## Editorial Advisory Board

### **Deborah T. Boros, M.A.**

President, Society of Elementary  
Presidential Awardees  
Second-Grade Teacher  
Mississippi Elementary  
Coon Rapids, MN

### **Lorraine Conrad**

K–12 Coordinator of Science  
Richland County School District #2  
Columbia, SC

### **Kitty Farnell**

Science/Health/PE Coordinator  
School District 5 of Lexington  
and Richland Counties  
Ballentine, SC

### **Kathy Grimes, Ph.D.**

Science Specialist  
Las Vegas, NV

### **Richard Hogen**

Fourth-Grade Teacher  
Rudy Bologna Elementary School  
Chandler, AZ

### **Kathy Horstmeyer**

Educational Consultant  
Past President, Society of  
Presidential Awardees  
Past Preschool/Elementary NSTA  
Director  
Carefree, AZ and Chester, CT

### **Jean Kugler**

Gaywood Elementary School  
Prince Georges County Public  
Schools  
Lanham, MD

### **Bill Metz, Ph.D.**

Science Education Consultant  
Fort Washington, PA

### **Karen Stratton**

Science Coordinator K–12  
Lexington District One  
Lexington, SC

### **Emma Walton, Ph.D.**

Science Education Consultant  
NSTA Past President  
Anchorage, AK

### **Debbie Wickerham**

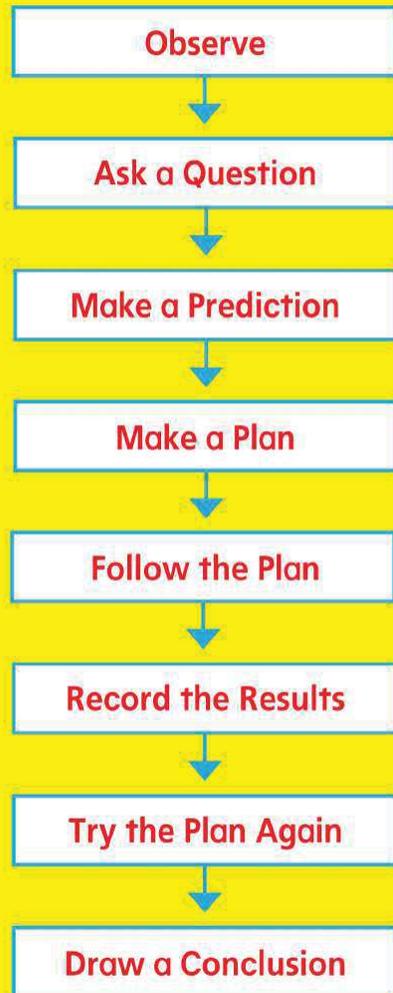
Teacher  
Findlay City Schools  
Findlay, OH



|                                |    |
|--------------------------------|----|
| <b>Science Skills</b> .....    | 2  |
| Observe .....                  | 4  |
| Compare.....                   | 5  |
| Classify.....                  | 5  |
| Measure .....                  | 6  |
| Put Things In Order.....       | 6  |
| Record Data.....               | 7  |
| Make a Model .....             | 7  |
| Communicate .....              | 7  |
| Infer.....                     | 8  |
| Predict.....                   | 8  |
| Investigate .....              | 9  |
| Draw Conclusions.....          | 9  |
| <b>Scientific Method</b> ..... | 10 |
| Observe .....                  | 12 |
| Ask a Question .....           | 12 |
| Make a Prediction.....         | 12 |
| Make a Plan.....               | 13 |
| Follow the Plan.....           | 13 |
| Record the Results .....       | 13 |
| Try the Plan Again .....       | 14 |
| Draw a Conclusion .....        | 14 |
| <b>Safety Tips</b> .....       | 16 |



# Scientific Method



**LIFE SCIENCE**

**Chapter 2: Plants are Living Things . . . . . 18**

**Lesson 1** Learning About Living Things . . . . . 20

**Lesson 2** Parts of Plants. . . . . 30

• Writing in Science . . . . . 40

**Lesson 3** Different Plants. . . . . 42

• Reading in Science . . . . . 52

Chapter 2 Review and Test Preparation . . . . . 54

**Chapter 3: Plants Grow and Change . . . . . 58**

**Lesson 1** Flowers, Fruits, and Seeds . . . . . 60

**Lesson 2** How Plants Grow and Change . . . . . 70

• Reading in Science . . . . . 80

**Lesson 3** Plants Live in Many Places. . . . . 82

• Writing in Science . . . . . 92

Chapter 3 Review and Test Preparation . . . . . 94

Careers in Science. . . . . 98



**Chapter 4: All About Animals . . . . . 100**

**Lesson 1** All Kinds of Animals . . . . . 102  
• Inquiry Skill Builder . . . . . 114

**Lesson 2** What Animals Need to Live . . . . . 116  
• Writing in Science . . . . . 126

**Lesson 3** How Animals Eat Food . . . . . 128  
• Inquiry Investigation . . . . . 138

**Lesson 4** Animals Grow and Change . . . . . 140  
• Reading in Science . . . . . 152

Chapter 4 Review and Test Preparation . . . . . 154

**TECH KNOWLEDGE**

History of Computers . . . . . 159

Computer Safety and Ethics . . . . . 163

**Chapter 5: Computer Basics . . . . . 166**

**Lesson 1** Parts of a Computer . . . . . 167  
• Computer Do's and Don'ts . . . . . 168

**Lesson 2** Use the Mouse . . . . . 169  
• Use the Keyboard . . . . . 170

**Lesson 3** Open and Close a File . . . . . 171  
• Open and Close a Program . . . . . 172

Chapter 5 Test and Project . . . . . 173





|  |            |
|--|------------|
| <b>Chapter 6: Keyboarding</b> .....          | <b>176</b> |
| <b>Lesson 1</b> Find A B C D E F .....       | 177        |
| • Find G H I J K L .....                     | 178        |
| <b>Lesson 2</b> Find M N O P Q R .....       | 179        |
| • Find S T U V W X Y Z .....                 | 180        |
| • Find the Number Keys .....                 | 181        |
| <b>Lesson 3</b> Find the Symbol Keys .....   | 182        |
| • Proper Position .....                      | 183        |
| • Return or Enter Key .....                  | 184        |
| • Space Bar .....                            | 185        |
| • Home Keys .....                            | 186        |
| <b>Lesson 4</b> Key Words .....              | 187        |
| Chapter 6 Test and Project .....             | 188        |
| <b>Chapter 7: Drawing and Graphics</b> ..... | <b>190</b> |
| <b>Lesson 1</b> The Paintbrush Tool .....    | 191        |
| • The Shape Tool .....                       | 192        |
| <b>Lesson 2</b> The Fill Tool .....          | 193        |
| • The Spray Can or Airbrush Tool .....       | 194        |
| <b>Lesson 3</b> The Pencil Tool .....        | 195        |
| • The Line Tool .....                        | 196        |
| Chapter 7 Test and Project .....             | 197        |

**LIFE SCIENCE**

**Chapter 8: Places to Live ..... 200**

**Lesson 1** Land Habitats ..... 202

**Lesson 2** Water Habitats ..... 212

- Writing in Science ..... 222

**Lesson 3** Plants and Animals Live Together ..... 224

- Reading in Science ..... 234

Chapter 8 Review and Test Preparation ..... 236

Careers in Science ..... 240

**EARTH AND SPACE SCIENCE**

**Chapter 9: Changes in Weather..... 242**

**Lesson 1** Weather All Around Us ..... 244

- Inquiry Skill Builder ..... 254

**Lesson 2** The Water Cycle ..... 256

- Inquiry Investigation ..... 266

**Lesson 3** Spring and Summer ..... 268

- Reading In Science ..... 278

**Lesson 4** Autumn and Winter ..... 280

- Math in Science ..... 290

Chapter 9 Review and Test Preparation ..... 292



**Chapter 10: The Sky ..... 296**

**Lesson 1** The Sky .....298

- Inquiry Skill Builder .....308

**Lesson 2** Day and Night ..... 310

- Math in Science .....320
- Inquiry Skill Builder .....322

Chapter 10 Review and Test Preparation..... 324

Careers in Science.....328

**TECH KNOWLEDGE**

**Chapter 11: Word Processing..... 330**

**Lesson 1** Review a Home Page ..... 331

- Type Words .....332
- New Lines .....333

**Lesson 2** Wrapping Words.....334

- Delete Text .....335
- Word Processing Practice .....336

**Lesson 3** Undo.....337

- Special Keys.....338
- Highlight Text .....339
- Using a Word Processing Program.....340

Chapter 11 Test and Project ..... 341

**Chapter 12: Internet ..... 344**

**Lesson 1** Digital Citizenship ..... 345

- Explore a Home Page..... 346
- Listen to a Story..... 347
- Watch a Video ..... 348

**Lesson 2** Draw a Picture ..... 349

- Play a Game ..... 350

**Lesson 3** URLs ..... 351

- Bookmarks ..... 352

**Lesson 4** Digital Images..... 353

- Hyperlinks..... 354

Chapter 12 Test and Project..... 355

**PHYSICAL SCIENCE**

**Chapter 13: Matter Everywhere ..... 358**

**Lesson 1** Matter Everywhere ..... 360

- Inquiry Investigation ..... 363

**Lesson 2** Measuring Matter..... 372

- Writing in Science ..... 382

**Lesson 3** Solids ..... 384

- Reading in Science ..... 396

**Lesson 4** Liquids and Gases ..... 398

- Inquiry Skill Builder..... 408

Chapter 13 Review and Test Preparation..... 410

**Chapter 14: Motion .....414**

**Lesson 1** Position and Motion..... 416

**Lesson 2** Push and Pull .....426

**Lesson 3** Magnets.....436

• Math in Science .....446

Chapter 14 Review and Test Preparation.....448

**Chapter 15: Energy Everywhere ..... 452**

**Lesson 1** Thermal Energy .....454

**Lesson 2** Sound.....464

• Reading in Science .....474

**Lesson 3** Light .....476

• Math in Science .....486

Chapter 15 Review and Test Preparation .....488

Careers in Science.....492

# Physical Science



## Matter Everywhere



What are things made of?

Answers will vary. Accept all reasonable responses.

Handwriting practice lines consisting of multiple sets of three horizontal lines (top, middle, bottom) in blue, green, and red colors.

### Vocabulary



**matter** what all things are made of



**solid** a state of matter that has a shape of its own



**liquid** a state of matter that flows and takes the shape of its container



**gas** a state of matter that does not have its own shape

Copyright © McGraw-Hill Education. (b) Pixtal/SuperStock, (d) McGraw-Hill Education, (f) Jules Frazer/Getty Images

Before reading this chapter, write down what you already know in the first column. In the second column, write down what you want to learn. After you have completed this chapter, write down what you learned in the third column.

| <b>Matter</b>                 |                             |   |
|-------------------------------|-----------------------------|---|
| <b>What We Know</b>           | <b>What We Want to Know</b> | <b>What We Learned</b>                              |
| Objects are different shapes. | Why do things have a shape? | Solids have a shape of their own.                   |
| Water can be poured.          | Does water have a shape?    | Liquids and gases do not have a shape of their own. |
| You can mix objects together. |                             |   |



**Before You Read**

How would you describe the objects shown here? What are they made of?

---

---

---

---

---

---

---

---

Answers will vary. Accept all reasonable responses.

**Essential Question**

What are some properties of materials?

---

---

---

---

## What are the properties of these objects?

### What to Do

- 1 Observe.** Look at and feel each spoon. Record what each one looks and feels like.

|       | Wood  | Plastic | Metal |
|-------|-------|---------|-------|
| Looks | brown | smooth  | shiny |
| Feels | light | hard    | heavy |

- 2 Predict.** Which spoons will float in water? Which will sink? Try it out.

Possible prediction: I think the wood and plastic will

float. I think the metal will sink.

### You need



spoons



tub of water



pencil

### Step 1



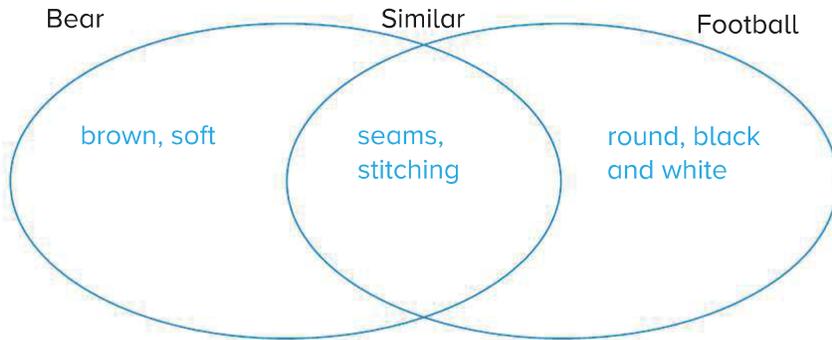
Every kind of matter has its own properties.

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

Solids, liquids, and gases are three forms of matter. All matter takes up space. Two objects cannot be in the same space at the same time.

 **Quick Check**

1. Compare the properties of a teddy bear and a football.



▲ **Brown and soft are two properties of this toy bear.**



## What are materials?

A **material** is the type of matter that makes up solids. Cotton, rubber, metal, and glass are different materials.

Objects that are made out of the same material can have the same properties. Some materials sink in water. Others float in water. Some materials are hard. Others are soft. Texture describes how a material feels. Rough and smooth are textures.

### Quick Lab

Sort objects in your classroom by type of material. Describe their properties.

### Sinking and Floating



### Read a Photo

Which materials sink in water?

glass, toy car

Some materials dissolve in water. When a material dissolves, it stays evenly mixed. Sugar dissolves in water. Sand does not dissolve. It sinks to the bottom. **Solubility** is the property that describes whether or not a material will dissolve. Sugar is soluble in water. Sand is not.



▲ This drink mix is soluble.

### ✓ Quick Check

2. What is a material?

Possible answers: A material, such as cotton, rubber, metal,

or glass, is the type of matter that makes up solids.

## Visual Summary

Write about what you learned.



