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Series Authors

Alton Biggs

Biology Instructor
Allen High School
Allen, Texas

John Eric Burns

Science Teacher
Ramona Jr. High School
Chino, California

Lucy Daniel, Ph.D.

Teacher, Consultant
Rutherford County Schools
Rutherfordton, North Carolina

Cathy Ezrailson

Science Department Head
Oak Ridge High School
Conroe, Texas

Ralph Feather, Jr., Ph.D.

Science Department Chair
Derry Area School District
Derry, Pennsylvania

Patricia Horton

Math and Science Teacher
Summit Intermediate School
Etiwanda, California

Thomas McCarthy, Ph.D.

Science Department Chair
St. Edwards School
Vero Beach, Florida

Ed Ortleb

Science Consultant
St. Louis Public Schools
St. Louis, Missouri

Susan Leach Snyder

Science Department Chair
Jones Middle School
Upper Arlington, Ohio

Eric Werwa, Ph.D.

Department of Physics and Astronomy
Otterbein College
Westerville, Ohio

National Geographic Society

Educational Division
Washington D.C.

Contributing Authors

Al Janulaw

Science Teacher
Creekside Middle School
Rohnert Park, California

Penny Parsekian

Science Writer for
The National Geographic Society
New London, Connecticut

Gerry Madrazo, Ph.D.

Mathematics and Science Education
Network
University of North Carolina, Chapel Hill
Chapel Hill, North Carolina

Series Consultants

Chemistry

Douglas Martin, Ph.D.
Chemistry Department
Sonoma State University
Rohnert Park, California

Cheryl Wistrom, Ph.D.
Associate Professor of Chemistry
Saint Joseph's College
Rensselaer, Indiana

Earth Science

Maureen Allen
Science Resource Specialist
Irvine Unified School District
Laguna Hills, California

Tomasz K. Baumiller, Ph.D.
Museum of Paleontology
University of Michigan
Ann Arbor, Michigan

Connie Sutton, Ph.D.
Department of Geoscience
Indiana University
Indiana, Pennsylvania

Physics

Thomas Barrett, Ph.D.
Department of Physics
The Ohio State University
Columbus, Ohio

David Haase, Ph.D.
Professor of Physics
North Carolina State University
Raleigh, North Carolina

Life Science

William Ausich, Ph.D.
Department of Geological Sciences
The Ohio State University
Columbus, Ohio

Dennis Stockdale
Asheville High School
Asheville, North Carolina

Daniel Zeigler, Ph.D.
Director
Bacillus Genetic Stock Center
The Ohio State University
Columbus, Ohio

Reading

Nancy Farnan, Ph.D.
School of Teacher Education
San Diego State University
San Diego, California

Gary Kroesch
Mount Carmel High School
San Diego, California

Safety

Mark Vinciguerra
Lab Safety Instructor
Department of Physics
The Ohio State University
Columbus, Ohio

Curriculum

Tom Custer, Ph.D.
Maryland State Department of
Education
Challenge/Reconstructed Schools
Baltimore, Maryland

Series Reviewers

Jhina Alvarado
Potrero Hill Middle School
for the Arts
San Francisco, California

Richard Cheeseman
Bert Lynn Middle School
Torrance, California

Linda Cook
Rider High School
Wichita Falls, Texas

John B. Davis
Niagara-Wheatfield
Central School
Sanborn, New York

Shirley Ann DeFilippo
Timothy Edwards
Middle School
South Windsor, Connecticut

Janet Doughty
H J McDonald Middle School
New Bern, North Carolina

Jason Druten
Jefferson Middle School
Torrance, California

Lin Harp
Magellan Middle School
Raleigh, North Carolina

Doris Holland
West Cary Middle School
Raleigh, North Carolina

Deborah Huffine
Noblesville Intermediate School
Noblesville, Indiana

Paul Osborne
DeValls Bluff High School
DeValls Bluff, Arkansas

Erik Resnick
Robert E. Peary Middle School
Gardena, California

Robert Sirbu
Lowell Junior High School
Oakland, California

Michael Tally
Wake County Public Schools
Raleigh, North Carolina

Cindy Williamson
Whiteville City Schools
Whiteville, North Carolina

Maurice Yaggi
Middlebrook School
Wilton, Connecticut

Donna York
Anchorage School District
Anchorage, Alaska

Activity Testers

Clayton Millage
Science Teacher
Lynden Middle School
Lynden, Washington

Science Kit and Boreal Laboratories
Tonawanda, New York



GRADE SIX: FOCUS ON EARTH SCIENCE

What are science content standards and why does California have them? Standards are guidelines for schools, students, and parents that describe the essential science concepts and skills for understanding the world in which we live. In 1999, The California State Board of Education established science content standards, and these standards will be the basis for state assessments that measure student achievement in science.

