Macmillan/McGraw-Hill Science: A Closer Look

Grade 5

Be a Scientist Lesson 1: Science Skills
The Scientific Method Lesson 2: Science Methods

Life Science

Unit A: Diversity of Life
Unit Literature: Adventures in Eating

Chapter 1: Cells and Kingdoms
Lesson 1 Cells
Objectives:
- Identify cells as the basic units of structure and function in organisms.
- Compare and contrast the structures of animal cells and plant cells.
  - Explore: What are plants and animals made of?
  - What are cells?
  - What is inside an animal cell?
  - What is inside a plant cell?
  - How are cells organized?

Focus on Skills: Experiment

Lesson 2 Classifying Life
Objectives:
- Explain how and why living things are classified.
- Differentiate among the major groups of living things.
  - **Explore:** How can live things be classified?
  - How are organisms classified?
  - What are animals?
  - What are plants and fungi?
  - What are bacteria and protists?
  - What are viruses?

Reading in Science: Meet Angelique Corthals

Lesson 3 Plants
Objectives:
- Classify nonvascular plants and vascular plants.
- Describe the structure andfunction of roots, stems, and leaves.
  - Explore: How is water transported in vascular plants?
  - How are plants classified?
  - What are roots?
  - What are stems?
  - What are leaves?
  - How are photosynthesis and respiration related?

Writing in Science - Explanatory: Saving Water the Yucca Plant Way
Math in Science - Calculating Surface Area: Leave it Be

Lesson 4 Classifying Animals

Objectives:

- Identify animals using a classification key.
- Summarize six major groups of invertebrates and five major groups of vertebrates.
  - Explore: How do you classify animals?
  - What are simple invertebrates?
  - What are complex invertebrates?
  - What are vertebrates?
  - What are mammals?

Writing in Science - Descriptive: The underground life of mole rats

Math in Science - Line symmetry: Animal Symmetry

Lesson 5 Animal Systems

Objectives:

- Summarize the functions of animal systems.
- Describe how two or more animal systems work together.
  - Explore: How does a muscle work?
  - What are the skeletal and muscular systems?
  - What are the digestive and excretory systems?
  - What are the circulatory and respiratory systems?
  - What are the nervous and endocrine systems?

Inquiry Investigation: When does your heart work the hardest?

Chapter Review

Chapter 2: Parents and Offspring

Lesson 1 Reproduction

Objectives:

- Compare and contrast asexual and sexual reproduction.
- Summarize how traits are passed from parent to offspring.
  - Explore: Can flowering plants grow without seeds?
  - What are sexual and asexual reproduction?
  - How do organisms reproduce asexually?
  - How do sexual and asexual reproduction compare?

Writing in Science - Explanatory: How do sea stars regenerate?

Math in Science - Line Graph: It is all part growing?

Lesson 2 Plant Life Cycles

Objectives:

- Compare and contrast different plant life cycles.
- Summarize pollination and fertilization in flowering plants.
  - Explore: How do flowering plants reproduce?
  - What are seedless plant life cycles?
  - What are the parts of a flower?
  - What is the angiosperm life cycle?
  - What is in a seed?
  - What is the conifer life cycle?

Focus on Skills: Observe

Lesson 3 Animal Life Cycles

Objectives:

- Compare and contrast incomplete and complete metamorphosis.
- Compare and contrast internal fertilization and external fertilization.
  - Explore: What are the stages of an animal's life cycle?
  - What are animal life cycles?
  - What is fertilization?
  - What happens to a fertilized egg?

Inqiry Investigation: How does light affect the lifecycle of the wax moth?

Lesson 4 Traits and Heredity

Objectives:

- Describe how inherited traits are passed from parent to offspring.
- Explain dominant and recessive traits.
  - Explore: What are some inherited human traits?
  - What is heredity?
  - How are traits inherited? (**Quick Lab**: Inherited traits in Corn)
  - How do we trace inherited traits?

Reading in Science: Genetically Modified Corn

Chapter Review

Careers: Health Care Technician/Botanist

Unit B: Ecosystems

Unit Literature: The case for clean water

Chapter 3: Interactions in Ecosystems

Lesson 1 Energy Flow in Ecosystems

Objectives:

- Describe how organisms interact in a food chain.
- Explain how food webs and energy pyramids summarize energy flow in ecosystems.
  - Explore: How do organisms in a food chain interact?
  - What is in an ecosystem?
  - How are food chains alike?
  - What are food webs made of?
  - How do energy pyramid compare?
  - How does change affect a food web?

