

Macmillan/McGraw-Hill Science: A Closer Look

Grade 4

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

Life Science

UNIT A - LIVING THINGS

Unit Opener

Unit Literature Dragons of the Sea (Ranger Rick)

CHAPTER 1 - KINGDOMS OF LIFE

Lesson 1 – Cells (10 pp)

OBJECTIVE:

- Identify five functions of living things
- Compare plant and animal cells
 - Explore Activity What are living things are made of?
 - What are living things?
 - How do plant and animal cells compare?
 - How are cells grouped?
 - How can you see cells?

Focus on Skills: Observe

Lesson 2 – Classifying Living Things (10 pp)

OBJECTIVE:

- Define, list, and compare the kingdoms of living things
- Describe and compare different types of microorganisms
 - Explore Activity How are organisms classified?
 - How are living things classified?
 - How can organisms be grouped within a kingdom?
 - What kinds of organisms have only one cell?
 - How are organisms named?

Reading in Science: Red Tide: A Bad Bloom at the Beach (STS)

Lesson 3 – The Plant Kingdom (12 pp)

OBJECTIVE:

- Describe the function of a plant's roots, stems, and leaves
- Explain the processes of photosynthesis and respiration
 - Explore Activity How are leaves different from each other?
 - How do we classify plants?
 - How do plants get what they need?
 - Why are leaves important?
 - What are mosses and ferns?
 - How do we use plants? /Review

Inquiry Investigation How do root hairs help plants take up water?

Lesson 4 – How Seed Plants Reproduce (12 pp)

OBJECTIVE:

- Describe pollination in flowering plants
- Describe the life cycle of a flowering plant
 - Explore Activity Does a seed need water to grow?
 - How do we classify seed plants?
 - How do seeds form?
 - How do seeds grow?
 - How are plants alike and different from their parents?
 - What are other ways plants can reproduce? /Lesson Review

Writing in Science: Dandelions and Me

Math in Science: Parts of a Whole

Chapter 1 Review

CHAPTER 2 – THE ANIMAL KINGDOM

Lesson 1 - Animals without Backbones

OBJECTIVE:

- Define animal and list the basic needs and characteristics of animals
- Summarize the characteristics of groups of invertebrates
 - Explore Activity: What makes an earthworm an animal?
 - What are invertebrates?
 - What are some invertebrates?
 - What are arthropods?
 - How are worms classified? / Review

Focus on Skills: Classify

Lesson 2 – Animals with Backbones

OBJECTIVE

- Define vertebrates and describe their characteristics
- Describe the seven groups of vertebrates
 - Explore Activity: What does a backbone do?
 - What are vertebrates?
 - What are some other vertebrate groups?
 - What are mammals?

Writing in Science: Gentle Giants

Math in Science: Protecting Animals

Lesson 3 – Systems in Animals

OBJECTIVE:

- Identify the seven organ systems of animals
- Summarize the parts and functions of the seven organ systems
 - Explore Activity: How does an earthworm respond to light?
 - How do animals move and sense changes?
 - How do air and blood travel in the body?
 - How is food broken down? /Review

Inquiry Investigation: How do animals with webbed feet move?

Lesson 4 – Animal Life Cycles

OBJECTIVE:

- Compare incomplete metamorphosis and complete metamorphosis
- Summarize how traits are passed from parent to offspring
 - Explore Activity: How does a caterpillar change as it grows?
 - What are the stages of an animal’s life?
 - What is metamorphosis?
 - How do animals reproduce?
 - What is inherited?

Reading in Science: Meet Christopher Raxworthy

Chapter Review

Careers: Bird handler/Zoologist

UNIT B ECOSYSTEMS

Unit Opener

Unit Literature: Sea Otters: Key to the Kelp Forest

CHAPTER 3 EXPLORING ECOSYSTEMS

Lesson 1 - Introduction to Ecosystems

OBJECTIVE:

- Identify abiotic and biotic factors in an ecosystem
- Describe how ecosystems differ from each other
 - Explore Activity: What can you find in an environment?
 - What is an ecosystem?
 - What are populations and communities?

Focus on Skills: Predict

Lesson 2 – Biomes

OBJECTIVE:

- Define a biome
- Describe Earth’s six main biomes
 - Explore Activity: How much sunlight reaches a forest floor?
 - What is a biome?
 - What are grasslands and forests?
 - What are deserts, taiga, and tundra?
 - Are there water biomes?

Reading in Science: Mail Call

Lesson 3 – Relationships in Ecosystems

OBJECTIVE:

- Explain how energy is cycled through an ecosystem
- Describe food webs and give examples of predator and prey relationships
 - Explore Activity: How much energy do living things use?
 - How do organisms depend on one another?
 - What is a food chain?
 - What is a food web?
 - What is an energy pyramid?