ADDITIONAL CONTENT STANDARDS FOR GRADE 6

- California Science Standards and Case Studies, found at the back of the book
- California Science Content Standards Assessment Practice booklets
- Chapter Assessments at the end of each chapter
- Science Voyages Website at www.glencoe.com/sec/science/ca

Plate Tectonics and Earth's Structure

1. Plate tectonics explains important features of the Earth's surface and major geologic events. As the basis for understanding this concept, students know:
 - a. the fit of the continents, location of earthquakes, volcanoes, and midocean ridges, and the distribution of fossils, rock types, and ancient climatic zones provide evidence
Sections 9-1, 9-2, 9-3, 10-1, 11-1, pages 616-617
 - b. the solid Earth is layered with cold, brittle lithosphere; hot convecting mantle; and dense, metallic core.
Sections 9-2, 9-3, 10-2, pages 617, 633
 - c. lithospheric plates that are the size of continents and oceans move at rates of centimeters per year in response to movements in the mantle.
Sections 9-2, 9-3, 11-1, pages 617, 620
 - d. earthquakes are sudden motions along breaks in the crust called faults, and volcanoes/fissures are locations where magma reaches the surface.
Sections 5-1, 9-2, 9-3, 10-1, 10-2, 11-1, 11-2, 11-3, pages 627, 635
 - e. major geologic events, such as earthquakes, volcanic eruptions, and mountain building result from plate motions.
Sections 5-1, 9-3, 10-1, 11-1, 11-

2, 11-3, pages 628, 620-621

- f. how to explain major features of California geology in terms of plate tectonics (including mountains, faults, volcanoes).
Sections 9-3, 10-1, pages 618, 620-621, 635-636
- g. how to determine the epicenter of an earthquake and that the effects of an earthquake vary with its size, distance from the epicenter, local geology, and the type of construction involved.
Sections 9-3, 10-2, 10-3, pages 618-619

Shaping the Earth's Surface

2. Topography is reshaped by weathering of rock and soil and by the transportation and deposition of sediment. As the basis for understanding this concept, students know:
 - a. water running downhill is the dominant process in shaping the landscape, including California's landscape.
Sections 6-2, 7-1, 7-2, 8-1, 8-2, pages 622-625
 - b. rivers and streams are dynamic systems that erode and transport sediment, change course, and flood their banks in natural and recurring patterns.
Sections 5-1, 7-1, 7-2, 8-1, 8-2, 24-3, page 623
 - c. beaches are dynamic systems in which sand is supplied by rivers and moved along the coast by wave action.

Sections 7-3, 8-1, 8-3, 9-3, 17-3, 24-3, pages 623-624

- d. earthquakes, volcanic eruptions, landslides, and floods change human and wildlife habitats.
Sections 7-1, 8-1, 9-3, 10-1, 10-2, 10-3, 11-1, 11-2, 11-3, pages 623-626

Heat (Thermal Energy) (Physical Science)

3. Heat moves in a predictable flow from warmer objects to cooler objects until all objects are at the same temperature. As a basis for understanding this concept, students know:
 - a. energy can be carried from one place to another by heat flow, or by waves including water waves, light and sound, or by moving objects.
Sections 8-3, 14-1, 14-2, 17-3, 23-3, 26-1, 26-2, 26-3, pages 622-625
 - b. when fuel is consumed, most of the energy released becomes heat energy.
Sections 4-1, 4-2, 26-3, page 628
 - c. heat flows in solids by conduction (which involves no flow of matter) and in fluids by conduction and also by convection (which involves flow of matter).
Sections 9-3, 14-1, 14-2, 14-3, 26-2, pages 628-629
 - d. heat energy is also transferred between objects by radiation; radiation can travel through space.
Sections 14-1, 14-2, 16-3, 26-2, page 629

Energy in the Earth System

4. Many phenomena on the Earth's surface are affected by the transfer of energy through radiation and convection currents. As a basis for understanding this concept, students know:
- a. the sun is the major source of energy for phenomena on the Earth's surface, powering winds, ocean currents, and the water cycle.
Sections 4-2, 14-1, 14-2, 14-3, 16-1, 16-3, 17-2, pages 632, 637
 - b. solar energy reaches Earth through radiation, mostly in the form of visible light.
Sections 14-1, 14-2, 16-1, 16-3, 26-2, 570-571, 602-603, pages 632-633
 - c. heat from Earth's interior reaches the surface primarily through convection.
Sections 9-3, 11-1, pages 630-631, 633, 635
 - d. convection currents distribute heat in the atmosphere and oceans.
Sections 14-2, 14-3, 16-3, 17-2, pages 633-634
 - e. differences in pressure, heat, air movement, and humidity result in changes of weather.
Sections 14-1, 14-3, 15-1, 15-2, 15-3, 16-1, 16-3, page 634

Ecology (Life Science)