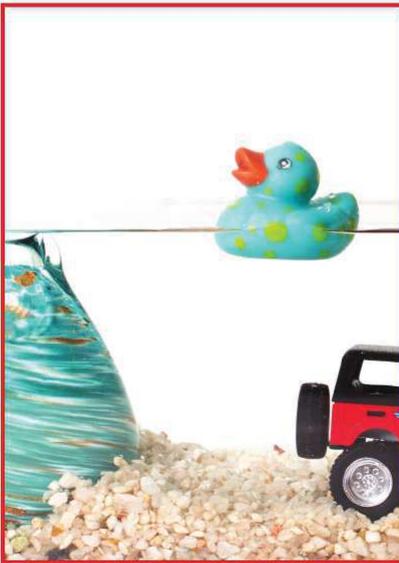
### Matter

Possible answers: Matter is what all things

are made of. Every kind of matter has its own

properties. Properties are how something

looks, feels, smells, tastes, and sounds.



### Solid material

Possible answers: A material is the type of matter

that makes up solids. Cotton, rubber, metal, and glass

are different materials. They are characterized by

characteristics such as diving in the water or buoyancy

over its surface, roughness, softness and others

## Think, Talk, and Write

### 1 Vocabulary. What is matter?

Matter is what all things are made of.

### 2 Classify. Sort different materials by their texture.

| Hard   | Soft |
|--|------|
| Answers will vary, but children should sort materials according to the properties. |      |

### 3 Describe how objects can be different.

Possible answer: Objects can have different properties, be made of different

materials, and have different parts.

### Essential Question What are some properties of materials?

Possible answer: Properties are texture, whether a material is soft or hard, and

whether a material sinks or floats.

## How can you make an object float?

Test materials to find out which float. If they sink, find out if you can change their shapes to make them float.

### What to Do

- Predict.** List the objects that you think will sink in the water. List the things that will float.

| Things That Will Float | Things That Will Sink |
|------------------------|-----------------------|
|                        |                       |

- Investigate.** Test your predictions. Place each object in the tub of water.



### You need



tub of water



rubber eraser



paper



aluminum foil



wooden block



rock



ball of clay



plastic cup

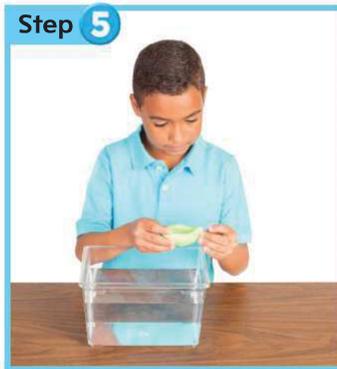
- 3 Compare.** Which materials float? Which sink? Were your predictions correct?

Answers will vary.

- 4 Observe.** Can you change the shape of any of the materials? Which ones?

Yes, I can change the shapes of paper, aluminum foil, and clay.

- 5 Investigate.** Change the shape of the materials to see if you can make them float. Test three different shapes.



- 6 Communicate.** How can you make an object float? Can you make all materials float? Explain.

I can change the shape to make an object float. I can make other materials float if I put it inside something that can float, like a boat.

## Investigate More

- 7** How can you make the best boat? Make a plan to test your ideas.

Answers will vary. Accept all reasonable responses.

# Measuring Matter



## Look and Wonder

### Before You Read

Many of these things look almost the same, but they are different. How can you describe and measure their differences?

Possible answer: The items are different sizes, colors, and shapes. If I

weighed them, I could tell more precisely how they differ in size. I could

also measure them with a ruler to determine their sizes.

### Essential Question

How do you observe and measure properties?

## How can you describe differences in objects?

### What to Do

- 1 Compare.** What properties of the object are the same? What properties are different?

Answers will vary depending on the objects students

observe.

- 2 Observe.** Observe the differences between the objects. Use a hand lens to help you.
- 3 Measure.** Use a balance to find out which object is heaviest.



#### You need



objects  
made of  
different  
materials



hand lens



balance

- 4 **Communicate.** Describe the differences in the objects using your observations and measurements.

Answers will vary. Accept all reasonable responses.

**Explore More**

- 5 **Compare.** Measure, observe, and compare the properties of other objects.

Answers will vary.

**Open Inquiry**

Learn more about properties of other objects.

My question is:

Sample question: How are rocks and marbles different?



# Read ar

## What too matter?

When you carefully (t or smell) it. matter, you about the Tools can describe n

▼ Toc  
me



**376**  
EXPLAIN

A **hand lens** is a tool that makes objects seem larger. It helps you observe. With a hand lens, you can see things that you cannot see with just your eyes. A hand lens can help you see small differences in materials.

**✓ Quick Check**

**1. Fill in each blank.**

A hand lens makes objects seem

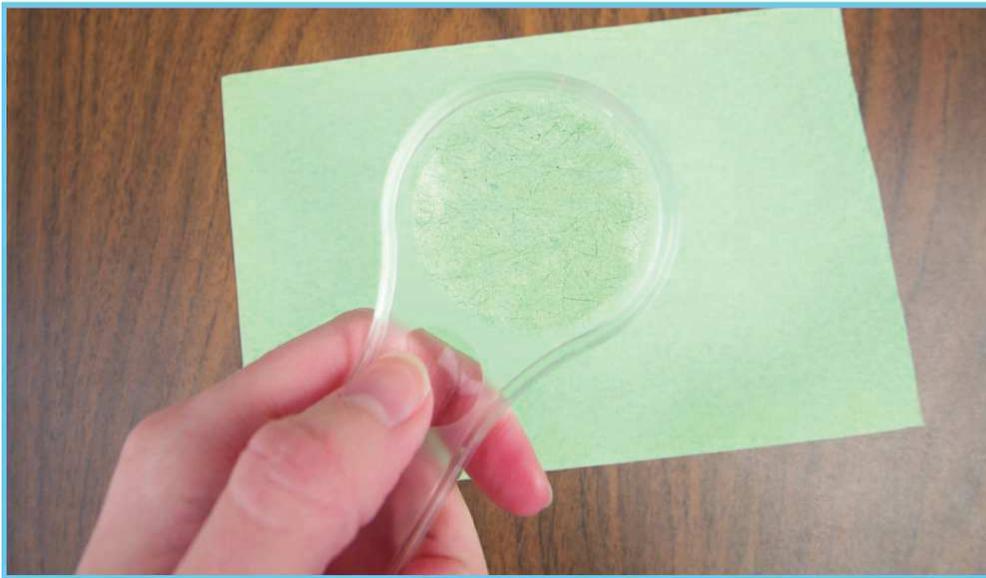
larger

You can see

small

differences in materials.

**▼ The hand lens helps you observe small parts of the paper.**



## How can you measure matter?

A **ruler** is a tool that measures length. Some rulers measure length in centimeters. Other rulers measure in inches. Many rulers give both measurements.

When you measure, you find out how long or how heavy something is. **Mass** and length are properties of matter. Mass is how much matter is in an object. Heavier objects have more mass than lighter objects. A **balance** can be used to measure mass.



▲ The chalk is 10 centimeters long.

### Read a Photo

Which bird has more mass?

The metal bird has more mass than

the sponge-shaped bird.

### Using a Balance



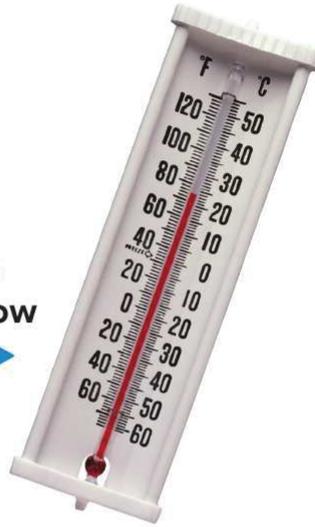
▲ The side with more mass will be lower.

You can also measure temperature. Temperature is how warm or cold something is. A **thermometer** is a tool that is used to measure temperature.

## Quick Lab

**Measure** the temperature of water using a thermometer.

A thermometer tells you how warm or how cold something is. ▶



### ✓ Quick Check

2. What properties can be measured?

Length, mass, and temperatures are properties that  
can be measured.

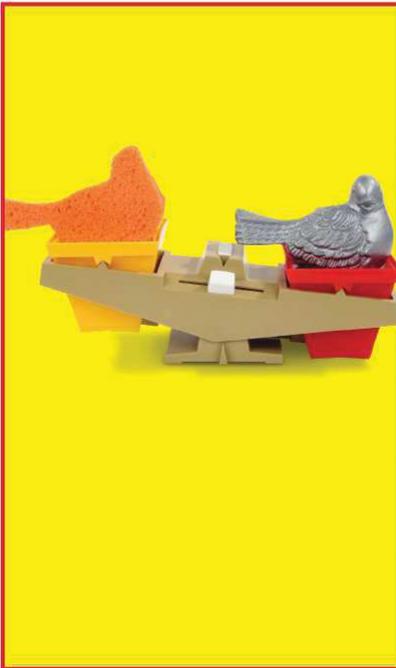
## Visual Summary

Write about what you learned.



### Observing Matter

Possible answers: When you observe matter,  
you carefully look, hear, taste, touch, or smell  
it. A hand lens is a tool that makes an object  
seem larger.



### Measuring Matter

## Think, Talk, and Write

**1 Vocabulary.** What is mass?

Mass is how much matter is in an object.

**2 Put Things in Order.** Use a balance to put three objects in order from the least to the most mass.

|                                |
|--------------------------------|
| Answers will vary depending on |
| the objects children measure.  |
|                                |

**3** What can you notice about matter by observing it?

**Essential Question** How do you observe and measure properties?

# A Shoe Story

Look at Emad's shoes. Where do you think they could have been?



Copyright © McGraw-Hill Education Ken Covington/McGraw-Hill Education



## Write About It

Write a story about Emad's shoes and where they have been. Describe the properties of the shoes.

### Remember

A story has a clear beginning, middle, and end.

Students' responses will vary. Accept all reasonable responses.

Handwriting practice lines consisting of solid blue top and bottom lines and a dashed blue middle line, repeated five times.

# Solids



## Look and Wonder

### Before You Read

Every kind of matter has its own properties. How would you describe the properties of these beads?

Possible answers: They are different colors; they are different sizes;

they are different shapes.

### Essential Question

How are solids alike?

## How can you compare some solids?

### What to Do

- 1 Collect five solid objects around your classroom.
- 2 **Compare.** Describe the objects' properties. How are they alike? How are they different? Sort them by their properties.

#### You need



classroom  
objects



balance

Answers will vary depending on the objects students gather. Students might

sort objects by color, shape, or texture.

- 3 **Measure.** Use a balance to put the objects in order from the most mass to the least mass.

Answers will vary.

#### Step 3



**Explore More**

**4 Classify.** What other properties can you use to sort the objects?

---



---



---



---



---

Answers will vary. Accept all reasonable responses.

**Open Inquiry**

Learn more about the properties of other solids.

My question is:

---



---



---



---



---

Sample question: Do large solids always have more mass

than smaller solids?

## What is a solid?

A **solid** is a form of matter. Only a solid has a shape of its own.

A solid can keep its shape even if it is moved.

### Read a Photo

Describe the solids in this picture.

\_\_\_\_\_

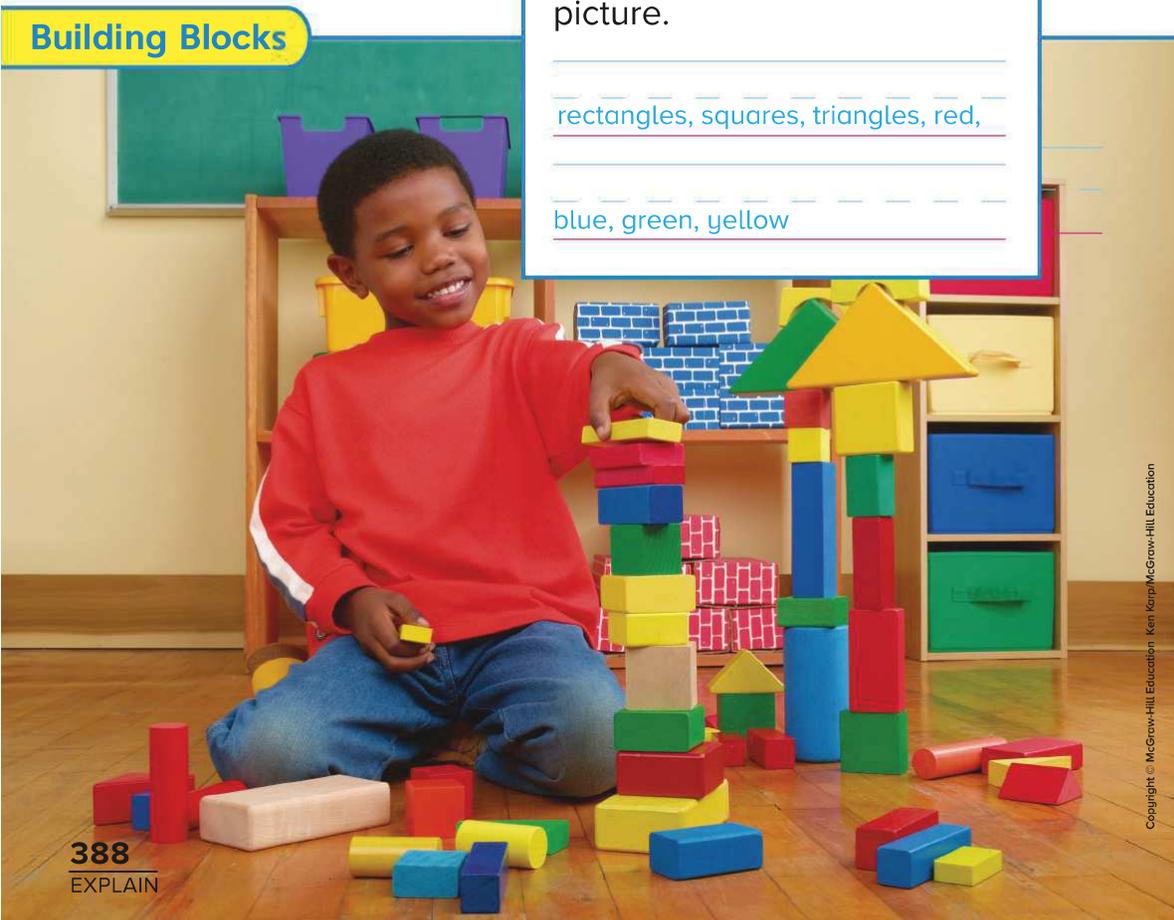
rectangles, squares, triangles, red,

\_\_\_\_\_

blue, green, yellow

\_\_\_\_\_

### Building Blocks

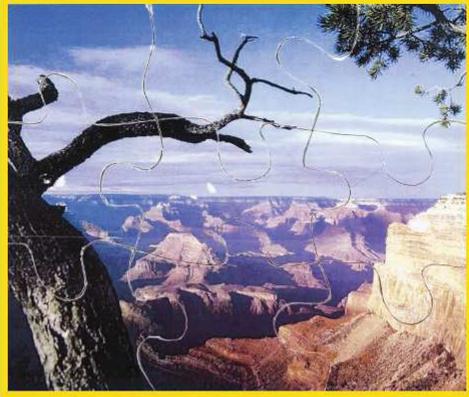


Copyright © McGraw-Hill Education Ken Kemp/McGraw-Hill Education

The amount of matter in a solid always stays the same.