Writing in Science: The Moth That Needed the Tree

Math in Science: How Many Monarchs?

Chapter Review

CHAPTER 4 – SURVIVING IN ECOSYSTEMS

Lesson 1 – Animal Adaptations

OBJECTIVE:

- Define adaptations and give examples of how adaptations help animals survive in their habitats
- Define and describe the types of symbiotic relationships
 - Explore Activity: Does the shape of a bird’s beak affect what it eats?
 - What helps animals survive in their environments?
 - How can animals survive in different environments?
 - How else do animals survive? / Review

Focus on Skills: Form a Hypothesis

Lesson 2 – Plants Respond to Their Surroundings

OBJECTIVE:

- Describe ways in which plants respond to their environments
- Describe plant adaptations
 - Explore Activity: How do plants respond to their environments?
 - How do plants respond to their environments?
 - What are some plant adaptations?

Writing in Science: A Field of Sun

Math in Science: Plants Respond to the Environment

Lesson 3 – Changes in Ecosystems

OBJECTIVE:

- Describe how abiotic and biotic factors cause ecosystems to change
- Describe the effects ecosystem changes have on living organisms
 - Explore Activity: How can a change to an ecosystem affect living things?
 - What causes an ecosystem to change?
 - How do people change ecosystems?
 - What happens when ecosystems change?
 - How can people prevent extinction?

Reading in Science: Mail Call Succession in burnt chaparral

Chapter Review

Careers: Scientific Photographer/ Forester

Earth Science

UNIT C EARTH AND ITS RESOURCES

Unit Opener

Unit Literature: Lichen: Life on the Rocks

CHAPTER 5 SHAPING EARTH

Lesson 1 – Earth

OBJECTIVE:

- Identify Earth’s landforms and the features of the ocean floor
- Describe the layers of Earth
 - Explore Activity: What shapes can the land take?
 - What does Earth’s land look like?
 - What does it look like where water meets land?

- What is below Earth's surface?

Focus on Skills: Experiment

Lesson 2 – The Moving Crust

OBJECTIVE:

- Describe how plate motions build mountains and cause earthquakes and volcanoes
- Explain how scientists use seismic waves to study earthquakes
 - Explore Activity: How can Earth's crust change shape?
 - What distorts Earth's crust?
 - What causes earthquakes?
 - How do scientists study earthquakes?
 - What is a volcano?

Reading In Science: Meet Ro Kinzler

Lesson 3 – Weathering and Erosion

OBJECTIVE:

- Define and give examples of physical and chemical weathering
- Explain how erosion helps break down and build up Earth's land
 - Explore Activity: How can rain shape the land?
 - What is weathering?
 - What is erosion?
 - How do glaciers shape the land?
 - How do people shape the land?

Writing in Science: Land over Time

Math in Science: Disappearing mountains

Lesson 4 – Changes caused by the Weather

OBJECTIVE:

- Describe the effects of floods, fires, tornadoes, and hurricanes
- Explain the causes and effects of mass wasting, landslides, and avalanches
 - Explore Activity: How does steepness of slope affect the movement of Earth's materials?
 - How do floods and fire change the land?
 - How do storms change the land?
 - How do landslides change the land?

Inquiry Investigation: What happens to the environment when a river floods?

Chapter Review

CHAPTER 6 - SAVING EARTH'S RESOURCES

Lesson 1 – Minerals and Rocks

OBJECTIVE:

- Describe the properties used to identify and classify minerals
- Compare the three types of rocks
 - Explore Activity: What makes rocks different from each other?
 - What is a mineral?
 - What are igneous and sedimentary rocks?
 - What are metamorphic rocks?

- How do we use rocks?

Focus on Skills: Communicate

Lesson 2 – Soil

OBJECTIVE:

- Describe the different layers of soil and how they form
- Define the texture, porosity, and permeability of soil
 - Explore Activity: What is soil made of?
 - What is soil made of?
 - What are some properties of soil?
 - Why is soil type important?

Inquiry Investigation: How quickly do minerals wash through different kinds of soil?

Lesson 3 –Resources from the Past

OBJECTIVE:

- Describe the different kinds of fossils, the ways they form, and how they provide evidence of Earth's past
- Explain why fossil fuels are a valuable and nonrenewable resource
 - Explore Activity: What can you learn from footprints?
 - How do fossils form?
 - How do we study fossils?
 - What are fossil fuels?
 - What can we use instead of fossil fuels?

Inquiry Investigation: How do scientists know how a dinosaur lived?

Lesson 4 – Water

OBJECTIVE:

- Explain how the water cycle renews Earth's fresh water
- Describe the ways people use and obtain fresh water
 - Explore Activity: Does water flow faster through soil or gravel?
 - Where is Earth's water found?
 - How is fresh water supplied?
 - How do we use water?

