SCIENCE

1st Grade

Sample Lesson

CHRISTIAN SCHOOLS INTERNATIONAL

Science 1

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CHRISTIAN SCHOOLS
INTERNATIONAL

CSI Science Perspective Statement

The CSI science program centers on the acknowledgment that the world in which we live belongs to God, who created and upholds it. Through scientific inquiry we can perceive a degree of the amazing complexity and orderliness of God's world. With this fuller understanding of creation comes a deepened awareness of the goodness and power of its Creator.

When we study creation, we learn not only about God but also about ourselves. We are a part of God's creation—a very special part. God designed a perfect harmony of relationships among humans, animals, plants, and nonliving things, but our fall into sin disrupted this unity and balance. As God's redeemed people through Christ's renewing power, we have been entrusted with bringing restoration and reconciliation to God's good creation.

God has put his world under our control and made us its caretakers. Caring for God's creation is a task with great responsibility that cannot be taken up lightly or in ignorance. Science is an essential tool for us to use in learning about the natural laws God has established so that we can care for the world wisely.

We live in an age in which scientific knowledge has increased at an explosive rate, and the use of that knowledge changes our lives daily. Some people believe that we can gain complete knowledge of—and mastery over—the world through science. Medical researchers have nearly eradicated some diseases, specialists have developed laser instruments that have revolutionized surgery, astronomers using sophisticated space probes have solved many mysteries of the universe, computer scientists have created machines that seemingly border on human intelligence. The possibilities of science seem endless.

Because science is a human activity, however, the knowledge that it can help us gain is limited. Secular culture tends to reduce the world to the human realm and therefore widely considers scientific inquiry or human reason as the path to all knowledge. But for Christians, ultimate truth is found only in God. Science is one avenue—an important one to be sure, but still only one—toward gaining an understanding of God's creation.

Science and the Bible

The relationship between science and the Bible has long been an emotionally charged issue. Sometimes non-Christians treat scientific theories as fact and use them to exclude God from scientific inquiry. This practice has led many Christians to believe that science and Christianity are antithetical.

In science textbooks, encyclopedias, library books, and magazines, students often encounter beliefs that do not acknowledge God, such as theories that explain the origin of the universe as a chance occurrence. It is important for students in a Christian school to realize that these kinds of beliefs spring from a worldview that does not include God. That such beliefs exist, however, does not make science itself incompatible with Christianity.

For us as Christians, all science should be conducted within a larger framework, or worldview, based on faith. The Bible is the divinely inspired record of God's redemptive work on behalf of his people; it contains all that is necessary for bringing us to salvation and instructing us about how to live. As the infallible Word of God, it is the only book that has the status of divine authority.

We learn about God through the direct revelation of his Word. We can also learn about God through the general revelation of his creation. As defined by theologian Louis Berkhof, general revelation is the way that "God speaks to man in his entire creation in the forces and powers of nature, in the voice of conscience, and in the providential government of the world in general and of the lives of individuals in particular." As Berkhof also notes, however, general revelation has limitations as a result of the Fall.

The study of science is one method of learning about God as he reveals himself in creation. Science is important for studying direct causes and finite relations in the material world. It can explain how events occur, but it cannot explain why. For this reason, it is vital that scientific study be conducted in the light of biblical revelation; the Bible sets the facts obtained through scientific study in the correct context of ultimate causes and infinite relations. The Bible and science are complementary, together helping us understand God's plan and purpose for creation.

The CSI science program is designed to be used in a school that includes both devotions and Bible study on a daily basis. Throughout the series, students are encouraged to examine a biblical perspective and to discuss Christian responses to issues in science.

Stewardship

One such issue is our responsibility as stewards of creation. In recent years an increasing number of people have begun to recognize the wisdom of caring for the Earth. Conserving the Earth's resources protects our own health, maintains the natural beauty of our environment, and preserves the Earth for future generations. In addition to these worthy goals, Christians have a more fundamental motivation for protecting the environment, a motivation that lies in our very reason for being.

As human beings created in the image of God, we have a unique position in creation. We are part of nature, yet because of our special relationship with God, we are also above it, sharing in God's dominion over all living things. When God placed Adam and Eve in the Garden of Eden, he commanded them to work the land and take care of it. The use and care of the Earth has been entrusted to us. It is our privilege and responsibility as God's stewards to serve and protect the rest of creation and, in so doing, to glorify the Creator.