If you take apart a puzzle, the total amount of matter in the puzzle does not change.

The puzzle pieces and the completed puzzle have the same amount of matter.



 **Quick Check**

1. Circle the objects that are a solid.

book

air

juice

ball

## What are some properties of solids?

Solids can have many different properties. They come in many different shapes and colors.

Some solids are flexible. When a solid is flexible you can bend it. Some solids float in water. Other solids sink.

Solids can be large or small. They can also be long or short. You can use a ruler to measure some solids.

### Quick Lab

Use a ruler to **measure** some solids.

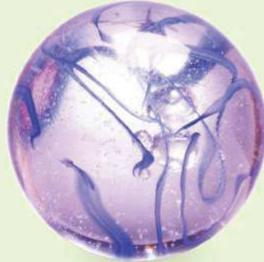


### Some Properties of Solids



#### rock

- hard
- speckled
- jagged



#### glass

- smooth
- breakable
- clear



#### yarn

- soft
- colorful
- long and thin

**FACT** Not all solids are hard.

Solids are made of different materials. Some metals, woods, and plastics are hard. Materials can be smooth or rough when you touch them. The chart below shows the properties of some solids.



**✓ Quick Check**

2. Circle the properties that describe how the objects below feel when you touch them.



**toy**

- blue
- pointy
- plastic



**sea sponge**

- yellow
- soft
- scratchy



**clay**

- sticky
- bendable
- firm

## What are shadows?

Have you ever made a shadow on a wall? A shadow is a dark area where light does not reach.

Different objects let different amounts of light through. A book is a solid object. It can block light and make a shadow. Glass is clear. It does not make a shadow because light passes through it.

### Read a Photo

How is this shadow made?

Possible answers: puppet is blocking

the Sun, light bulbs, flashlights

### Shadows



392

EXPLAIN

A shadow's size depends on where a light source is. A large shadow forms when the light source is close to the object. Light coming from above creates a short shadow. As the light source gets lower, the shadow gets longer.



▲ The size of your shadow can change.

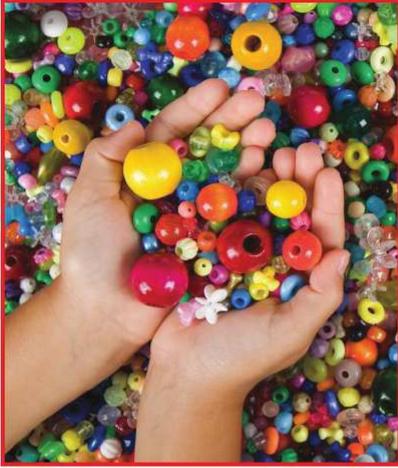
**Quick Check**

3. What kinds of objects make shadows?

Possible answer: Solid objects make shadows. Objects that light can pass through do not make shadows.

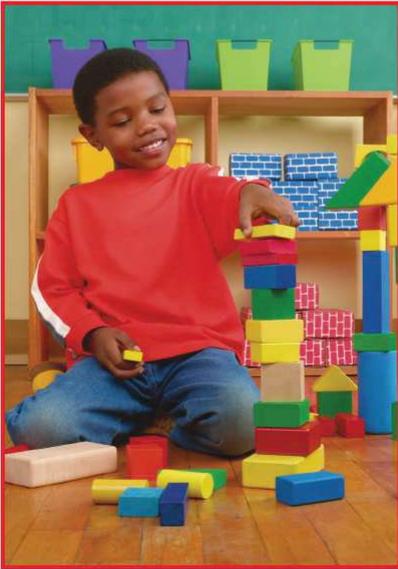
## Visual Summary

Write about what you learned.



### Solids

Possible answers: Solids have a shape of their own. The amount of matter in a solid always stays the same.



### Properties of Solids

Possible answers: Solids come in many different shapes, colors, and sizes. Some solids float in water. Other solids sink. The texture of solids can be smooth or rough. Solids block light and can make shadows.

## Think, Talk, and Write

- 1 **Observe.** Use a hand lens to observe properties of some solids up close.

Answers will vary, depending on the solid that children choose.

- 2 Write a list of solids you can bend.

Possible answer: sponge, clay, rubber

**Essential Question** How are solids alike?

Possible answer: All solids keep their shape even if they are moved.

# BUILDING BLOCKS

Do you know the story about the three little sheep? Each sheep built a house from a different material to hide from the wolf.

The first sheep used straw to build a house. The second sheep used wood to build a house. The third sheep used bricks to build a house.



► Straw is dry, hollow grass. Straw is used for building houses and for animal bedding.



Wood comes from trees. Wood is stronger than straw. A wood house can last for more than a hundred years.



Bricks are made from hard clay. Bricks are very strong. A brick house can last for more than a thousand years.



**Predict.** Which one of these materials would make the strongest building? Why?

| What I Predict   | What Happens  |
|--|---|
| Possible answer: Bricks would make the strongest building because they are stronger than straw and wood. | Possible answer: Bricks are the strongest building material because they are made from hard clay and can last longer than straw and wood. |

- ☰
- ←
- ☰
- 🔖
- ✎
- 📄
- ?
- i
- ⚙️



**Before You Read**

This boy is swimming in water. Why do you think there are bubbles in the water?

Possible answer: The boy blows the bubbles in the water.

Write the lesson vocabulary words below.

liquid

gas

**Essential Question**

How are liquids different from gases?

## What are some properties of a liquid?

### What to Do

- 1 Measure.** Fill a dropper with colored water. Place drops of water next to each other on wax paper.
- 2 Observe.** Use a toothpick to move the drops. What happens to the drops?

Possible answer: The size and shape of each

drop changes.

- 3 Communicate.** What are some properties of water?

Possible answers: clear, wet, warm, cool, flows quickly

#### You need



dropper



colored water



wax paper



toothpicks

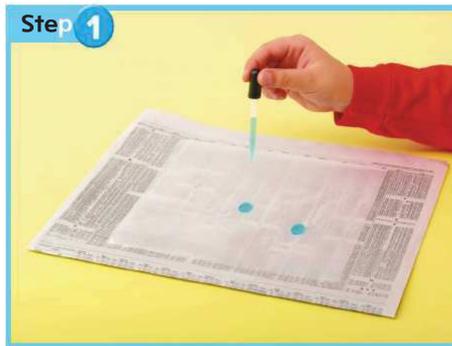
**Explore More**

**4 Infer.** Do liquids have their own shape? How do you know?

Liquids do not have a shape of

their own. They take on the shape

of whatever they are in.



**Open Inquiry**

Learn more about the properties of liquids.

My question:

Sample question: Do other liquids share the same properties as water?

## What is a liquid?

A **liquid** is a form of matter. Like solids, liquids have mass and take up space.

Liquids do not have a shape of their own. They take the shape of whatever they are in. Liquids flow when you pour them.



◀ Liquids like honey and ketchup flow slowly.



◀ Liquids like milk and oil flow quickly.

Copyright © McGraw-Hill Education. (l)Grosbeck/Unl/Getty Images, (r)Den Kosmayer/Shutterstock.com, (b)Pixal/SuperStock, (b)Hutchings Photography/Digital Light Source

You can use a measuring cup to measure liquids. A measuring cup measures how much space a liquid takes up.

**✓ Quick Check**

Circle the correct answer.

1. A liquid \_\_\_\_\_ have its own shape.

does

does not

2. A measuring cup measures how

much \_\_\_\_\_ a liquid takes up.

space

air



▲ The amount of liquid in these containers is the same.

## What is a gas?

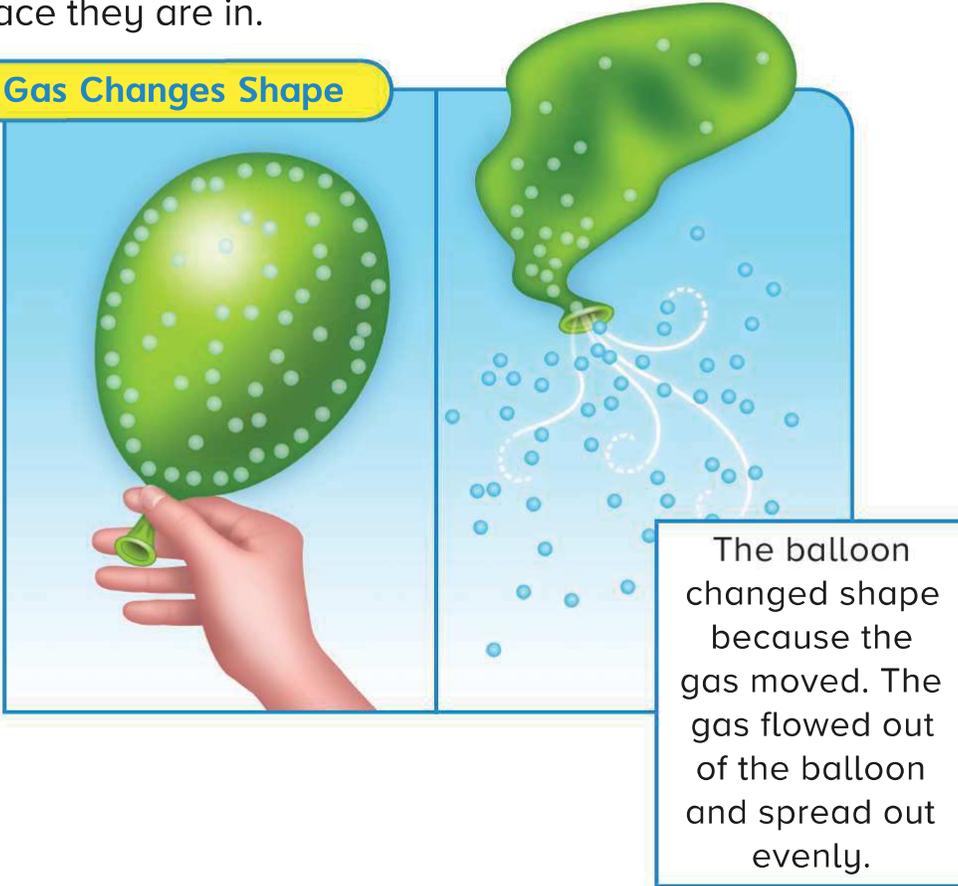
A **gas** is a form of matter too. Like liquids, gases do not have a shape of their own.

Gases spread to fill all the space of whatever they are in. Gases spread evenly in the space they are in.



Underline the sentence that tells you how a gas is the same as a liquid.

### Gas Changes Shape



**FACT**

Air is matter. It has mass and takes up space.

The air we breathe is made up of different gases.

You cannot see these gases, but you can feel them. Air can feel hot or cold. It can also move.

## Quick Lab

**Observe** how air in a cup keeps a tissue dry in water.

Even though you cannot see the air, it helps these ribbons stay up. ►



### ✓ Quick Check

3. How can you describe gas?

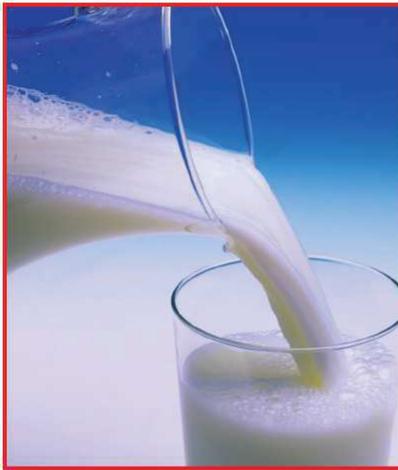
Possible answers: Gases fill all the space of their

containers; we often cannot see gases; we can feel the

movement of gases.

## Visual Summary

Write about what you learned.



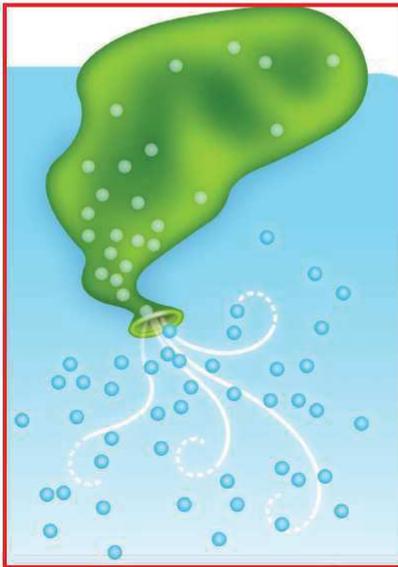
### Liquids

Possible answers: Liquids do not have a shape

of their own. Liquids flow when you pour them.

Some liquids are thick. They flow slowly. Some

liquids are thin. They flow quickly.



### Gases

Possible answers: Like liquids, gases do not

have a shape of their own. Gases spread

evenly to fill the space they are in. The air

we breathe is made of different gases. Gases

cannot be seen but we can feel them.

## Think, Talk, and Write

1 Vocabulary. What is a liquid?

A liquid is a form of matter.

2 Predict. What would happen to the gas in a balloon if it had a hole?

| What I Predict   | What Happens   |
|--|--|
| Possible answer: The air would flow out of the hole and the balloon would become flat. | Possible answer: The air flows out of the hole and the balloon is flattened. |

3 How do measuring cups measure liquids?

A measuring cup measures how much space a liquid takes up.