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept, students know:
- a. energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis, and then from organism to organism in food webs.
Sections 23-1, 23-3, 26-3, page 635
 - b. over time, matter is transferred from one organism to others in the food web, and between organisms and the physical environment.
Sections 23-3, 26-3, pages 637-638

- c. populations of organisms can be categorized by the functions they serve in an ecosystem.
Sections 23-1, 23-2, 23-3, pages 638-639
- d. different kinds of organisms may play similar ecological roles in similar biomes.
Sections 22-1, 23-2, 23-3, 24-2, 24-3, page 639
- e. the number and types of organisms an ecosystem can support depends on the resources available and abiotic factors, such as quantity of light and water, range of temperatures, and soil composition.
Sections 22-3, 23-1, 23-2, 24-1, 24-2, 24-3, page 639

Resources

6. Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation. As a basis for understanding this concept, students know:
- a. the utility of energy sources is determined by factors that are involved in converting these sources to useful forms and the consequences of the conversion process.
Sections 4-1, 4-2, 16-3, pages 630-633, 642-643, 645-646
 - b. different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and classify them as renewable or nonrenewable.
Sections 4-1, 4-2, 4-3, 4-4, 6-2, 14-2, 23-1, page 643
 - c. natural origin of the materials used to make common objects.
Sections 4-1, 4-4, 6-2, pages 643-644

Investigation and Experimentation

7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform investigations. Students will:

- a. develop a hypothesis.
Sections 1-1, 1-2, 9-3, 14-1, 14-2, 15-3, 16-1, 23-2, 25-3, 27-3, pages 623, 643-646, 674-675
- b. select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.
Sections 2-2, 2-3, 6-1, 6-2, 7-1, 8-3, 9-3, 10-1, 14-1, 16-1, 22-3, 23-1, 23-2, 24-2, 25-3, 26-2, 27-2, 27-3
- c. construct appropriate graphs from data and develop qualitative statements about the relationships between variables.
Sections 1-2, 2-3, 6-1, 6-2, 8-1, 9-3, 10-2, 10-3, 14-1, 14-2, 15-1, 16-3, 17-1, 21-3, 25-2, 27-3, pages 631, 633, 641
- d. communicate the steps and results from an investigation in written reports and verbal presentations.
Sections 1-2, 1-2, 4-1, 4-3, 6-1, 6-2, 14-2, 15-1, 16-3, 21-1, 21-2, 22-2, 25-1, 25-3, 27-3, pages 621, 626, 637, 644, 646
- e. recognize whether evidence is consistent with a proposed explanation.
Sections 1-2, 6-1, 7-3, 8-1, 9-1, 9-2, 9-3, 10-2, 10-3, 17-3, 23-3, 25-3, 27-3, pages 622, 627, 632
- f. read a topographic map and a geologic map for evidence provided on the maps, and construct and interpret a simple scale map.
Sections 1-1, 4-4, 5-1, 5-2, 5-3, 9-2, 9-3, 11-1, pages 618, 636, 638, 643, 698
- g. interpret events by sequence and time from natural phenomena (e.g., relative ages of rocks and intrusions).
Sections 4-1, 5-1, 6-2, 8-1, 8-2, 9-2, 9-3, 10-1, 11-1, 11-2, 11-3, 14-2, 16-3, pages 622-624, 632
- h. identify changes in natural phenomena over time without manipulating the phenomena (e.g., a tree limb, a grove of trees, a stream, a hillslope).
Sections 6-1, 6-2, 9-3, 15-3, 16-1, 16-3, 21-3, 23-1, 24-2, 24-3, pages 622-623, 632, 641