We have failed in carrying out the cultural mandate fully because of the fall into sin, but Christ's redeeming grace enables us to continue doing God's work in the world. As Christ's representatives, we must work toward bringing God's peace to all life on the Earth.

Stewardship of the Earth is not a grim, joyless assignment forced upon reluctant Christians. It is rather a task motivated, at least in part, by an awe and appreciation of the extraordinary wonders of the world God created. The fall has affected the world, but it has not completely obscured the matchless handiwork of the Creator. We see evidences of God's

creative genius in massive geological formations, in the intricate relationships of parts within an atom, in old-growth forests, and in the variety and complexity of the creatures that inhabit the land, air, and ocean. We also observe God's providential care for his creation in the cycle of the seasons, in human and animal reproduction, in the provision of foods for nutrition, and in our own with the ability to make positive changes in our environment.

The CSI science series matches a sense of awe at the unity and diversity of creation with an awareness of the delicate balance of interrelationships among its parts and of our responsibility for its welfare. Students are led to examine their own lifestyles and become conscious of the impact that their daily actions have on the myriad forms of life in God's creation. They are encouraged to use their unique abilities as a means to honor and obey God, to serve other humans, and to sustain God's remarkable gift of the Earth and its resources.

Science and Technology

Another issue in science that demands a Christian response is the application of science in technology. The vast influence and rapid growth of technology has largely shaped our society, institutions, and way of life. Thus, it is essential that today's students have the knowledge and skills to enable them to participate as informed and trustworthy stewards of an increasingly technologized world.

A science curriculum should help students understand how science, technology, and society influence one another. Science is concerned with understanding the way the world works, while technology uses science to change the way the world works, usually in order to meet a societal need or desire. Unfortunately, many technological devices that meet human needs are destructive in other ways. As a result, we now find ourselves in a world of dwindling resources and environmental hazards.

But the very technology that can be so destructive may also provide the means to end such damage. The challenge lies with tomorrow's adults to develop the kind of technology that will preserve the Earth rather than threaten it.

CSI's science program seeks to foster a questioning attitude in students by presenting both the successes and failures of human beings in using technology. In this way, students are led to both appreciate the value of science and technology in society and to understand their limitations.

Concepts and Content

The world is a place of constant surprise and wonder. Learning about God's world prompts amazement and awe of the One who created and upholds the world.

The CSI science series uses student's natural inquisitiveness and joy of discovery as the basis for further investigation into the beauty, order, intricacy, and variety of God's world. Written from the perspective of "let's find out" about God's world, this curriculum gives structure to their exploration, building on their natural curiosity and eagerness to investigate by initiating activities and discussions that relate directly to their world. The lessons are student-centered and active, encouraging students to make their own hypotheses and devise ways to test them. Science becomes a cooperative activity, with the teacher often guiding—rather than dictating—the exploration of the students.

Rather than the teacher explaining a concept and then illustrating it with activities, the concepts develop from the students' own concrete experiences. This inductive approach to learning not only makes science more interesting for the students, but also makes it relevant to their lives. With the teacher's guidance, students become creative problem solvers who are able to imagine possibilities and implications, to use a variety of resources and observation skills, to gather information, to form and articulate ideas, and to make responsible decisions.

The Christian Classroom

At the heart of any study taking place in the Christian school classroom is the Bible. CSI's science program is steeped in a profound biblical perspective that leads students to see God's hand in everything around them. The program materials are filled with interest-provoking pictures, projects, and hands-on activities that serve as a basis for scientific concepts and relate them to everyday life. These concrete, creative learning experiences based on God's Word will enrich students' knowledge of creation, affirm their faith in the Creator, and enable them to use science to the glory of God.

Using the CSI Science Curriculum

CSI's science curriculum, 2nd edition, is a hands-on program that encourages students to become actively involved in scientific discovery. The curriculum is designed to give teachers as much flexibility as possible. Most units are independent, so they can be used in whatever order is most convenient for teachers, students, and cross-curricular activities planning. Teachers can choose lessons based on the interests of students, the time and materials available, each school's overall science program.

Most lessons can be taught in a single class period, but many contain enough optional and cross-curricular activities to provide a week's worth of lesson material.