**Essential Question** How are liquids different from gases?

Possible answers: Liquids can be poured to fill a container. You can use a measuring cup to measure liquids. Gases spread evenly to fill all the shape of whatever they are in. They spread evenly in the space they are in.

## Focus on Skills

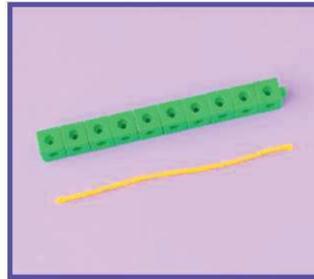
### Inquiry Skill: **Measure**

You **measure** to find out the size or amount of something. You can use string or cubes to measure how long or wide something is. You can also use a ruler to measure some things.



### Learn It

Duaa used cubes and a ruler to compare the length of three books. She made a chart to show what she found out.



| Book             | Cubes    | Centimeters    |
|------------------|----------|----------------|
| I Spy            | 13 cubes | 25 centimeters |
| The Biggest Tree | 9 cubes  | 18 centimeters |
| Watch It Grow    | 9 cubes  | 18 centimeters |

## Try It

Look at the pictures on the previous page.

- 1 How many cubes around is the can in the picture?

It is ten cubes round.

- 2 Use string to measure the width of two classroom objects. How many cubes wide is each object?

Answers will vary.

- 3 Use a ruler to measure the cubes. Use a chart like Duad's to show what you find out.

| Width of My Objects |       |             |
|---------------------|-------|-------------|
| Object              | Cubes | Centimeters |
| Answers will vary.  |       |             |
|                     |       |             |

# CHAPTER 13 Review

## Vocabulary

Use each word once to complete the sentences.

1. All things are made of

matter

2. A liquid does not have its own shape.

3. A solid has a shape of its own.

4. A tool used to measure mass is a

balance

5. The air is made of different

gases

balance

gases

liquid

matter

solid



## Science Skills and Ideas

Answer the questions below.

6. Describe the different textures you see on these puppets.

Possible answers: soft, fuzzy, rough, smooth



7. **Measure.** How can you measure mass?

You can measure mass by using a balance.

8. **Predict.** If you blow into a balloon, what will happen?

| What I Predict                                    | What Happens            |
|---|-------------------------|
| Air will fill the balloon and it will get bigger. | The balloon got bigger. |

9. Describe the properties of the liquids below.



Possible answers: Ketchup is red, salty, and thick, and it flows slowly;

honey is brown, sweet, thick, and sticky, and it flows very slowly; milk is

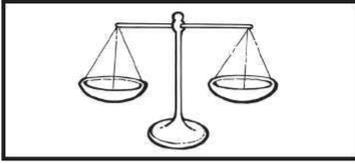
white and thin, and it flows quickly.



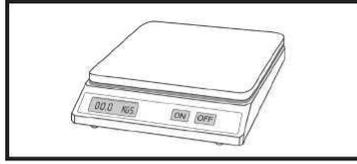
10. What are properties of natural and human-made materials?

Accept all reasonable responses.

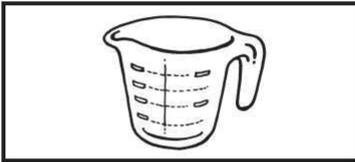
1. Amirah wants to measure how much space a liquid takes up.



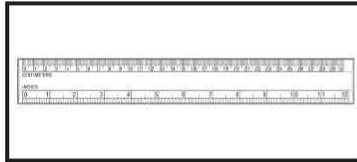
balance



scale



measuring cup



ruler

What tool should she use?

- A balance
  - B scale
  - C measuring cup
  - D ruler
2. Which is not a property of solids?
- A They have mass.
  - B They take the shape of the space they are in.
  - C They can be rough or smooth.
  - D They take up space.

## Motion



How can you make things move?

Answers will vary. Accept all reasonable responses.

Handwriting practice lines consisting of multiple sets of solid top and bottom lines with a dashed middle line.

### Vocabulary



**push** a force that moves something away from you



**pull** a force that moves something closer to you



**ramp** a slanted surface that you can use to move things up or down



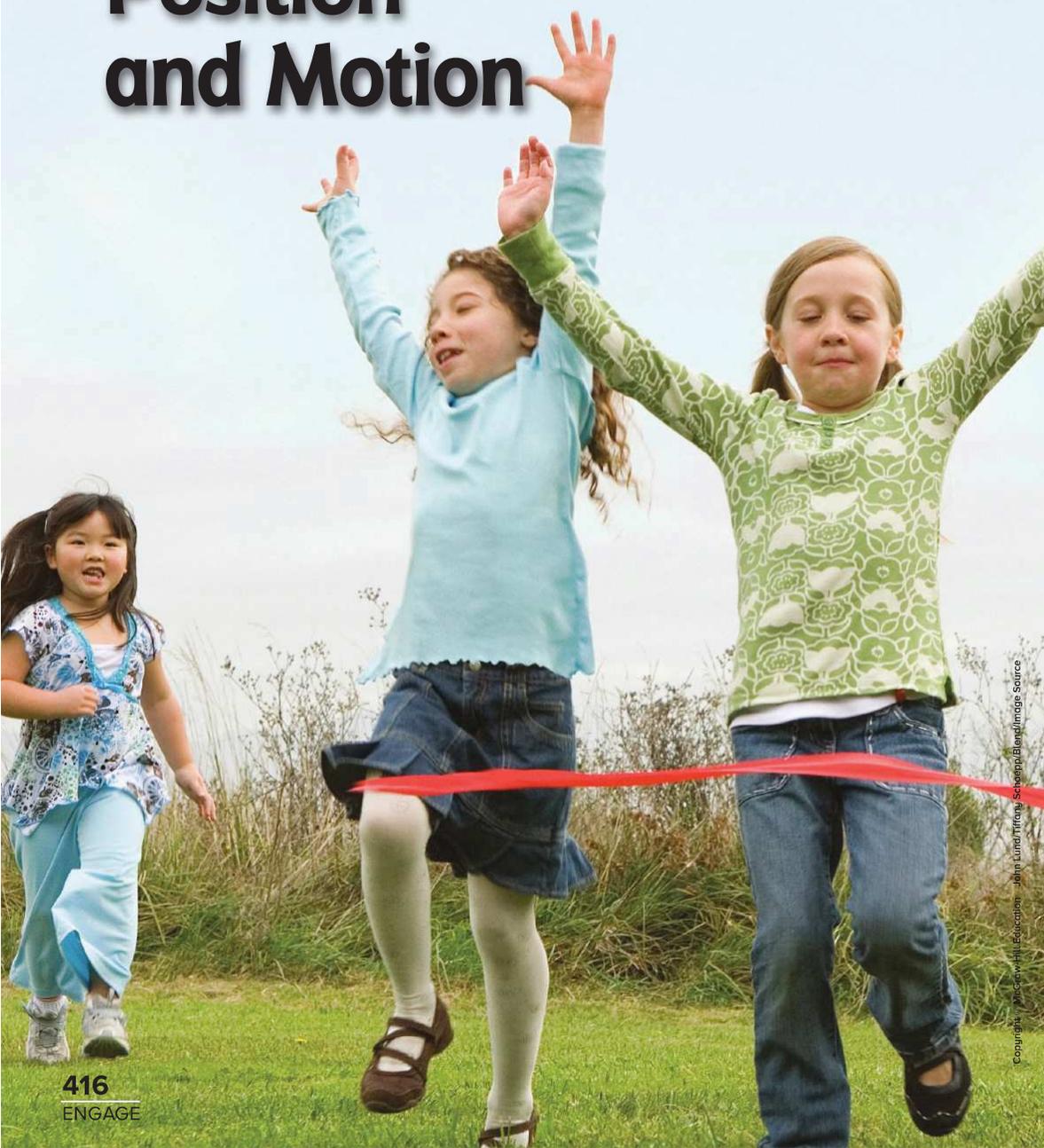
**magnet** something that can pull, or attract, some objects with metal in them

Chapter Sourced From: 14. On the Move, Chapter 11, from Science, A Closer Look Grade 1 ©2011 Copyright © McGraw-Hill Education (i)Masas/Shutterstock.com, (j)Photofusion Picture Library/Alamy, (k)Michael Scott/McGraw-Hill Education, (l)Ken Cavonagh/McGraw-Hill Education

Before reading this chapter, write down what you already know in the first column. In the second column, write down what you want to learn. After you have completed this chapter, write down what you learned in the third column.

| <b>Motion</b>         |                             |  |
|-----------------------|-----------------------------|--|
| <b>What We Know</b>   | <b>What We Want to Know</b> | <b>What We Learned</b>                       |
| Things move.          | How do things move?         | An object is moved when it changes position. |
| Pushing moves things. | What moves heavy things?    |  |
| Round things roll.    |                             |  |

# Position and Motion



Copyright © Pearson Education, Inc. All rights reserved. Photo: iStockphoto.com

**Before You Read**

It is a race! Who is winning the race? How can you tell?

Possible answers: The girl in front. She looks like she is ahead of the others.

**Essential Question**

How can you describe motion?

Copyright © McGraw-Hill Education. © McGraw-Hill Education. © Houghton Mifflin Harcourt. © Pearson Education, Inc. All rights reserved.

## How do you know something moved?

### What to Do

- 1 Put three objects on a table.
- 2 **Observe.** Look closely at the objects. Where are they on the table?

Possible answer: They are next to each other at the edge of the table.

- 3 Cover your eyes. Have your partner move one object.



### You need



classroom  
objects

**4 Infer.** Open your eyes. Which object did your partner move? How can you tell?

Possible answer: My partner moved the cube. I know because it is not next to the other objects.

**Explore More**

**5 Investigate.** Can making a map of the table and objects help you find out which object moved? Try it.

Possible answer: Yes, making a map of the table and objects can help you find out which object moved.

**Open Inquiry**

Investigate other ways to determine if something has moved.

My question is:

Sample question: What other ways can you record how an object has moved?

# Read and Respond .....

## How can you tell where something is?

Have you ever told a friend where something is? You probably described the object's position.

**Position** is the place where something is located.

### ✓ Quick Check

Fill in the blank.

1. An object changes its

position

when it is moved from one place to another.

### Find Things at a Fair



Position tells you if one thing is close to or far away from another thing. Position can tell you if an object is over, under, right, or left.

### Read a Photo

Where are things located at this fair? Use position words.

Possible answers: The balloon seller is next

to the carousel; the snack seller is in front of

the Ferris Wheel.

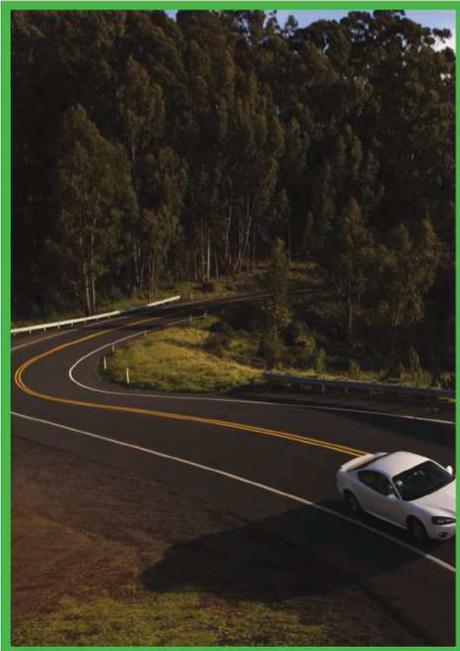
## How do things move?

Objects can move in many ways. **Motion** is a change in an object's position.

Things can move forward, backward, or in a circle. They can even zigzag!

### Quick Lab

Make a ball move in a curvy line and in a straight line.



▲ This car drives down a curvy road.



▲ This airplane moves in a straight line.

**Speed** is how fast or slow something moves. Different objects move at different speeds.

**A rocket ship moves much faster than an airplane. ▶**

**✓ Quick Check**

2. What words can you use to describe an object's position?

Possible answers: near, next to,

beside, above, below

3. How can you tell if one object is moving faster than another?

Possible answers: It moves farther

away than the other object; it is

ahead of the other object.



## Visual Summary

Write about what you learned.



### Position

Possible answers: Position is the place where something is located. Position words can tell if something is close or far, above, under, to the right or left.



### Motion

Possible answer: Motion is a change in an object's position. Objects can move forward, backward, or in a circle.

## Think, Talk, and Write

**1 Vocabulary.** What is speed?

Speed is how fast or slow something moves.

**2 Compare and Contrast.** How are a rocket ship and an airplane alike? How are they different?

Possible answers: Decreased similarity is they both can move; they both fly; they both carry people.

The differences: A rocket ship is faster than an airplane; a rocket ship travels

farther into space than an airplane.

**Essential Question** How can you describe motion?

Possible answers: You can describe motion by using words like backward, forward,

in a circle, or zigzag. You can also describe motion by describing the speed of an

object.

# Push and Pull



Copyright © McGraw-Hill Education Digital Vision/Alamy

## Look and Wonder

### Before You Read

This boy is climbing a rope. How does he move up?

Possible answers: He can use his arms to pull himself up on the rope.

He can push up with his legs.

### Essential Question

What can change how things move?

## How can you make something move?

### What to Do

- 1 Fold an index card.

#### Step 1



#### You need



index card



tissue

- 2 **Investigate.** Try different ways to make the card move. How can it move?

Possible answers: I can flick it, drop it, push it, and blow on it.

**3 Observe.** What changes about the card? What stays the same?

Possible answers: The card is in a different position; the card moved. The card is still a solid; the card's properties are the same.

**Explore More**

**4 Infer.** Do you think a tissue will move in the same way as the card? Why or why not? Try it.

Student answers will vary, but students may note that a push or pull will move the card.

**Open Inquiry**

Investigate other ways things move.

My question is:

Sample question: How can you make things move?

## What makes things move?

Things cannot move on their own. You have to use force to move them. A **force** is a push or a pull that makes an object move.

A **push** moves the object away from you. A **pull** moves it toward you.

Answer true or false.

