



UNIT
1

The Physical Sciences

Chapter 1: What Physics and Chemistry Are About 3

- 1.1 Physical Science in Your Life 4
- 1.2 Describing the Physical World 10
- 1.3 Energy, Matter, and Change 15

Connection: How Do Hybrid Cars Work? 22

Activity: Guess the Gram 24

Chapter 1 Assessment 25

Chapter 2: Science and Measurement 27

- 2.1 Inquiry and the Scientific Method 28
- 2.2 Distance, Time, and Speed 34
- 2.3 Experiments and Variables 41

Connection: Amazing Infrared 46

Activity: Make a Water Clock 48

Chapter 2 Assessment 49

UNIT
2
Motion and Force

Chapter 3: Motion	53
3.1 Position and Velocity	54
3.2 Graphs of Motion	60
3.3 Acceleration	67
<i>Connection: Moments in Motion</i>	74
<i>Activity: How Fast Are You?</i>	76
<i>Chapter 3 Assessment</i>	77
Chapter 4: Forces	79
4.1 Forces	80
4.2 Friction	87
4.3 Forces and Equilibrium	94
<i>Connection: Defy Gravity? It Can Be Done</i>	100
<i>Activity: Make it Work: Friction and Forces</i>	102
<i>Chapter 4 Assessment</i>	103


UNIT
3
Laws of Motion and Energy

Chapter 5: Newton's Laws of Motion	107
5.1 Newton's First Law	108
5.2 Newton's Second Law	112
5.3 Newton's Third Law	117
<i>Connection: Rockets: Out of This World Travel</i>	122
<i>Activity: Making a Spool Car</i>	124
<i>Chapter 5 Assessment</i>	125
Chapter 6: Energy and Machines	127
6.1 Energy and the Conservation of Energy	128
6.2 Work and Power	135
6.3 Simple Machines	140
<i>Connection: A Mighty Energizing Wind</i>	148
<i>Activity: Pop Goes the Balloon!</i>	150
<i>Chapter 6 Assessment</i>	151
Chapter 7: Gravity and Space	153
7.1 Gravity	154
7.2 The Solar System	161
7.3 The Sun and the Stars	174
<i>Connection: Extraterrestrial Volcanoes</i>	182
<i>Activity: Sunspots</i>	184
<i>Chapter 7 Assessment</i>	185

UNIT
4
Electricity, Sound, and Light
Chapter 8: Electricity and Magnetism 189

- 8.1 Electricity 190
- 8.2 Electric Circuits and Electrical Power
..... 196
- 8.3 Properties of Magnets 203

Connection: Household Electricity 212

Activity: Make a Simple Motor 214

Chapter 8 Assessment 215

Chapter 9: Waves and Sound 217

- 9.1 Harmonic Motion 218
- 9.2 Waves 225
- 9.3 Sound 232

Connection: Sound All Around 240

Activity: Make Your Own Speaker 242

Chapter 9 Assessment 243

Chapter 10: Light and Color 245

- 10.1 Properties of Light 246
- 10.2 Color and Vision 254
- 10.3 Optics 261

Connection: Bioluminescence 268

Activity: Make a Pinhole Viewer 270

Chapter 10 Assessment 271

UNIT
5
Matter
**Chapter 11: Temperature, Heat, and
the Phases of Matter 275**

- 11.1 Temperature and the Phases of Matter
..... 276
- 11.2 Heat 283

Connection: Extraordinary Materials 292

Activity: Magical Ice Cream Topping! 294

Chapter 11 Assessment 295

**Chapter 12: The Physical Properties
of Matter 297**

- 12.1 Density 298
- 12.2 Buoyancy 304
- 12.3 Properties of Materials 310

Connection: Silly Putty®: Solid or Liquid? 316

Activity: Make Your Own Viscoelastic Liquid 318

Chapter 12 Assessment 319