This curriculum provides a comprehensive framework for teaching science. It is not meant, however, to prescribe every step of each lesson. Teachers are encouraged to use the built-in flexibility to shape the curriculum to best fit your school's overall goals and objectives, your individual teaching style, and your students' needs and abilities.

Teacher Guide

Unit Openers

- The *Unit Overview* allows you to see at a glance all the lessons contained in each unit.
- The *Unit Background* provides Christian perspective or brief scientific background for each unit.
- *Unit Resources* provide you with science resource books and audiovisual materials both for you and for the students.
- *Bulletin Board Ideas* and *Center Ideas* suggest ways to reinforce the unit's topic.

Lessons

- *Student Objectives* for each lesson tell you that lesson's aims for student learning. These objectives are specific, measurable goals that will enable you to check the progress of your students.
- *Structuring the Curriculum* helps are placed in some lessons to help you with lesson planning.
- The lesson *Background* provides information to help the nonspecialist teacher understand the science concepts of the lesson. While the *Background* may be helpful in answering student questions, it is intended primarily as a teacher resource.
- Each lesson opens with lesson-related *Discover* activities or questions to spark the interest of students, assess their previous knowledge of lesson content, and encourage them to discover for themselves the concepts of the lesson.

- The *Develop* section helps students understand the concepts that they explored in *Discover.* This section may also include additional activities to reinforce or expand the students' learning.
- *Reinforce/Assess* enables you to test students' learning and strengthen their understanding of lesson concepts. A simple reinforcement activity may also be included in this section.
- Many *Extend* activities are provided at the end of each lesson. These activities include additional science experiments and demonstrations, as well as literature, cross-curricular activities, and Bible studies that relate to the lesson concepts. All of the *Extend* activities are optional, but if you have time to do them, they will provide valuable support for student learning.

Activity Sheets

- The back of the teacher guide contains blackline masters for you to copy. Suggestions for their use are incorporated in the lesson during *Discover, Develop,* or *Reinforce/Assess.*

New DVD/PDF Option with Supplemental Material

The new Grade K–2 Science DVD/PDF includes:

- Exciting new flexible lessons and units that complement the printed curriculum
- New experiments and activities to reinforce and enhance the new material
- New Glossary terms and updated references
- Integration of up-to-date technology
- New multiple forms of assessments

DVD/PDF is available upon request. To inquire or order, visit the store at www.csionline.com.

National Science Education Standards

In order to provide teachers and students with the most comprehensive science education curriculum, CSI's 2nd edition materials were updated and expanded in accordance with the National Science Education Standards. Adherence to these standards is charted on pages 17b-17c.

K–6 Scope and Sequence

Kindergarten

Unit 1: Investigating Health
- Lesson 1: Who Created Me?
- Lesson 2: What Are Families Like?
- Lesson 3: How Does Learning Help Us?
- Lesson 4: What Does Skin Do?
- Lesson 5: How Does Eating Help Our Bodies?
- Lesson 6: How Should We Care for Our Teeth?
- Lesson 7: How Do Rest and Exercise Help Our Bodies?
- Lesson 8: How Can We Avoid Getting Sick?
- Lesson 9: How Can We Treat Illnesses?

Unit 2: Investigating Living Things
- Lesson 1: Scientific Investigations
- Lesson 2: How Are Plants Alike and Different?
- Lesson 3: How Do Plants Grow?
- Lesson 4: How Are Plants Useful in God's Creation?
- Lesson 5: How Are Animals Alike and Different?
- Lesson 6: How Do Animals Change As They Grow?
- Lesson 7: How Are Animals Useful in God's Creation?

Unit 3: Investigating Materials
- Lesson 1: What Are Wood, Metal, Rubber, and Leather Like?
- Lesson 2: What Is Clay Like?
- Lesson 3: What Are Fabrics and Paper Like?
- Lesson 4: What Are Glass and Plastic Like?
- Lesson 5: What Are Composite Pieces Like?

Unit 4: Investigating God's Nonliving World
- Lesson 1: What Are Nonliving Things Like?
- Lesson 2: What Are Rocks and Soil Like?
- Lesson 3: What Is Water Like?
- Lesson 4: How Are Landforms and Bodies of Water Different?
- Lesson 5: How Can We Take Care of the Land and the Water?
- Lesson 6: What Are Sky Objects Like?
- Lesson 7: What Does the Sun Do?
- Lesson 8: What Objects Can We See in the Nighttime Sky?