1. You pull an object to move it away from you.

---

---

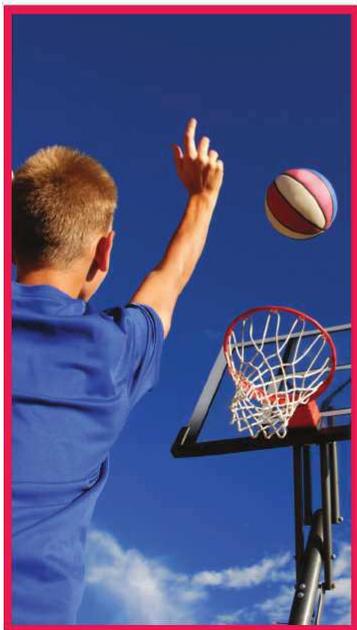
---

---

---

---

false



◀ This boy pushes the basketball away from him.

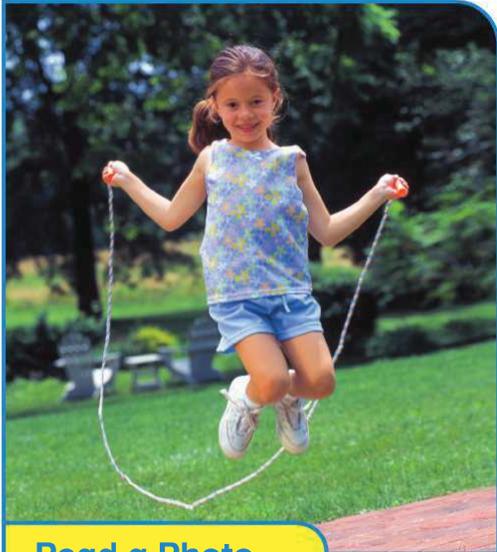


▲ This boy pulls the bag of basketballs toward him.

Copyright © McGraw-Hill Education (i)Masas/Shutterstock.com (i)Michael Scott/McGraw-Hill Education

**Gravity** is the force that pulls things toward Earth.

When you jump up, gravity pulls you back down. If you let go of something, gravity pulls it to the ground.



**Read a Photo**

Will this girl stay up in the air? Why or why not?

Possible answer: No, gravity will pull her

back down.

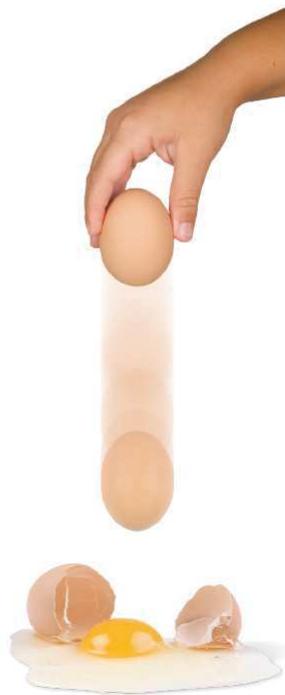
**Quick Check**

2. What things do you push and pull every day?

Possible answers: doors,

crayons, drinking cups, ball.

**Gravity pulls this egg to the ground. ▼**



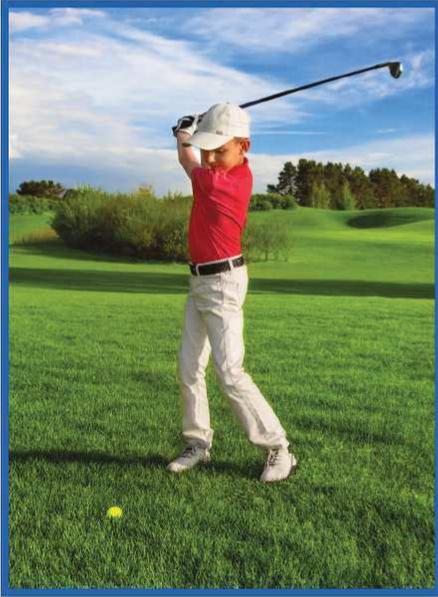
## How are forces different?

The size of a push or pull moves things differently. A small push can move a light object. A bigger push can move a heavy object.

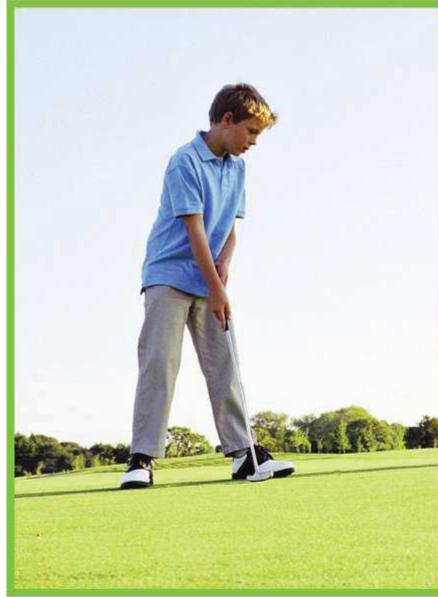
A big push also makes an object move faster and farther than a small push.

### Quick Lab

**Investigate** how much force you need to slide a checker piece.



▲ This boy uses a big force to push the golf ball far away.



▲ This boy uses a small force to push the golf ball a short way.

Friction is a force that slows things down. **Friction** is two things rubbing together.

Have you ever dragged your feet to slow down on a swing? That is friction.



◀ Drag a rubber stopper on the ground. Friction makes you stop.

 **Quick Check**

3. What could make something move slower?

Possible answers: a small push or less force would make something move

slower than a big push; moving an object on a surface with friction would make

the object move slower than moving it on a surface with no friction.

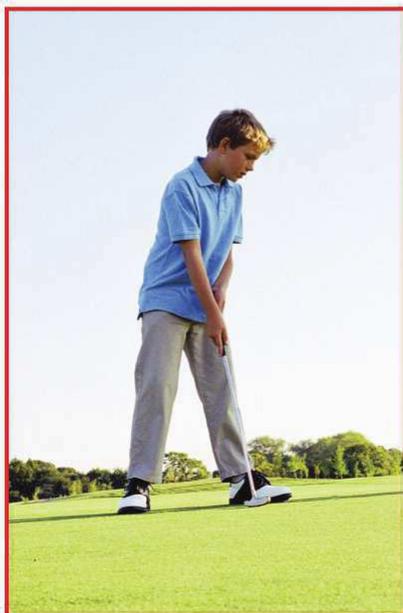
## Visual Summary

Write about what you learned.



**Forces**

Possible answers: A force is a push or a pull that makes an object move. A push moves the object. A pull moves it toward you. Gravity is the force that pulls things toward Earth.



**Differences between Forces**

Possible answers: Pushes and pulls depend on the size of objects. A small push can move a light object. A bigger push can move a heavy object.

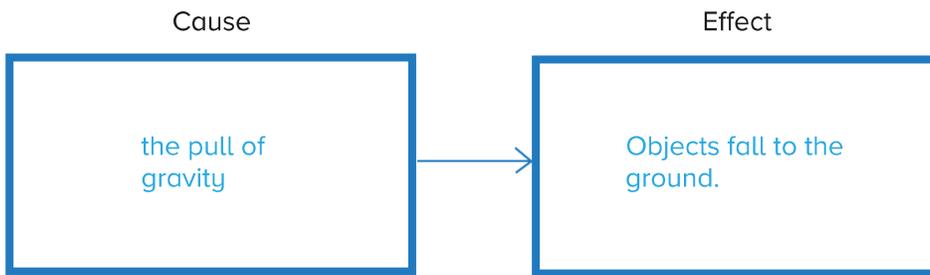
Copyright © McGraw-Hill Education (i)Michael Scott/McGraw-Hill Education, (ii)BananaStock/Alamy

## Think, Talk, and Write

**1 Vocabulary.** What is friction?

Friction is two things rubbing together.

**2 Cause and Effect.** What makes things fall to the ground?



**Essential Question** What can change how things move?

Possible answers: Forces like a push, a pull, gravity, and friction can change how things move.

# Magnets



Copyright © McGraw-Hill Education Mitchell D. Bridwell/PhotoEssai

**Before You Read**

Magnets pull things toward them. Where are the magnets on this train?

Possible answers: They are on the end of each train car.

**Essential Question**

What does a magnet do?

## What will a magnet pull?

### What to Do

- 1 Predict.** Put objects that you think a magnet will pull in one pile. Put objects it will not pull in another pile.
- 2 Investigate.** Put the magnet close to different objects. What happens?

#### You need



magnet



classroom objects

#### Step 2



Possible answer: Some objects are pulled to the

magnet. Other objects are not pulled to the magnet.

- 3 Classify.** Which objects were pulled by the magnet?  
Which objects were not?

| Pulled      | Not Pulled  |
|-------------|-------------|
| pencil band | eraser      |
| paper clip  | plastic cup |
| foil        | pencil wood |

**Explore More**

- 4 Infer.** What kinds of objects do magnets pull?

Possible answers: Magnets pull metal objects.

**Open Inquiry**

Investigate why magnets attract objects.

My question is:

Sample question: Why do magnets attract some objects and not others?

## What is a magnet?

Some things stick together with tape or glue. A magnet does not need those things to stick to something.

A **magnet** pulls, or attracts, some kinds of objects.

### ✓ Quick Check

Fill in each blank.

1. A \_\_\_\_\_  
\_\_\_\_\_ magnet \_\_\_\_\_

is attracted to some metal objects.



Which objects on the table will this magnet attract? ▼



Magnets attract things that have iron in them. Iron is a kind of metal. Magnets do not attract things that are made of plastic, rubber, or cloth.

### Magnet Chart

| My Magnet Chart  |  |
|--|--|
| Attracted  | Not Attracted  |
| <br>paper clips | <br>rubber bands |
| <br>Washers     | <br>google eyes   |
| <br>twist ties  | <br>pom-poms     |

### Read a Chart

Did the magnet attract rubber bands? Why or why not?

\_\_\_\_\_  
No; rubber bands do not  
\_\_\_\_\_  
\_\_\_\_\_  
contain iron.

# What are a magnet's poles?

Every magnet has two poles.

**Poles** are where the magnet's pull is strongest. The N shows the north pole.

The S shows the south pole. If you hold the north pole of one magnet up to the south pole of another magnet, the poles will attract.

## Quick Lab

See if a magnet can pull through paper, water, or your hand.



Magnets can be different shapes.



All magnets have a north pole and a south pole.



Copyright © McGraw-Hill Education. (K)Ken Cavonagh/McGraw-Hill Education, (c.)Martaie Rey/McGraw-Hill Education, (p)Jacques Cornet/McGraw-Hill Education

If you put two north poles or two south poles next to each other, they will repel one another. **Repel** means to push away.

**These magnets have red north poles and blue south poles. ▶**



**✓ Quick Check**

2. What kinds of objects will a magnet attract?

Possible answer: Magnets will attract

objects that have iron in them.

3. Why is there space between some magnets on this pencil?

Possible answer: The magnets are

repelling each other because two of the

same poles are next to each other.

## Visual Summary

Write about what you learned.



### Magnets

Possible answers: A magnet pulls, or attracts some objects. Magnets attract things that have iron in them. Iron is a kind of metal. Magnets do not attract things that are made of plastic, rubber, or cloth.



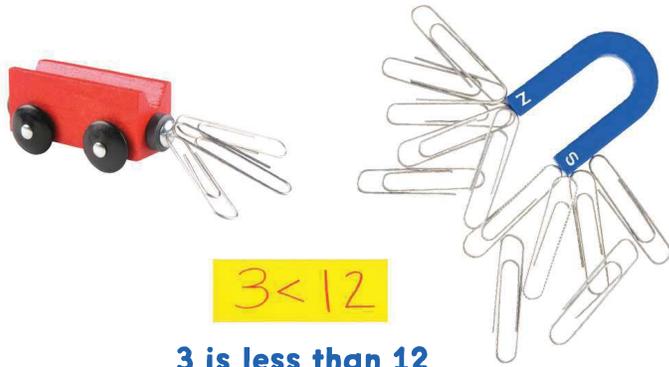
### Magnet Poles

Possible answers: Every magnet has two poles. Poles are where the magnet's pull is strongest.



# Comparing Magnets

Nahla had two magnets. She wondered which one would pick up more paper clips. She compared the amounts.



Copyright © McGraw-Hill Education, Natalie Ray, McGraw-Hill Education

## Compare

Use two different magnets. See which one picks up more paper clips. Compare the amounts.

---

---

---

---

---

---

---

---

| Magnet 1           | Magnet 2 |
|--------------------|----------|
| Answers will vary. |          |

## Remember

The  $<$  symbol always points to the smaller number.



## Science Skills and Ideas

Answer the questions below.

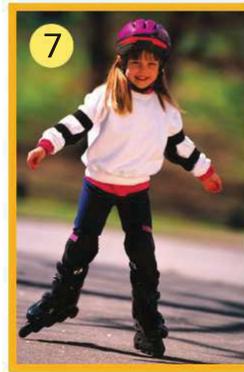
6. Use position words to describe where the cotton candy stand is in the picture below.



Possible answers: in front of the roller coaster;

to the right of the merry-go-round; on the front of

the tents



7. **Infer.** What will happen if this girl drags her rollerblades' rubber stopper on the ground? Why?

Possible answers: she will slow down; she will

stop; because of friction; because the stopper rubs on the ground.

# CHAPTER 14 Review

## Science Skills and Ideas



8. How can you make things move?

Accept all reasonable responses.

- ☰
- ←
- ☰
- 🔖
- ✎
- 📄
- ?
- i
- ⚙️

Test Prep

1. Look



What group

- A Th
- B Th
- C Th
- D Th

2. Which

- A me
- B ruk
- C plc
- D glc

Copyright © McGraw-Hill Education

## Energy Everywhere



What is energy?

Answer will vary. Accept reasonable responses.