Writing in Science: Saving Water

Math in Science: How Much Water Do You Use?

Lesson 5 – Pollution and Conservation

OBJECTIVE:

- Identify pollution as a drawback to many human activities
- Describe ways in which people reduce pollution and conserve resources
 - Explore Activity: How can you clean an oil spill?
 - What is pollution?
 - How can we protect soil and water?
 - What are the 3Rs?

Reading in Science: Saving Soil

Chapter Review

Careers: Survey technician/Geologist

UNIT D WEATHER AND SPACE

Unit Opener

Unit Literature: Tornado Tears Through Midwest

Chapter 7 – WEATHER AND CLIMATE

Lesson 1 – Air and Weather

OBJECTIVE:

- Define the atmosphere as a mixture of different gases
- Describe four properties of weather that can be measured and the tools used to measure them
 - Explore Activity: How does the wind move?
 - What is in the air?
 - What are some properties of weather?
 - How can you measure weather? / Review

Writing in Science: Spring Forecast

Math in Science: Measuring Weather Changes

Lesson 2 – The Water Cycle

OBJECTIVE:

- Sequence the steps of the water cycle
- Identify and describe types of clouds and precipitation
 - Explore Activity: How does water change from a liquid to a gas?
 - How does water change between a liquid and a gas?
 - Where does water go?
 - What are some types of clouds?
 - What are other forms of precipitation?

Focus on Skills: Make a model

Lesson 3 –Tracking the Weather

OBJECTIVE:

- Explain how air masses form and identify the types of weather caused by air masses
- Forecast the weather by interpreting data on a weather map
 - Explore Activity: How do raindrops form?
 - What are air masses and fronts?
 - What does a weather map show?
 - What are the clues of severe weather? / Review

Reading in Science: Hurricane Season (STS)

Lesson 4 – Climate

OBJECTIVE:

- Define and give examples of climate
- Explain the main factors that determine the climate of a region
 - Explore Activity: What affects weather patterns?
 - What is climate?
 - What determines climate?
 - How do mountains affect climate? / Review

Inquiry Investigation:

Chapter Review

CHAPTER 8 THE SOLAR SYSTEM AND BEYOND

Lesson 1 - Earth and Sun

OBJECTIVE:

- Explain the main factors that determine the climate of a region
- Explain how Earth's revolution and its tilted axis cause the seasons
 - Explore Activity: What causes day and night?
 - What causes day and night?
 - What causes the seasons?
 - How does the sun's path appear to change over the seasons?

Writing in Science: Without the Sun

Math in Science: The Sun's Light

Lesson 2 - Earth and Moon

OBJECTIVE:

- Explain why the Moon is covered with craters
- Explain what causes the Moon's phases, solar eclipses, and lunar eclipses
 - Explore Activity: What affects the size of craters on the Moon?
 - What is the Moon like?
 - What are the phases of the Moon?
 - What is a lunar eclipse?

Focus on Skills: Interpret data

Lesson 3 - The Solar System

OBJECTIVE:

- Define and describe the solar system
- Discuss the properties of the inner planets and the outer planets
 - Explore Activity: How do sizes of objects in the solar system compare?
 - What is the solar system?
 - How do we learn about the solar system?
 - What are the inner planets?
 - What are the outer planets?
 - What else in the solar system?

Reading in Science: To the Moon!

Lesson 4 Stars and Constellations

OBJECTIVE:

- Discuss stars, including their composition, appearance, and distance from Earth
- Discuss the characteristics of the Sun and its importance to life on Earth
 - Explore Activity: Why do some stars seem brighter than others?
 - What are stars?
 - What are constellations?
 - What is the sun like?

Inquiry Investigation: What is a Constellation?

Chapter Review

Careers: Planetarium technician/Air traffic controller

Physical Science

UNIT E - MATTER

Unit Opener

Unit Literature: Mr. Mix-It

CHAPTER 9 PROPERTIES OF MATTER

Lesson 1 – Describing Matter

OBJECTIVE:

- Define and describe the three states of matter
- Compare and contrast the properties of matter
 - Explore Activity: How can you tell if something is a solid or a liquid?
 - What is matter?
 - What are the states of matter?
 - What happens to the matter we use?

Writing in Science: Juggling Matter

Math in Science: Calculating Volume

Lesson 2 – Measurement

OBJECTIVE:

- Describe some properties of matter that can be measured
- Measure properties of matter using correct units
 - Explore Activity: How can you compare matter?
 - How do we measure matter?
 - What is density?
 - What is weight?

Inquiry Skill Builder: Measure

Lesson 3 – Classifying Matter

OBJECTIVE:

- Explore how to classify matter
- Explain how elements are organized in the periodic table
 - Explore Activity: How can you identify a metal?
 - What are elements?
 - How are elements organized?
 - How do scientists use the periodic table?