Writing in Science - Fictional Narrative: Two Desert Creatures

Math in Science - Calculate Percents: How Much Energy is Used

Lesson 2 Relationships in Ecosystems

Objectives:

- Explain why organisms compete.
- Summarize the different kinds of symbiotic relationships between organisms.
  - Explore: What do organisms need to survive?
  - Why do organisms compete?
  - How do organisms avoid competition?
  - How do organisms benefit from interactions?
  - What are parasites?

Focus on Skills: Predict

Lesson 3 Adaptation and Survival

Objectives:

- Describe and discuss types of adaptations.
- Explain how some plants and animals are adapted to their environments.
  - Explore: How do adaptations help animals survive in their environment?
  - What is adaptation?
  - What are some plant adaptations?
  - What are some animal adaptations?
  - What is mimicry?

Reading in Science: Meet Caroline Chaboo

Chapter Review

Chapter 4: Ecosystems and Biomes

Lesson 1 Cycles in an Ecosystem

Objectives:

- Summarize the steps of the water, carbon, and nitrogen cycles.
- Explain how recycling and composting help the environment.
  - Explore: How do water drops form?
  - What is the water cycle?
  - What is the carbon cycle?
  - What is the nitrogen cycle?
  - How is matter recycled?

Inquiry Investigation: How does water move in and out of plants?

Lesson 2 Changes in Ecosystems

Objectives:

- Analyze changes in ecosystems.
- Compare natural and human-caused changes in ecosystems.
  - Explore: What happens when ecosystems change?
  - How can ecosystems change?
  - What happens when ecosystems change?
  - How do ecosystems come back?
  - What is secondary succession

Focus on Skills: Interpret Data

Lesson 3 Biomes

Objectives:

- Describe harsh climate biomes.
- Compare forest biomes and the grassland biome.
  - Explore: How are soils different?
  - What are biomes?
  - What are some harsh biomes?
  - What are some forest biomes?
  - What are grasslands?

Reading in Science: A year in a life of a forest

Lesson 4 Water Ecosystems

Objectives:

- Differentiate among plankton, nekton, and benthos.

- Compare freshwater, ocean, and estuary ecosystems.
  - Explore: How does the ocean get salty?
  - What are water ecosystems?
  - What are freshwater ecosystems?
  - What are ocean ecosystems?
  - Where do salt and freshwater meet?

Writing in Science - Persuasive: Keep our water clean
Math in Science - Percents and Fractions: Understanding Earth's Water

Chapter Review
Careers: Gardener/Plant Ecologist

Earth Science

Unit C: Earth and Its Resources

Unit Literature: The Many Sides of Diamonds

Chapter 5: Our Dynamic Earth

Lesson 1 Earth's Landforms

Objectives:

- Classify Earth's physical features.
- Describe Earth's layers.
  - Explore: What are Earth's Features?
  - What are landforms?
  - What are the features of the ocean floor?
  - How do we map Earth's features?
  - What are Earth's layers?

Focus on Skills: Make a Model

Lesson 2 Plate Tectonics

Objectives:

- Discuss how plate tectonics explains continental drift.
- Identify the forces that produce different kinds of mountains.
  - Explore: How does a mountain range form?
  - Is Earth's crust moving?
  - How does the movement of Earth's crust affect the ocean?
  - How does the movement of Earth's plates affect the land?

Writing in Science - Expository: Pangaea and other supericontinents
Math in Science - Estimate area: Estimate the area of a continent

Lesson 3 Volcanoes

Objectives:

- Define an eruption.
- Describe how volcanoes build land.
  - Explore: How can you measure the slope of a volcano?
  - Where are volcanoes found?
  - How do volcanoes build land?
  - How do volcanoes build islands?/LR

Inquiry Investigation: How do volcanoes form islands?

Lesson 4 Earthquakes

Objectives:

- Discuss the causes of earthquakes.
- Describe how earthquakes are detected.
  - Explore: How does the ground move during an earthquake?
  - What is an earthquake?
  - What waves are produced in an earthquake?
  - How are earthquakes measured?
  - How can people prepare?

Writing in Science - Expository: How earthquakes help predict volcanic eruptions
Math in Science – Multiplying decimals: Using the Richter Scale

Lesson 5 Shaping the Crust

Objectives:

- Describe weathering.
- Discuss the relationship between erosion and deposition.
  - Explore: How does ice break up rocks?
  - What is weathering?
  - What is erosion?
  - How do erosion and deposition work together?
  - How are shorelines changed?
  - How do can shorelines be protected?

Reading in Science: Wrestling with the Big Muddy
Chapter Review

Chapter 6: Protecting Earth's Resources

Lesson 1 Minerals and Rocks

Objectives:

- Define and identify minerals.
- Discuss the types of rocks and how they form.
  - Explore: What are properties of minerals?
  - What are minerals?
  - What are the shapes of a mineral?
  - What is the rock cycle?
  - What are igneous and sedimentary rocks?
  - What are metamorphic rocks?