### Vocabulary



**energy** a force that makes things work or change



**heat** a form of energy that makes things warm

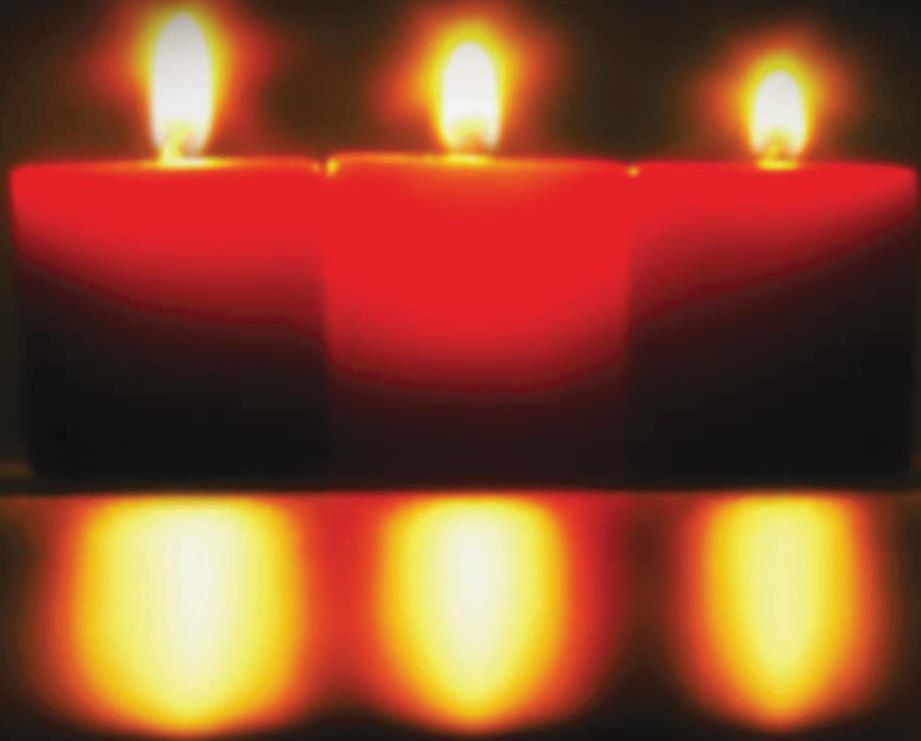


**light** a form of energy that lets you see

Before reading this chapter, write down what you already know in the first column. In the second column, write down what you want to learn. After you have completed this chapter, write down what you learned in the third column.

| <b>Energy</b>                        |                                  |   |
|--------------------------------------|----------------------------------|---|
| <b>What We Know</b>                  | <b>What We Want to Know</b>      | <b>What We Learned</b>                                      |
| Heat comes from the Sun.             | What else makes heat?            | We can get heat from burning things like wood, oil, or gas. |
| Sounds can be loud.                  | What makes a sound loud or soft? |   |
| Electricity lights streets at night. |                                  |   |

# Thermal Energy



**Before You Read**

Heat can change things in many ways. How is heat changing these candles?

---

Possible answer: The candles are melting.

---

---

---

---

---

**Essential Question**

How do we use energy and heat?

---

---

---

## How can heat change things?

### What to Do

- 1 Put butter, an ice cube, and crayons on two plates. Place one plate in a warm place and the other in a cool place.

#### Step 1



#### You need



plastic plates



butter



ice cube



crayons

- 2 **Predict.** What will happen to the objects on each plate?

Possible prediction: The things in the warm place will

melt, except for the crayons. The things in the cool

place will stay the same.

**3 Observe.** Wait ten minutes. How have the objects changed?

Students' predictions will vary, but may include that the ice melted more,  
and that the butter started to soften or melt.

**4 Draw Conclusions.** What made the objects change?

Heat made them change.

**Explore More**

**5 Investigate.** Wait two hours. Check the objects. Have they changed?

Possible answer: The ice melted into water. The butter melted more.

The crayons got warm.

**Open Inquiry**

Investigate how heat energy affects other objects.

My question is:

Sample question: How does heat affect other materials?

# Read and Respond .....

## What is energy?

When you eat food, you get energy to work and play.

**Energy** makes things work and change. There are many different forms of energy.

### ✓ Quick Check

1. What is energy?

Energy makes things work

and change.



▲ Gasoline gives cars energy to move.

◀ Satellite dishes send energy from space to make pictures on TVs.

Heat, light, sound are some forms of energy.

We use different forms of energy every day.

## Quick Lab

Use energy from the Sun to **observe** how colors absorb heat.



▲ Windmills turn energy from wind into electricity.



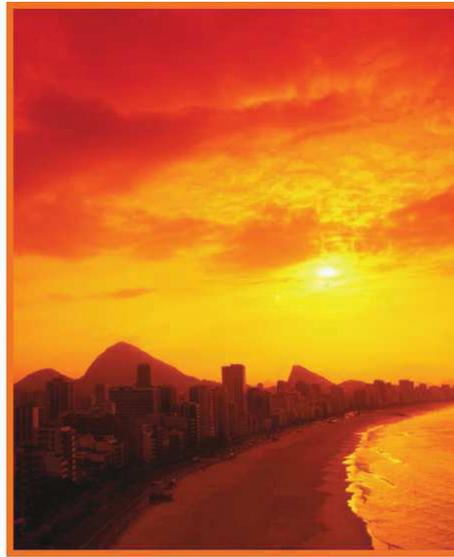
▲ Electrical energy can make lights work.

## What is heat?

**Heat** is energy that makes things warm. We can get heat from burning things like wood, oil, or gas.

People can use this energy to warm their homes.

**Most of the heat energy on Earth comes from the Sun. ▶**



### Read a Photo

What happens when wood burns?

Possible answers The wood glows bright red;

it turns black and turns to ash; it changes

shape; the burning wood makes heat.

### Heat Energy



460

EXPLAIN

People also use heat to cook. Rubbing things together is a source of heat too. You can feel the heat when you rub your hands together.



▲ Heat popcorn kernels and they will pop!

✓ **Quick Check**

2. Where do we get energy?

Possible answers: We get

energy from the food we

eat; wind energy makes

electricity; cars get energy

from gasoline.

3. How do we use heat?

Possible answer: We can

use heat to warm our

houses and to cook.



Rub your hands together. Friction makes heat. ►

**Visual Summary**

Write about what you learned.

**Energy**

Possible answers: Energy makes things work

and change. Heat, light, sound, and electricity

are some forms of energy.

**Heat**

Possible answers: Heat is energy that makes

things warm. Heat comes from burning things

like wood, oil, or gas.

## Think, Talk, and Write

**1 Vocabulary.** What is energy?

Energy makes things work and change.

**2 Main Idea and Detail.** What are some different ways we get heat?

Possible answers: from the Sun; from fire; from oil; from gas; from rubbing things together

**Essential Question** How do we use energy and heat?

Possible answers: We use energy from electricity to turn on lights; we use energy from gasoline to make cars move; we use heat to cook food and warm our homes.

# Sound



## Look and Wonder

### Before You Read

Sounds are made in different ways. How does this man make sounds with his guitar?

Possible answer: He strums or plucks the strings of the guitar. The

strings vibrate to make sounds.

### Essential Question

How is sound made?

## Can you make sound with a rubber band?

### What to Do

- 1 Put a rubber band across a bowl.  
**Be Careful.** Remember to wear safety goggles.



- 2 **Observe.** Pull the rubber band. Let go.  
What do you see and hear?

Possible answers: The rubber band moves and it makes a sound.

### You need



**goggles**



**rubber band**



**plastic bowl**



**3** Pull it  
happe

Possible

sound.

**4** **Draw**

Answers

or vibrati

**Explore**

**5** **Invest**  
same

Possible

**Open In**

Investigat

My questi

Sample ques

Copyright © McGraw-Hill Education



- 3 Pull it again. Stop the rubber band from moving. What happens?

Possible answers: The rubber band stops moving and it does not make a sound.

- 4 **Draw Conclusions.** What do you think made the sound?

Answers will vary, but may include: the rubber band moving back and forth, or vibrating.

### Explore More

- 5 **Investigate.** Find out if a thicker rubber band makes the same sound.

Possible answer: The thicker rubber band made a different sound.

### Open Inquiry

Investigate how sounds are different.

My question is:

Sample question: What makes sounds change?

## How can you make sound?

You cannot see sound, but you can hear it. Sometimes you can even feel it.

Sound is a form of energy. It is made when an object vibrates.

**Vibrate** means to move back and forth. When an object stops vibrating, the sound stops too.

### ✓ Quick Check

Fill in each blank.

1. Sound is energy that is made when an object vibrates.

When you hit cymbals together, the metal vibrates, making a sound.



**FACT** When you speak, cords in your throat vibrate.

Different things make different sounds. Sounds can tell us things.

A clock's alarm tells you when to wake up. Fire alarms and car horns can warn you about danger.

 **Quick Check**

2. How can sounds help you stay safe?

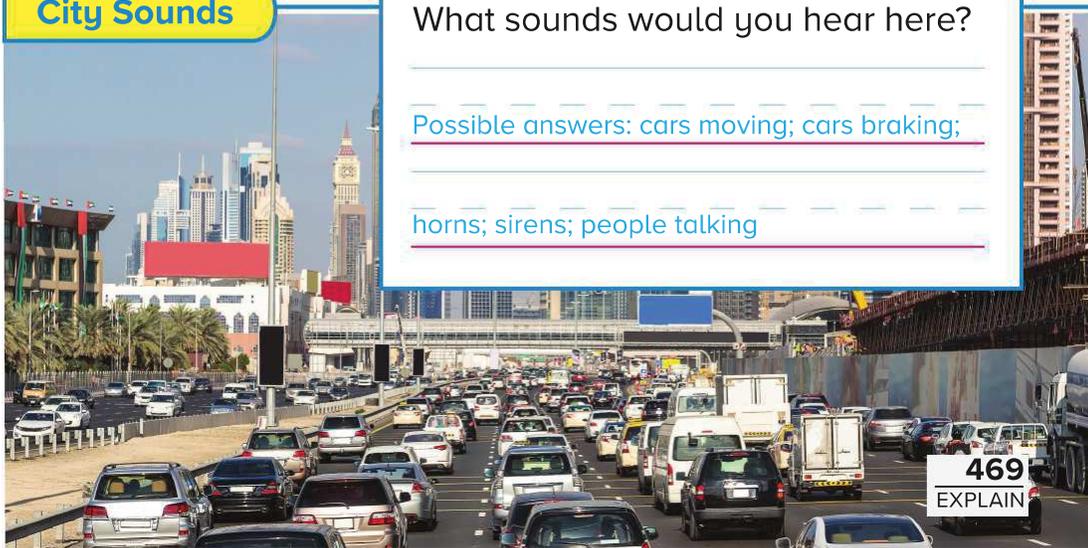
Possible answers: Sounds can help me stay safe by alerting me to danger. Smoke detectors, car horns, police and fire sirens, and lifeguards' whistles all make sounds to warn us of something dangerous.

**Read a Photo**

**City Sounds**

What sounds would you hear here?

Possible answers: cars moving; cars braking; horns; sirens; people talking





Some sounds, such as a whistle, produce fast vibrations. Others, like a motorcycle, produce slower vibrations.

A sound's **pitch** is a quality by which your ear distinguishes fast vibrations from slower vibrations. Fast vibrations make sounds with a high pitch. Slow vibrations make sounds with a low pitch.

 **Quick Check**

3. What are some soft sounds?

Possible answers: a whisper, a

cat's purr



**This coyote's howl has a high pitch.**

# Visual Summary

Write about what you learned.



## Sound

Possible answers: Sound is a form of energy.

It is made when an object vibrates. Vibrate

means to move back and forth.



## Different Sounds

Possible answers: Sound can be loud or

soft. Big vibrations make loud sounds. Small

vibrations make soft sounds.

## Think, Talk, and Write

**1 Vocabulary.** What is the meaning of the word *pitch*?

Quality by which your ear distinguishes fast vibrations from slower vibrations.

**2 Classify.** What are some different ways we get heat?

Possible answers: Sounds can be loud or soft. Sounds can have a high

or low pitch.

**Essential Question** How is sound made?

Possible answer: Sound is a form of energy made when an object vibrates,

or moves back and forth. An alarm clock, car horn, and whistle make different

sounds.

## Sounds and Safety

There are different kinds of sounds.

Some sounds warn you about danger. They can help you stay safe.



◀ Fire alarms are very loud. They tell you to move to a safe place.



▲ Sirens and flashing lights warn other cars on the road of an emergency.

Some people cannot hear. They use their other senses to stay safe.

They can see the flashing lights of an alarm, police car, or ambulance. This warns them of danger.

**Smoke alarms beep and flash lights to warn you of danger. ▼**



**Summarize.** List the most important ideas in the chart below. Then summarize the article. Remember, when you summarize, you retell the most important ideas in the selection.