Unit 5: Investigating Transportation
- Lesson 1: What Safety Rules Are Important for Pedestrians?
- Lesson 2: How Does Technology Help with Transportation?
- Lesson 3: How Do We Get around the Neighborhood?
- Lesson 4: How Do We Stay Safe in Cars and Buses?
- Lesson 5: What Are Trucks and Trains Like?
- Lesson 6: What Is Sea Transportation Like?
- Lesson 7: What Is Air Transportation Like?

Grade 1

Unit 1: Scientific Investigations

- Lesson 1: How Do We Do Science?
- Lesson 2: What Is Teamwork?
- Lesson 3: How Do We Measure Length?
- Lesson 4: How Do We Use a Ruler?
- Lesson 5: How Do We Measure Temperature?
- Lesson 6: How Do We Measure How Much a Container Holds?

Unit 2: Investigating the Senses

- Lesson 1: What Are Your Senses?
- Lesson 2: How Do You See?
- Lesson 3: What Happens When People Can't See?
- Lesson 4: How Do You Hear?
- Lesson 5: What Happens When People Can't Hear?
- Lesson 6: How Do You Smell?
- Lesson 7: How Do You Taste?
- Lesson 8: How Do You Feel?
- Lesson 9: How Do You Use All of Your Senses?

Unit 3: Investigating Living Things

- Lesson 1: How Are Living Things Different from Nonliving Things?
- Lesson 2: How Do Living Things Reproduce Themselves?
- Lesson 3: How Do Living Things Grow and Change?
- Lesson 4: How Do Living Things Move?
- Lesson 5: How Do Living Things Respond to Other Things, and How Do Living Things Show Variety?
- Lesson 6: How Does God Provide for Plants?
- Lesson 7: How Does God Provide for Animals?

Unit 4: Investigating Changes

- Lesson 1: How Do People Change?
- Lesson 2: How Do Families Change?
- Lesson 3: What Changes Do Living Things Make When They Do Their Activities?
- Lesson 4: How Does the Earth Change?
- Lesson 5: How Does the Sun Make Changes?
- Lesson 6: How Do the Stars Seem to Change?
- Lesson 7: How Does the Moon Change?
- Lesson 8: How Do Weather Patterns Change?
- Lesson 9: How Does the Wind Change?
- Lesson 10: How Do Temperature and Precipitation Change?
- Lesson 11: What Changes Happen in the Fall?
- Lesson 12: What Changes Happen in the Winter?
- Lesson 13: What Changes Happen in the Spring?
- Lesson 14: What Changes Happen in the Summer?

Unit 5: Investigating Materials and Objects

- Lesson 1: What Are Materials and Objects Like?
- Lesson 2: How Can We Use Numbers in Observations?
- Lesson 3: What Are the Properties of Different Materials?
- Lesson 4: How Can a Material's Uses and Properties Be Changed through Mixing with Water?
- Lesson 5: How Can a Material's Uses and Properties Be Changed through Manipulating Them?
- Lesson 6: How Can a Material's Uses and Properties Be Changed through Heating or Cooling?

Unit 6: Investigating Things That Make Sound

- Lesson 1: How Is Technology Useful?
- Lesson 2: How Do Different Sound Systems Make Sounds?
- Lesson 3: How Can I Make a Sound System?
- Lesson 4: How Do Sounds Change?
- Lesson 5: How Can Tools Help Make a Sound System?
- Lesson 6: How Can I Design a Sound System?
- Lesson 7: How Can I Build a Sound System?
- Lesson 8: How Can I Use My Sound System?

Grade 2

Unit 1: Scientific Investigations

- Lesson 1: How Do Scientists Do Science?
- Lesson 2: What Is Teamwork?
- Lesson 3: How Are Investigations, Observations, and Explanations Done?
- Lesson 4: How Do We Measure Amounts?
- Lesson 5: How Do We Measure Weight?

Unit 2: Investigating Bones and Muscles

- Lesson 1: What Are Bones Like?
- Lesson 2: What Bones Are in Your Body?
- Lesson 3: How Should We Care for Our Bones?
- Lesson 4: What Are Joints Like?
- Lesson 5: What Do Skeletal Muscles Do?
- Lesson 6: What Do Involuntary Muscles Do?
- Lesson 7: How Should We Care for Our Muscles?