Focus on Skills: Classify

Lesson 2 Soil

Objectives:

- Describe the formation and uses of soil.
- Identify methods of soil conservation.
  - Explore: What is in soil?
  - What is soil?
  - How is soil used?
  - How is soil conserved?

Inquiry Investigaiton: Which soil is better for plant growth?

Lesson 3 Fossils and Energy

Objectives:

- Identify and compare types of fossils.
- Discuss renewable and nonrenewable energy resources, including fossil fuels.
  - Explore: How can wind move Objectivesects?
  - What are fossils?
  - How old are fossil fuels?
  - How are fossil fuels used?
  - How can the Sun, wind and water provide us with energy?
  - What are other sources of alternative energy?
  - How can we conserve energy?

Writing in Science - Descriptive: So you want to be a fossil hunter?
Math in Science - Converting Units

Lesson 4 Air and Water

Objectives:

- Explain why air and water are resources.
- Describe important ideas about the pollution and conservation of air and water.
  - Explore: How much fresh water do you use?
  - What are sources of fresh water?
  - How do we use water?
  - How do we clean and save water?
  - How do we use and pollute the air?
  - How do we clean up the air?

Reading in Science - Getting the Salt Out
Chapter Review
Careers: Oil Rig Driller/Cartographer

Unit D: Weather and Space

Unit Literature: Strong Storms

Chapter 7: Weather Patterns

Lesson 1 The Atmosphere and Weather

Objectives:

- Summarize how the Sun warms Earth.
- Explain how global and local winds form.
  - Explore: How does the angle of sunlight affect temperature?
  - How does the Sun warm Earth?
  - What is the atmosphere?
  - What variables can change air pressure?
  - What are global winds?
  - What causes local winds?
  - How do we measure air pressure and wind?

Inquiry Skill Builder: Communicate

Lesson 2 Clouds and Precipitation

Objectives:

- Explain how clouds and precipitation form.
- Summarize how air masses and fronts affect the weather.
  - Explore: How much rain falls in your community?

- How do clouds form?
- What is precipitation?
- What are air masses and fronts?
- What are Highs and Lows?
- What do weather maps tell you?

Inquiry Investigation: How can you tell that water vapor is in the air?

Lesson 3 Severe Storms

Objectives:

- Summarize the different kinds of severe storms.
- Explain how severe storms form.
  - Explore: What happens when air masses of different temperatures meet?
  - What are thunderstorms
  - What are winter storms?
  - What are tornadoes?
  - What are hurricanes?
  - How do we predict and track storms?

Writing in Science - Personal Narrative: living through a mudslide
Math in Science - Multiply Fractions: How far away is lightning?

Lesson 4 Climate

Objectives:

- Explain what determines an area's climate.
- Summarize the factors that affect climate.
  - Explore: How does distance from an ocean affect temperature?
  - What is climate?
  - What affects climate?
  - What is El Niño?

Reading in Science: Museum mail call
Chapter Review

Chapter 8: The Universe

Lesson 1 Earth and Sun

Objectives:

- Describe the movements of Earth and the Sun.
- Explain how Earth's movements cause the seasons and day and night.
  - Explore: What keeps Earth moving around the sun?
  - How does Earth stay in orbit?
  - What is rotation? (Quick Lab: Season's and Earth's tilt)
  - What is revolution?

Focus on Skills: Use Numbers

Lesson 2 Earth and Moon

Objectives:

- Describe the features of the Moon, and identify the relative positions of the Moon, Earth, and Sun that produce each of the Moon's major phases.
- Explain how eclipses and tides occur.
  - Explore: What makes the moon seem to change shape?
  - What are the phases of the Moon?
  - What are solar and lunar eclipses?

• What are tides?

Writing in Science - Explanatory: What would happen if gravity went away?
Math in Science - Mulitply decimals: Weight on other planets?

Lesson 3 The Solar System

Objectives:

- Describe the planets and some of their major features, as well as asteroids, meteors, and comets.
- Describe how humans have explored the solar system.

• Explore: How far apart are the planets?
• How do we observe the solar system?
• What are the planets in the solar system?
• How are the planets different?
• How are the moons different?
• What are asteroids, meteors and comets?
• How do we explore the solar system?

Reading in Science: Voyager Discoveries

Lesson 4 Stars and the Universe

Objectives:

- Define a star and identify systems of stars.
- Explore the life cycle of a star, and compare the Sun with other stars.

• Explore: How does distance affect how bright a star appears?
• How do stars form?
• Do all stars have planets?
• What are constellations?
• What are galaxies?
• What is the Big Bang theory?