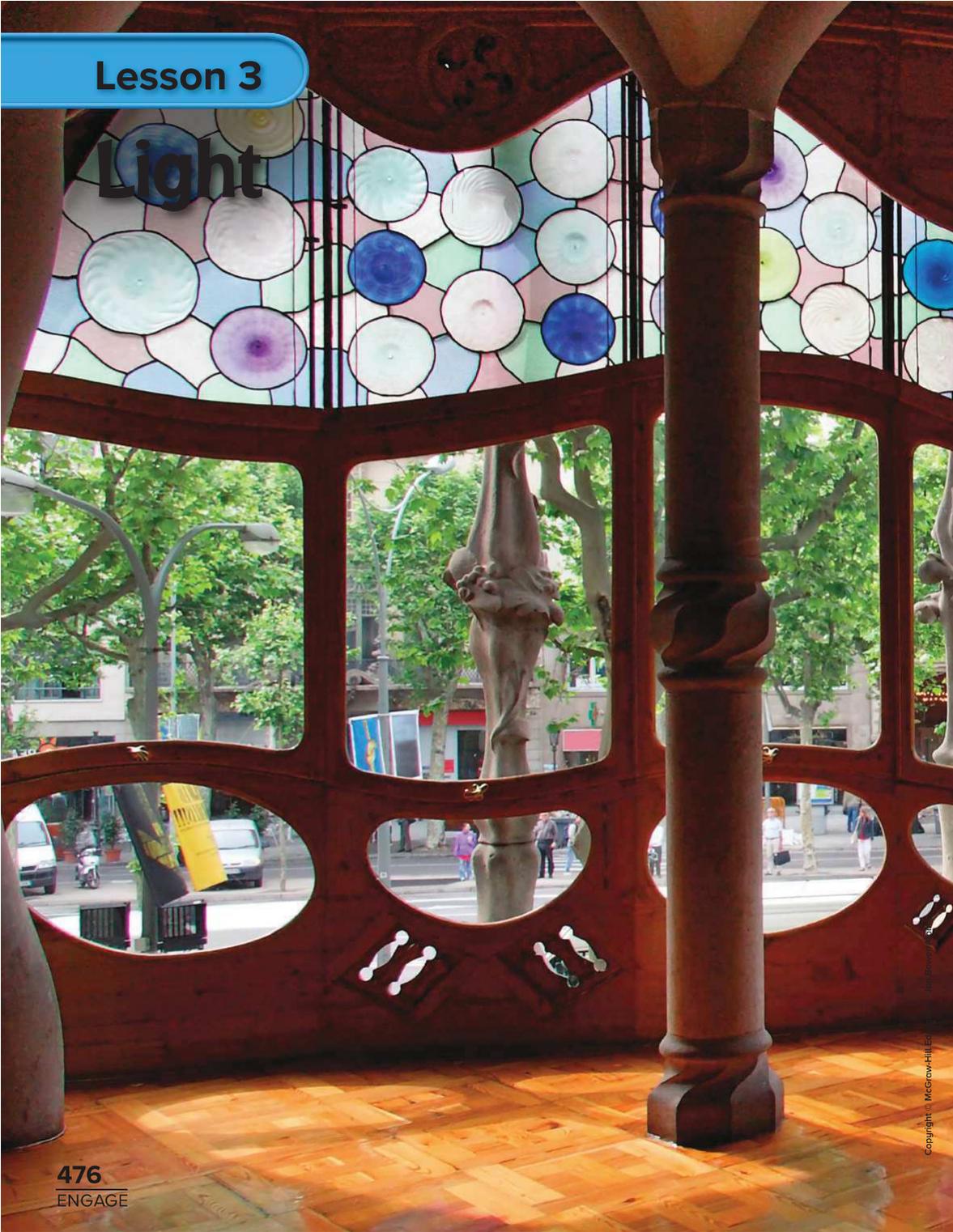
|               |
|---------------|
| <b>Idea 1</b> |
|               |

|               |
|---------------|
| <b>Idea 2</b> |
|               |

|   |
|---|
| <b>Summarize</b>                                    |
| Answers will vary. Accept all reasonable responses. |

## Lesson 3

# Light



**Before You Read**

Stained glass windows are made with different colors of glass. What happens when light shines through the glass?

Possible answers: The light will shine through in different colors.

**Essential Question**

How do you use light?

## What lets light through?

### What to Do

- 1 Observe.** Look through a cardboard tube. Can you see light in the tube?

Possible answer: Yes, light is seen in the tube.

- 2** Cover the end of the tube with aluminum foil. Can you see light now?

Possible answer: No, light cannot be seen if the end of the tube is covered.

### You need



cardboard tube



aluminum foil



wax paper



plastic wrap



rubber band



**478**  
EXPLORE

- 3 Record Data.** Repeat with wax paper and plastic wrap. Record whether or not you can see light.

| What I Predict                 | What Happens                  |
|--------------------------------|-------------------------------|
| tin foil will not let in light | tin foil did not let in light |

- 4 Draw Conclusions.** Repeat with wax paper and plastic wrap. Record whether or not you can see light.

Students' sentences will vary, depending on their predictions.

**Explore More**

- 5 Predict.** What other materials will let light through? Try it.

Students' answers will vary, but might include glass or water.

**Open Inquiry**

Investigate other materials that light can and cannot pass through.

My question is:

Sample question: How does color affect light that passes through objects?



When light is blocked, there is a shadow.

Sometimes your body blocks light. This forms a shadow on the ground.

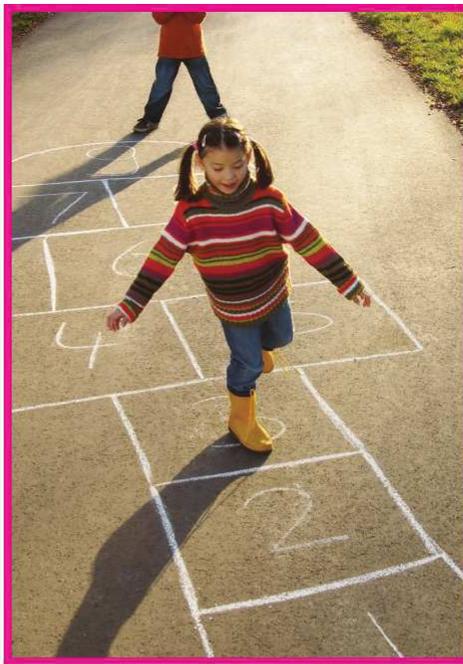
### Read a Diagram

Why does the boy see things differently?

Possible answers: The two pairs of

glasses and the blindfold allow different

amounts of light to pass through them.



- ▲ This girl has a shadow because light cannot shine through her body.



This is what the boy sees with the mask on.

Copyright © McGraw-Hill Education. All rights reserved. © 2014 McGraw-Hill Education.

## What are some sources of light?

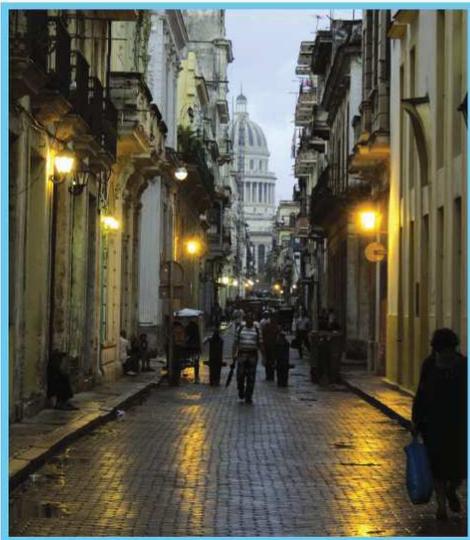
Most of the light on Earth comes from the Sun. Other stars also make light.

Some lights, like lamps, streetlights, and flashlights, are made by people.

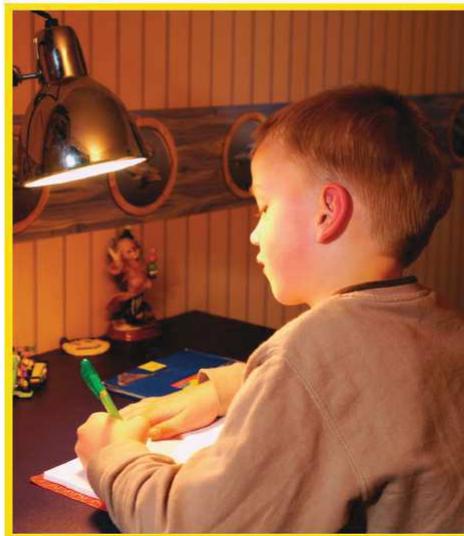
### Quick Lab

Shine light on a mirror.  
**Record** what you see.

▼ Streetlights help you see at night.



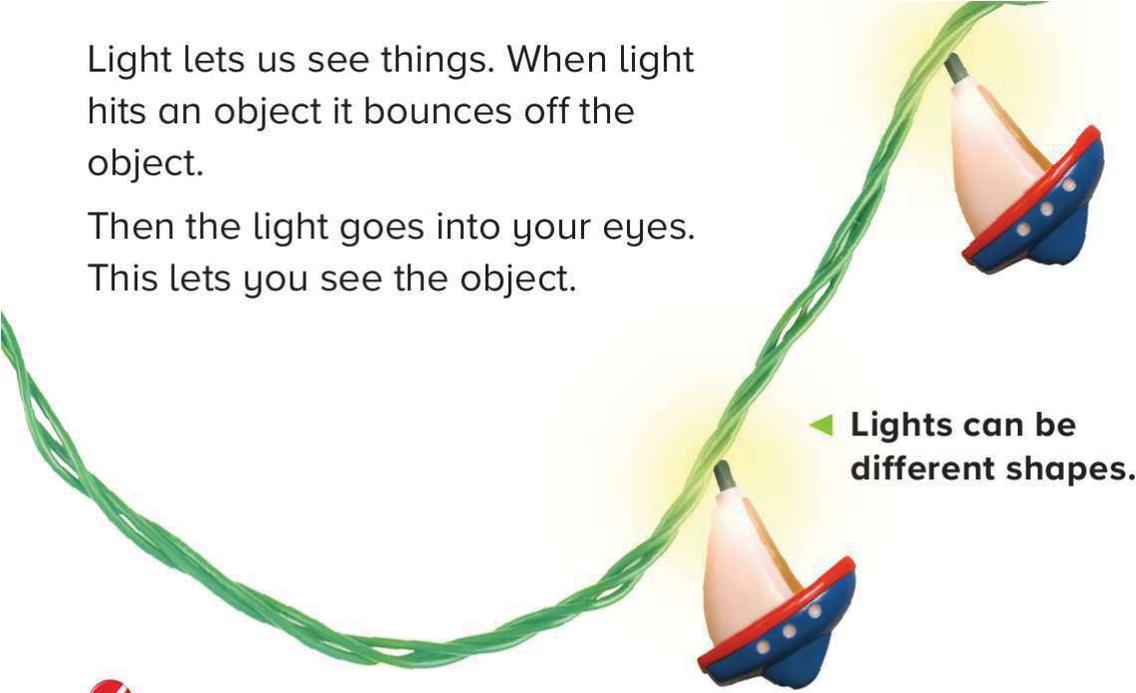
▼ You need light to see your homework.



Copyright © McGraw-Hill Education (i)Dove Meyer, (j)Kader Meguedal/Alamy

Light lets us see things. When light hits an object it bounces off the object.

Then the light goes into your eyes. This lets you see the object.



◀ Lights can be different shapes.

**✓ Quick Check**

2. What are some objects that light cannot go through?

Possible answers: our bodies;

aluminum foil; the classroom walls

3. Why is light important?

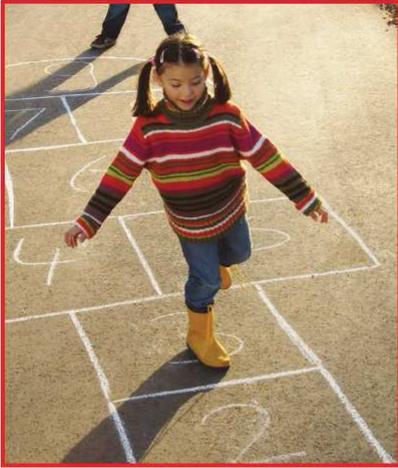
Possible answer: Light is important

because it lets us see things.



## Visual Summary

Write about what you learned.



### Light

Possible answers: Light is energy that lets you see objects. Objects let different amounts of light pass through them. Some objects do not allow any light to go through them.



### Sources of Light

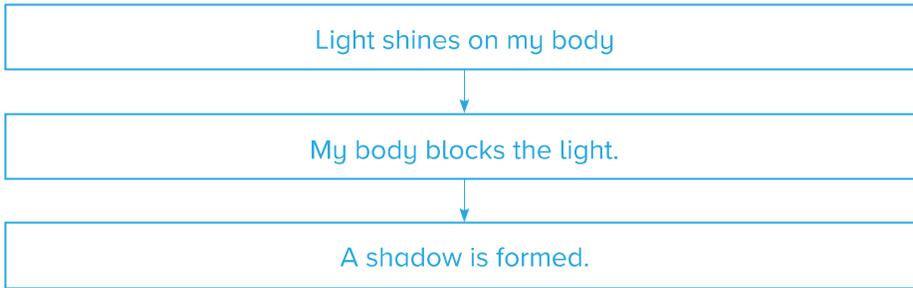
Possible answers: Light comes from the Sun and other things like lamps, streetlights, and flashlights.

## Think, Talk, and Write

**1 Vocabulary.** What is light?

a form of energy that lets you see

**2 Arrange events.** How does your body make a shadow?



**Essential Question** How do you use light?

Possible answers: I use light to see things; I use a flashlight to help me see outside at night; I use a lamp to help me see inside.

# Stained Glass

Stained glass windows are made with many pieces of colored glass. When sunlight shines through stained glass, you can see different colors of light.



Copyright © McGraw-Hill Education Nigel Reed/Alamy

## Sort the Shapes

What shapes do you see in the stained glass window above? How many circles do you see? How many rectangles do you see?

---

Answers will vary. Accept all

---

reasonable responses.

## Remember

Use tally marks to keep track of the shapes you counted.

# CHAPTER 15 Review

## Vocabulary

Use each word once to complete the sentences.

energy

heat

pitch

vibrates

1. Heat, light, and sound  
are some forms of energy.

2. Quality by which your ear distinguishes  
fast vibrations from slower vibrations  
pitch.

3. A sound is made when an object  
vibrates.

4. When you rub your hands together,  
you can feel heat.



Copyright © McGraw-Hill Education (i)Comstock Images/SuperStock, (j)Natalie Ray/McGraw-Hill Education

## Skills and Concepts

Answer the questions below.

5. How could you make different sounds on a guitar?

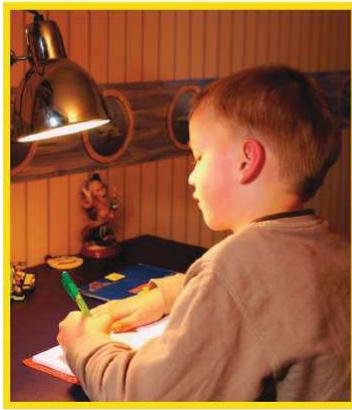
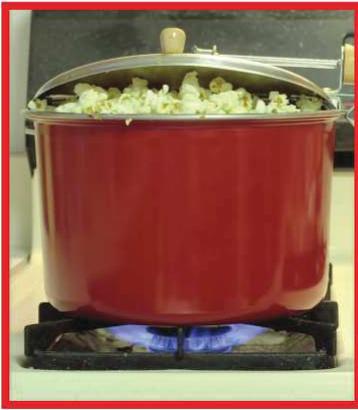
Possible answer: strum the strings so they vibrate

slowly or quickly; pluck one string; pluck more

than one string at once; lightly drum on the body

6. **Draw Conclusions.** Talk about the forms of energy in these pictures.

| Text Clues          | Conclusion                  |
|---------------------|-----------------------------|
| Popcorn is popping. | Heat energy is working.     |
| Light is shining.   | Electric energy is working. |



# CHAPTER 15 Review

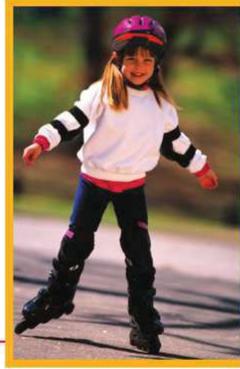
## Skills and Concepts

7. **Summarize** Where can we get heat?