Unit 3: Investigating Health and Safety

- Lesson 1: What Fuel Does My Body Need?
- Lesson 2: Why Are Food Groups Important?
- Lesson 3: How Can We Eat a Balanced Diet?
- Lesson 4: What Good Is Exercise?
- Lesson 5: Why Keep Clean?
- Lesson 6: Why Do We Rest?
- Lesson 7: How Can We Stay Safe?

Unit 4: Investigating Animals

- Lesson 1: What Can We Learn about Animals?
- Lesson 2: What Are Animal Life Cycles Like?
- Lesson 3: Where Do Animals Live?
- Lesson 4: How Do Animals Change Their Habitats?
- Lesson 5: How Does God Prepare Animals for Their Homes?
- Lesson 6: What Do Animals Eat?
- Lesson 7: How Do Animals Behave?
- Lesson 8: Can Behavior Be Learned?
- Lesson 9: How Do Animals Stay Safe?
- Lesson 10: What Is a Fossil?
- Lesson 11: What Animals Lived Long Ago?
- Lesson 12: Why Are Some Animals Extinct?
- Lesson 13: How Can People Protect Animals?

Unit 5: Investigating Liquids and Solids

- Lesson 1: What Are Solids and Liquids Like?
- Lesson 2: What Do Solids Look and Feel Like?
- Lesson 3: How Can Solids Be Measured?
- Lesson 4: What Do Liquids Look and Feel Like?
- Lesson 5: How Does Surface Tension Affect Liquids?
- Lesson 6: What Is Evaporation?
- Lesson 7: What Are Gases Like?
- Lesson 8: What Happens When Solids and Liquids Are Mixed?
- Lesson 9: What Happens When We Mix Liquids with Other Liquids?
- Lesson 10: How Can We Use and Care for Liquids and Solids?

Unit 6: Investigating Position and Motion

- Lesson 1: What Is Position?
- Lesson 2: How Do Reference Objects and Distance Describe Position?
- Lesson 3: What Is Motion?
- Lesson 4: How Do Paths Relate to Motion?
- Lesson 5: How Do Different Things Move?
- Lesson 6: How Can Motion Change?
- Lesson 7: How Can We Predict Motion?

Unit 7: Investigating Buoyancy and Boats

- Lesson 1: What Is Technology?
- Lesson 2: What Makes Things Float and Sink?
- Lesson 3: How Do Floating Things Move?
- Lesson 4: What Are Sailboats Like?
- Lesson 5: How Are Other Boats Propelled?
- Lesson 6: How Are Tools Used?
- Lesson 7: How Are Boats Designed?
- Lesson 8: How Are Boats Built?
- Lesson 9: How Does My Boat Work?

Grade 3

Unit 1: Scientific Investigations

- Lesson 1: How Do Scientists Do Science?
- Lesson 2: What Is Teamwork?
- Lesson 3: How Do We Measure Temperature?
- Lesson 4: How Are Tables and Graphs Used?

Unit 2: Investigating the Circulatory and Respiratory Systems

- Lesson 1: What Does the Circulatory System Do?
- Lesson 2: How Can I Care for My Circulatory System?
- Lesson 3: What Does the Respiratory System Do?
- Lesson 4: How Can I Care for My Respiratory System?
- Lesson 5: How Can I Avoid Accidents?

Unit 3: Investigating Plants

- Lesson 1: What Is the Life Cycle of Plants?
- Lesson 2: Where Do Plants Live?
- Lesson 3: How Are Plants Structured?
- Lesson 4: What Do Plants Need?
- Lesson 5: How Do Plants Interact with Their Surroundings?
- Lesson 6: How Do Fossils Help Us Learn More about Plants?
- Lesson 7: How Are Plants Grouped?

Unit 4: Investigating Forces and Electricity

- Lesson 1: What Is a Force?
- Lesson 2: What Is a Magnet?
- Lesson 3: What Is an Electric Charge?

Unit 5: Investigating Heat and Temperature

- Lesson 1: What Is Temperature?
- Lesson 2: What Is Heat?
- Lesson 3: How Is Heat Produced?
- Lesson 4: What Is Conduction?
- Lesson 5: What Is Convection?
- Lesson 6: What Is Radiation?