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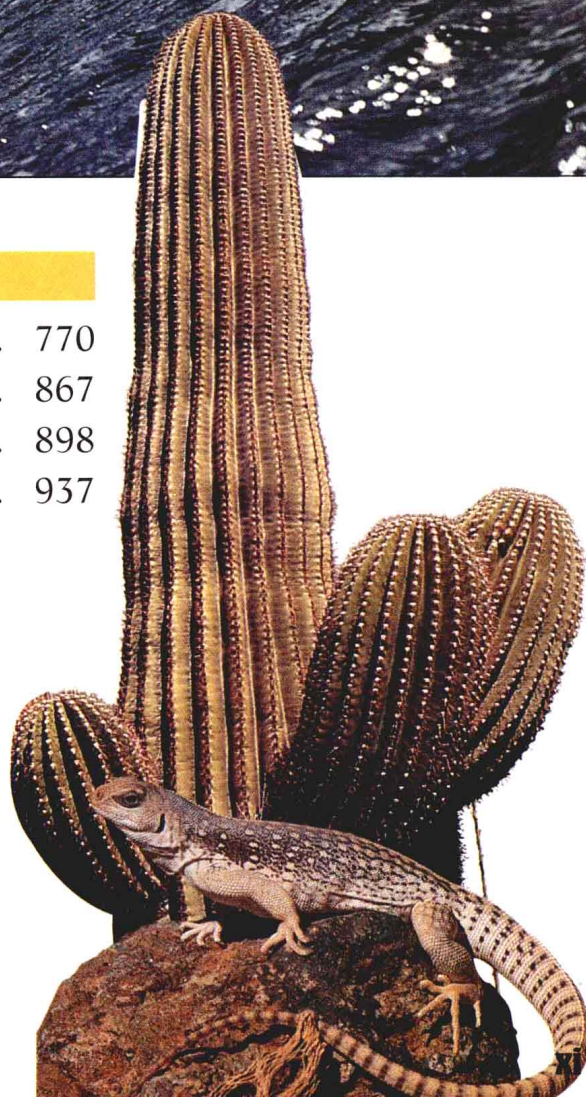
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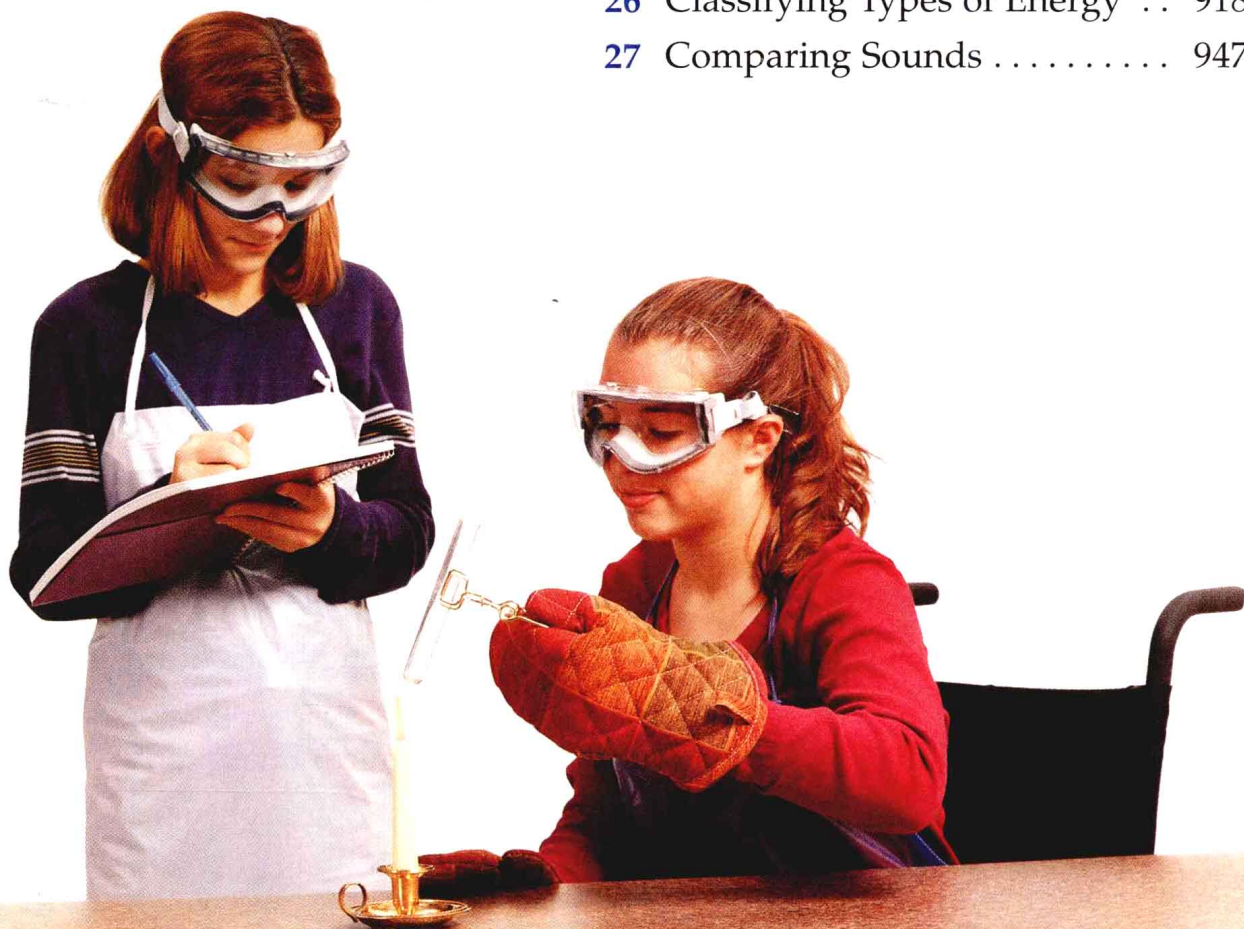
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UNIT

7

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