Possible answer: From the Sun and from burning wood,  
oil and gas, and some electrical devices such as an oven.

8. What makes shadows on the ground?

Possible answer: something blocking the light from  
the Sun.



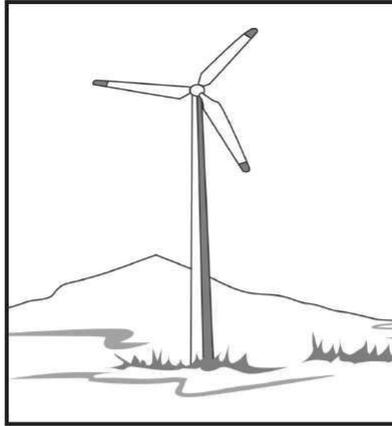
9. What is energy?

Answers will vary. Accept all reasonable responses.

1. This windmill can give your computer the power to work.

What does a windmill turn wind energy into?

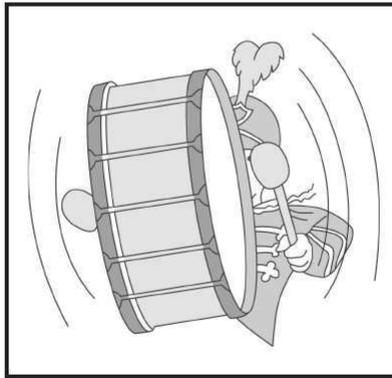
- A heat
- B electricity
- C light
- D sound



2. Look at this picture.

How can you make a loud sound with this drum?

- A Beat the drum lightly.
- B Beat the drum heavily.
- C Beat the drum slowly.
- D Beat the drum quickly.



## Musician

A musician's job is to make different sounds. Musicians need to study and practice hard. Musicians have to know all about fast, slow, high, and low sounds. Jazz, classical, and rock are kinds of music.



musician

 Write a question you have about one of the careers on this page.

Questions will vary. Accept all reasonable responses.

## More Careers to Think About



sound engineer



instrument maker

## Musician

A musician's job is to make different sounds. Musicians need to study and practice hard. Musicians have to know all about fast, slow, high, and low sounds. Jazz, classical, and rock are kinds of music.



musician

 Write a question you have about one of the careers on this page.

Questions will vary. Accept all reasonable responses.

## More Careers to Think About



sound engineer



instrument maker

A

**adaptation** a body part or a way an animal acts that helps it stay alive The giraffe long neck is a perfect adaptation.



**amphibian** an animal that lives on land and in water A frog is an amphibian.



**anemometer** a device which is used to measure the wind speed. We calculate wind speed using Anemometer.



**axis** a center line that an object spins around Earth spins on its axis.



**التكيف** تغيّر في عضو من جسم الحيوان يساعده في البقاء حيًا. أو الطريقة التي يتبعها الحيوان للحفاظ على حياته. رقبة الزرافة الطويلة هي مثال نموذجي على التكيف.



**برمائي** حيوان يعيش في الماء وعلى اليابسة. الضفدع حيوان برمائي.



**مقياس الرياح** جهاز يُستخدم لقياس سرعة الرياح. نقيس سرعة الرياح باستخدام مقياس الرياح.



**المحور** خط مركزي يدور حوله الجسم. تدور الأرض حول محورها.



**B**

**balance** a tool used to measure mass The side of a balance with more mass will go down.



**ميزان** أداة تُستخدم لقياس الكتلة. تنخفض كفة الميزان ذات الكتلة الأكبر.



**bird** an animal that has two legs, two wings, and feathers A duck is a bird.



**طائر** حيوان له قدمان وجناحان ويغطي جسمه الريش. البط من الطيور.



**burn** a way of changing matter using heat When you burn paper, it changes to ash.



**احتراق** طريقة لتغيير حالة المادة بالحرارة. تتحول الورقة إلى رماد عندما تحترق.

**C**

**camouflage** a way that animals blend into their surroundings Animals use camouflage to stay safe.



**تمويه** طريقة تُخفي الحيوانات في البيئة المحيطة. تلجأ الحيوانات إلى التمويه لتحافظ على نفسها.





E

**evaporate** to change from a liquid to a gas Water can evaporate from oceans, rivers, lakes, or land.



**تبخّر** التحول من الحالة السائلة إلى الحالة الغازية. يتبخّر الماء من المحيطات أو الأنهار أو البحيرات أو اليابسة.



F

**fall** the season after summer Some leaves change colors in fall.



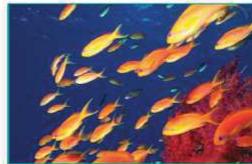
**خريف** الفصل الذي يلي الصيف. تتغيّر ألوان بعض أوراق الشجر في فصل الخريف.



**fish** an animal that lives in water and has gills and fins Fish use gills to breathe in water.



**أسماك** حيوانات تعيش في الماء ولها خياشيم وزعانف. يتنفس السمك في الماء بواسطة الخياشيم.



**freeze** to change from a liquid to a solid Water will freeze if it gets really cold.



**تجمّد** التحول من الحالة السائلة إلى الحالة الصلبة. يتجمّد الماء عندما يصبح باردًا جدًا.



## G

**gas** a state of matter that does not have its own shape  
Gas gives balloons their shape.



**غاز** حالة المادة التي ليس لها شكل خاص بها.  
تشكل البالونات بأشكالها عند ملئها بالغاز.



**gills** the part of a fish that takes in oxygen from water A  
fish uses its gills to breathe in water.



**خياشيم** عضو في جسم السمك يستخلص من خلاله السمك  
الأكسجين من الماء.  
تستخدم الأسماك خياشيمها في التنفس في الماء.



## H

**habitat** the place where an animal lives A forest is a  
habitat for many plants and animals.



**موطن بيئي** المكان الذي تعيش فيه الكائنات الحية.  
الغابة هي الموطن البيئي لكثير من النباتات والحيوانات.



**hand lens** a tool that makes objects seem larger A hand lens lets us see very small things.



**عدسة يدوية** أداة تستخدم لتكبير الأشياء. يمكننا رؤية الأشياء الصغيرة جدًا عند الاستعانة بالعدسة اليدوية.



**hatch** a baby animal breaking out of an egg  
Birds hatch from eggs.



**فرخ صغير** الحيوان الذي يفقس من بيضته.  
تفقس الطيور من البيض.



**herbivore** an animal that eats plants A rabbit is a herbivore.



**آكل النباتات** حيوان يتغذى على النباتات.  
الأرنب من آكلات النباتات.



**human-made materials** materials not found on Earth that are made by people Plastic is a human-made material.



**مواد مصنّعة** مواد لم تُوجد على الأرض صنعت بيد الإنسان.  
اللدائن من المواد المصنّعة.



# I

**insect** an animal with three body parts and six legs An ant is an insect.

**حشرة** حيوان يتكوّن جسمه من ثلاثة أجزاء وست أرجل. النمل من الحشرات.



# L

**life cycle** the series of changes in one's life like birth, growth, reproduction and death A butterfly has four stages in its life cycle.

**دورة الحياة (المُمر)** هي المرحل التي تمر بها الكائنات الحية من الولادة إلى الممات. تمر الفراشة بأربع مراحل في دورة حياتها.



**life span** the period of time from birth to death The insects have a very short life span.

**مدة الحياة** الفترة التي تمر منذ الميلاد إلى الوفاة. مدة حياة الحشرات قصيرة جدًا.



**liquid** a state of matter that flows and takes the shape of its container Milk is a liquid.

**سائل** كل مادة تسيل وتأخذ شكل الوعاء الموجودة فيه. اللبن من السوائل.



**lodge** a shelter made of tree branches and mud Beavers make their lodges in the middle of a lake or pond.



**كوخ** مأوى مصنوع من فروع الأشجار والطين. تبني القنادس أكواخها وسط البحيرات أو البرك.



**lungs** the body parts used to breathe air Birds use lungs to breathe.



**الرئتان** عضوان في جسم بعض الكائنات الحية تتنفس بهما الهواء. تتنفس الطيور من خلال الرئتين.



M

**mammal** an animal with hair or fur Most mammals give birth to live young.



**ثديي** حيوان يغطي جسمه الشعر أو الفرو. تلد معظم الثدييات صغارها.



**mass** the amount of matter in an object A metal bird has more mass than a sponge bird.



**كتلة** مقدار ما يحتويه الجسم من المادة. كتلة الطائر المصنوع من المعدن أكبر من كتلة الطائر المصنوع من الإسفنج.



**material** the matter that makes up solids Cotton and rubber are two different materials.



**خامة** المادّة الأويّة التي توجد على حالتها الطبيعيّة قبل ان تُعالج أو تصنع.  
القطن والمطاط خامتان مختلفتان.



**matter** what all things are made of A kite is made of matter.



**مادّة** كل شيء حولنا ويشمل حيز ( ما تتكون منه كل الأشياء).  
الطائرة الورقية مصنوعة من مادّة.



**melt** to change from a solid to a liquid Ice cubes melt and become water.



**انصهار** تغير المادّة من الحالة الصلبة إلى الحالة السائلة  
تنصهر مكعبات الثلج وتتحوّل إلى ماء.



**mixture** two or more different things put together A fruit salad is a mixture of different fruits.



**خليط** شيان مختلفان أو أكثر موضوعان معًا  
تتكوّن سلطة الفواكه من خليط من فواكه مختلفة.



**Moon** a ball of rock that moves around Earth The Moon does not make its own light.

**القمر** جسم صخري كبير يدور حول كوكب ما. لا يُصدر القمر ضوءاً من ذاته.



N

**natural resources** materials that come from Earth that people use Plants and animals are natural resources.

**الموارد الطبيعية** مواد نحصل عليها من الطبيعة ويمكن للإنسان أن يستخدمها. النباتات والحيوانات من الموارد الطبيعية.



P

**phase** the Moon's shape as we see it from Earth The Moon's phase will change each night.

**أوجه القمر** الأشكال المختلفة التي يبدو عليها القمر في السماء. يتغيّر طور القمر كل ليلة.





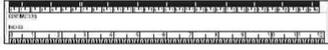
**rotation** a turn or spin Earth makes one rotation in 24 hours.



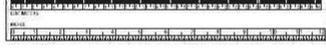
**دوران محوري** دورة كاملة حول المحور. تدور الأرض دورة كاملة حول محورها كل 24 ساعة.



**ruler** a tool used for measuring length A ruler tells us how long or wide something is.

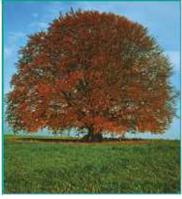


**مسطرة** أداة تُستخدم لقياس الطول. تقيس المسطرة طول الأشياء أو عرضها.



## S

**season** a time of year Fall, winter, spring, and summer are the four seasons.



**فصل** فترة زمنية في السنة. الخريف والشتاء والربيع والصيف هي الفصول الأربعة.



**shelter** a place where animals can live and be safe These raccoons find shelter in a log.



**مأوى** مكان تعيش فيه الحيوانات في أمان. تتخذ حيوانات الراكون من جذوع الأشجار مأوى لها.



**solid** a state of matter that has a shape of its own A block is a solid.



**صلبة** المادة التي تحافظ على شكلها. الخشب مادة صلبة.



**solubility** the property that describes whether or not a material will dissolve Sugar has more solubility than sand.



**ذائبية** خاصية تصف ما إذا كانت المادة ستذوب أم لا. يتميز السكر بذايبية أكبر من الرمال.



**spring** the season after winter Many baby animals are born in spring.



**الربيع** الفصل الذي يأتي عقب الشتاء. تُولد العديد من صغار الحيوانات في فصل الربيع.



**star** an object in the sky that makes its own light We can see many stars in the night sky.



**نجم** جسم يظهر في السماء يُصدر الضوء بذاته. نرى العديد من النجوم في السماء ليلاً.



**summer** the season after spring Lemonade can cool you off in the hot summer.



**الصيف** الفصل الذي يأتي عقب الربيع. ستشعر بالانتعاش عندما تشرب عصير الليمون في الصيف الحار.



**Sun** the star closest to Earth The Sun gives light and heat to Earth.



**الشمس** النجم الأقرب إلى الأرض. ترسل الشمس أشعتها إلى الأرض وتمنحها الدفء والضوء.



T

**tadpole** a young frog A tadpole grows into an adult frog.



**شرغوف (أبو ذنبية)** صغير الضفدع. ينمو الشرغوف ليصبح ضفدعًا يافعًا.



**temperature** how hot or cold something is In winter the temperature can be very cold.



**درجة الحرارة** مدى سخونة الجسم أو برودته. تكون درجة الحرارة منخفضة جدًا في فصل الشتاء.



**thermometer** a tool that measures temperature The thermometer shows a temperature of 65 degrees Fahrenheit.

ترموتر أداة تقيس درجة الحرارة. يبيّن الترمومتر درجة الحرارة.



**tool** an object or body part that helps do work Badgers use their paws as tools.

**عضو** جزء في الجسم يساعد على أداء الأعمال. تستخدم حيوانات الخلد مخالبها في حفر الأنفاق.



**trait** the way animals look or act (page 61) Animals have the same traits as their parents.

**سمة** شكل الحيوانات أو سلوكها. تتميز (صفة) الحيوانات بنفس سمات آباؤها.



W

**water vapor** the water that goes up into the air as a gas and is too small to see You can not see water vapor.

**بخار الماء** الماء الذي يتبخر في الهواء كالفاز وهو صغير جدًا ولا يمكن أن نراه.

. لا يمكنك رؤية بخار الماء.