Unit 6: Investigating Soil

- Lesson 1: How Does Soil Form?
- Lesson 2: What Are Different Types of Soil Like?
- Lesson 3: What Are Soil Layers Like?
- Lesson 4: How Do We Depend on Soil?
- Lesson 5: How Can We Care for Soil?

Unit 7: Investigating Natural Resources

- Lesson 1: How Do We Use Water, and Where Do We Find Water?
- Lesson 2: What Are the Different Kinds of Water?
- Lesson 3: What Are the Different Forms of Water?
- Lesson 4: What Is the Water Cycle?
- Lesson 5: Where Does Water Come From?
- Lesson 6: How Can We Clean Up Water Pollution?
- Lesson 7: How Can We Take Care of Water?
- Lesson 8: What Is Air Like?
- Lesson 9: How Can We Use and Take Care of Air?
- Lesson 10: What Is Air Pollution?
- Lesson 11: What Is a Natural Resource?
- Lesson 12: How Are Natural Resources Processed?
- Lesson 13: How Can Natural Resources Be Replaced?
- Lesson 14: How Can We Conserve Natural Resources?

Unit 8: Investigating Structures

- Lesson 1: What Is Scale?
- Lesson 2: What Materials Are Strong and Stable?
- Lesson 3: What Goes into Structures?
- Lesson 4: How Can I Plan a Structure?
- Lesson 5: How Can I Build a Structure?
- Lesson 6: How Can I Evaluate a Structure?

Grade 4

Unit 1: Scientific Investigations

- Lesson 1: What Is Teamwork?
- Lesson 2: How Can Scientific Investigations Answer Questions?
- Lesson 3: How Are Scientific Tools Helpful?
- Lesson 4: How Do I Deal with Data?
- Lesson 5: How Do I Use Results?

Unit 2: Investigating Organ Systems

- Lesson 1: What Do Organ Systems Do?
- Lesson 2: How Does the Digestive System Work?
- Lesson 3: How Can I Care for My Digestive System?
- Lesson 4: How Does the Urinary System Work?
- Lesson 5: How Can I Care for My Urinary System?
- Lesson 6: How Can I Prevent Injury to My Organs?
- Lesson 7: How Does Organ Donation Work?

Unit 3: Investigating Living Things and Their Homes

- Lesson 1: What Are Living Things Like?
- Lesson 2: What Is the Importance of Habitats and Niches?
- Lesson 3: What Is Ecology?
- Lesson 4: What Is a Pond Community Like?
- Lesson 5: How Are Living and Nonliving Things Important in an Ecosystem?
- Lesson 6: How Do the Parts of an Ecosystem Interact?
- Lesson 7: How Does Energy Flow in an Ecosystem?

Unit 4: Investigating Light

- Lesson 1: What Is Light?
- Lesson 2: How Does Light Travel?
- Lesson 3: How Do Shadows Form?
- Lesson 4: How Does Light Reflect?
- Lesson 5: How Does Light Bend?
- Lesson 6: How Do We See?
- Lesson 7: What Is Color?
- Lesson 8: How Is Light Used in Technology?

Unit 5: Investigating Sound Waves and Hearing

- Lesson 1: How Does Sound Carry Energy?
- Lesson 2: What Causes High and Low Sounds?
- Lesson 3: What Causes Loud and Soft Sounds?
- Lesson 4: How Does Sound Interact with Different Materials?
- Lesson 5: How Do We Hear?
- Lesson 6: What Is Noise?
- Lesson 7: How Is Sound Used in Technology?

Unit 6: Investigating Minerals, Rocks, and Earth's Structure

- Lesson 1: What Is a Mineral?
- Lesson 2: What Are Rocks Like?
- Lesson 3: How Do Rocks Change Form?
- Lesson 4: How Do Fossils Form?
- Lesson 5: How Do We Use Rocks and Minerals?
- Lesson 6: What Is Earth's Structure Like?
- Lesson 7: How Do Weathering and Erosion Change Earth's Surface?

Unit 7: Investigating Packaging

- Lesson 1: How Are Packages Designed?
- Lesson 2: How Are Packages Designed to Protect?
- Lesson 3: How Are Packages Designed to Group?
- Lesson 4: How Are Packages Designed to Beautify and Advertise?
- Lesson 5: How Are Packages Designed to Inform?
- Lesson 6: How Are Packages Made?
- Lesson 7: How Do Packages Affect Creation?
- Lesson 8: How Can I Make the Best Package and Evaluate Packages?