Inquiry Investigation: How do craters form?
Chapter Review
Careers: Weather Observer/Astronomer

Unit E: Matter

Unit Literature: Green and clean
Chapter 9: Comparing Kinds of Matter

Lesson 1 Properties of Matter

Objectives:

- Describe matter and summarize its properties.
- Measure certain properties of matter and calculate other properties, such as density.

• Explore: Which has more matter?
• How can we describe matter?
• What is density?
• What are the states of matter?

Focus on Skills: Infer

Lesson 2 Elements

Objectives:

- Explain the structure of matter, atoms, and molecules.
- Summarize how elements are grouped.

• Explore: How can you know what's "inside" matter?

- How can you spot a chemical change?
- How can you use chemical changes?

Writing in Science - Expository: the case of the mystery compounds
Math in Science - Multiplying numbers: Reacting with water

Lesson 4 Acids, Bases, and Salts

Objectives:

- Categorize substances as acids, bases, or salts.
- Understand that acids and bases neutralize each other.
  - Explore: Which are acids and which are bases?
  - What are acids and bases?
  - How can indicators identify acids and bases?
  - What are salts?

Reading in Science: Meet Christina Elson
Chapter Review
Careers: Science Lab Technician/Green Chemist

Unit F: Forces and Energy

Unit Literature: The great jump in China
Chapter 11: Using Forces

Lesson 1 Motion

Objectives:

- Comprehend the meanings of acceleration, deceleration, and negative acceleration.
- Calculate velocity and acceleration.
  - Explore: How is speed measured?
  - What is motion?
  - What is speed?
  - What is acceleration?
  - What is momentum?

Reading in Science: The Position of the Earth and Sun

Lesson 2 Forces and Motion

Objectives:

- Understand what a force is.
- Differentiate between balanced and unbalanced forces.
  - Explore: Do heavier Objectivesects fall faster?
  - What are forces?
  - What are friction and gravity?
  - What is Newton's first law?
  - What is Newton's second law?
  - What is Newton's third law?

Focus on Skills: Measure

Lesson 3 Work and Energy

Objectives:

- Define work and energy.
- Understand how work and energy are related.
  - Explore: What happens to energy?
  - What is work?

- What is energy?
- How can energy change?

Inquiry Investigation: What affects potential and kinetic energy?

Lesson 4 Simple Machines

Objectives:

- Distinguish among the six types of simple machines.
- Analyze how simple machines affect force and work.
  - Explore: What makes work easier?
  - What are simple machines?
  - What are levers?
  - What other machines are like levers?
  - What are inclined planes?
  - What are compound machines?

Writing in science - Explanatory: A humane mousetrap
Math in Science - Order of Operations: Measuring Mechanical Advantage
Chapter Review

Chapter 12: Using Energy

Lesson 1 Heat

Objectives:

- Distinguish between heat and temperature.
- Differentiate between conduction, convection, and radiation.
  - Explore: Which can give you more heat?
  - What is heat?
  - How does heat travel?
  - What is thermal conductivity
  - When is heat waste?

Focus on Skills: Form a Hypothesis

Lesson 2 Sound

Objectives:

- Describe how sound is produced and transmitted.
- Differentiate between frequency, amplitude, pitch, and volume.
  - Explore: What makes sound?
  - How is sound produced?
  - How does sound travel?
  - What is pitch?
  - What is volume?
  - What is echolocation?

Inquiry Inverstigation: How can you change sound?

Lesson 3 Light

Objectives:

- Comprehend the nature of light.
- Recognize that light can be reflected or bent.
  - Explore: What path does light follow?
  - What is light?
  - How does light make shadow?

- How does light bounce and bend?
- Why do we see colors?
- Is all light visible?

Writing in science - Expository: How we use lasers
Math in science - Bar graph: graphing wavelengths of light

Lesson 4 Electricity

Objectives:

- Differentiate between current and static electricity.
- Describe the characteristics of electric current and electric circuits.
  - Explore: Which bulb does each switch control?
  - What is static electricity?
  - How can electricity flow?
  - What kinds of circuits are there?
  - How can you use electricity safely

Reading in Science: Building a better battery

Lesson 5 Magnetism

Objectives:

- Explain the operation of an electromagnet.
- Describe how a generator uses a magnetic field to make alternating current.
  - Explore: How do magnets apply forces
  - What is magnetism?
  - What are electromagnets?
  - How can magnets produce electricity?
  - What is magnetic levitation?

Inquiry Incvestigation: How are electric current and electromagnets related?
Chapter Review
Careers: Auto Mechanic/Mechanical Engineer