Reading in Science: Meet Sisir Mondal

Chapter Review

CHAPTER 10 - MATTER AND ITS CHANGES

Lesson 1 – How matter can change

OBJECTIVE:

- Comprehend that a change of state is a physical change
- Differentiate between physical and chemical change
 - Explore Activity: Can you change the properties of a solid?
 - What are physical changes?
 - How does matter change state?
 - What are chemical changes?
 - How do physical and chemical changes compare?

Reading in Science: Lady Liberty

Lesson 2 – Mixtures**OBJECTIVE:**

- Explain that mixtures are combinations of matter
- Predict ways to separate mixtures
 - Explore Activity: How do solids and water mix?
 - What is a mixture?
 - How can you separate the parts of a mixture?
 - How can you separate the parts of a solution?

Focus on Skills: Use variables

Lesson 3 – Compounds**OBJECTIVE:**

- Identify compounds as two or more elements chemically combined
- Differentiate between acids and bases
 - Explore Activity: How does iron react with air and moisture?
 - What are compounds?
 - What are acids and bases?

Inquiry Investigation: Oxidation of an apple

Chapter Review

Careers: Pharmacy technician/Pharmaceutical researcher

UNIT F - FORCES AND ENERGY**Unit Opener**

Unit Literature: Magnetic Migration

CHAPTER 11 - FORCES**Lesson 1 - Motion and Forces****OBJECTIVE:**

- Explain how motion, speed, velocity, and acceleration are related
- Summarize the forces that act on a moving object, including friction and gravity
 - Explore Activity: How fast does it move?
 - What is motion?
 - What are acceleration and forces?
 - What is gravity?

Focus on Skills: Use Numbers

Lesson 2 - Changing Motion**OBJECTIVE:**

- Demonstrate a basic understanding of how forces affect motion
- Explain how friction affects motion
 - Explore Activity: How do forces change motion? -Why do things move?
 - What happens when you change the force?
 - How does friction affect motion? / Review

Writing in Science: Wheels in Motion

Math in Science: Measure The Force of Friction

Lesson 3 – Work and Energy

OBJECTIVE:

- Compare work and energy
- Explain how energy changes from one form to another
 - Explore Activity: How are position and force related?
 - What is work?
 - What are forms of energy?
 - How can energy change? /Review

Reading in Science: Hybrid Power

Lesson 4 – Simple Machines

OBJECTIVE:

- Summarize how the different kinds of simple machines make work easier
- Explain how simple machines work together to make compound machines
 - Explore Activity: How do pulleys reduce force?
 - What are simple machines?
 - What are pulleys and wheels and axles?
 - What are inclined planes?
 - How do simple machines work together?

Inquiry Investigation: How do ramps make it easier to move objects?

Chapter Review

CHAPTER 12 - ENERGY

Lesson 1– Heat

OBJECTIVE:

- Explain that heat flows from warmer materials to cooler materials
- Describe and define conduction, convection, and radiation
 - Explore Activity: What keeps mammals warm in places with little heat?
 - What is heat?
 - How does heat travel?
 - How does heat affect matter?

Focus on Skills: Infer

Lesson 2 – Sound

OBJECTIVE:

- Explain how sound is produced and how it travels through a medium
- Identify the characteristics of sound, including frequency, pitch, volume, and echoes
 - Explore Activity: How can strings make music?
 - What makes sound?
 - Where does sound go?
 - How do sounds differ?
 - How do we use sound?

Writing in Science: A Voice in the Well

Math in Science: Hearing Echoes

Lesson 3 – Light

OBJECTIVE:

- Demonstrate that light travels in a straight line
- Describe ways light can be absorbed, reflected, or refracted by objects
 - Explore Activity: What makes white light?
 - What is light?
 - What is refraction?
 - How do mirrors work?
 - What can light pass through?

Inquiry Investigation: What happens to light when it is reflected?

Lesson 4 – Electricity

OBJECTIVE:

- Describe the characteristics of electrically charged objects
- Explain the difference between static and current electricity
 - Explore Activity: How do rubbed balloons interact?
 - What is static electricity?
 - What is current electricity?
 - What are two kinds of circuits?
 - How do you use electricity safely?

Inquiry Investigation: Compare strength of static electricity from wool and paper.

Lesson 5 – Magnetism and Electricity

OBJECTIVE:

- Describe a magnetic field and the effect of distance on magnetic force
- Recognize how an electromagnet, electric motor, and generator work
 - Explore Activity: How do magnets interact?
 - What is a magnet?
 - What are magnetic fields?
 - What is an electromagnet?
 - How is electricity produced?
 - How does electricity reach your home?

Reading In Science: Motors at work

Chapter Review

Careers: Electrician/Electrical engineer (feature alternative energy)