Grade 5

Unit 1: Scientific Investigations
- Lesson 1: What Is Teamwork?
- Lesson 2: How Can Scientific Investigations Answer Questions?
- Lesson 3: How Are Microscopes Used?
- Lesson 4: How Are Measurements and Data Determined and Used?
- Lesson 5: How Do Scientists Develop Explanations?

Unit 2: Investigating the Endocrine and Reproductive Systems
- Lesson 1: How Does Growth Happen?
- Lesson 2: How Does the Endocrine System Work?
- Lesson 3: What Happens during Puberty?
- Lesson 4: What Is Reproduction Like?
- Lesson 5: How Does the Female Reproductive System Work?
- Lesson 6: How Does the Male Reproductive System Work?
- Lesson 7: How Do Unborn Babies Develop?
- Lesson 8: What Are Sexually Transmitted Diseases?
- Lesson 9: How Can I Protect Myself from Sexual Abuse?

Unit 3: Investigating Nutrition
- Lesson 1: What's in the Food I Eat?
- Lesson 2: Why Do I Need Protein?
- Lesson 3: Why Do I Need Carbohydrates and Fats?
- Lesson 4: Why Do I Need Vitamins?
- Lesson 5: Why Do I Need Minerals?
- Lesson 6: Why Do I Need Water?
- Lesson 7: How Can I Get the Nutrients I Need?
- Lesson 8: Why Do I Eat What I Do?
- Lesson 9: Can I Trust Food Advertisements?

Unit 4: Investigating Cells
- Lesson 1: Why Are Cells Important?
- Lesson 2: How Do Cells Work?
- Lesson 3: How Are Traits Passed Along?

Unit 5: Investigating Agriculture and Forestry
- Lesson 1: Why Do We Need Plants?
- Lesson 2: What Does Agriculture Involve?
- Lesson 3: How Is Food Transported and Processed?
- Lesson 4: What Are Forests Like?
- Lesson 5: How Can We Best Use Plants, the Land, and the Food Supply?

Unit 6: Investigating Motion and Forces
- Lesson 1: What Is Motion?
- Lesson 2: What Are the Laws of Motion?
- Lesson 3: What Is Force?
- Lesson 4: How Do Machines Make Work Easier?
- Lesson 5: What Are the Simple Machines?
- Lesson 6: How Do Machines Affect Society?

Unit 7: Investigating Space
- Lesson 1: What Is the Solar System Like?
- Lesson 2: What Is the Earth Like?
- Lesson 3: What Is the Moon Like?
- Lesson 4: What Is the Sun Like?
- Lesson 5: What Are the Stars Like?
- Lesson 6: What Is the Universe Like?
- Lesson 7: How Does Technology Help Us Study Space?
- Lesson 8: What Role Did the Heavens Have in Various Civilizations?

Unit 8: Investigating Things that Move
- Lesson 1: What Makes Vehicles Work?
- Lesson 2: Why Are Gears Important to Vehicles?
- Lesson 3: How Does Rolling Relate to Movement?
- Lesson 4: What Energy Sources Are Important for Vehicles?
- Lesson 5: How Can I Plan a Vehicle that Moves?
- Lesson 6: How Can I Build a Vehicle that Moves?
- Lesson 7: How Can I Evaluate a Vehicle that Moves?

Grade 6

Unit 1: Scientific Investigations

- Lesson 1: What Is Teamwork?
- Lesson 2: How Can Scientific Investigations Answer Questions?
- Lesson 3: What Science Skills and Tools Are Important?
- Lesson 4: How Do Computers Help Us Analyze Data?
- Lesson 5: How Do Scientists Develop Explanations?

Unit 2: Investigating the Immune and Nervous Systems

- Lesson 1: How Does the Immune System Work?
- Lesson 2: What Is a Communicable Disease?
- Lesson 3: What Is a Noncommunicable Disease?
- Lesson 4: How Do Medicines Help the Immune System?
- Lesson 5: How Can I Care for My Immune System?
- Lesson 6: How Does the Nervous System Work?
- Lesson 7: What Things Put the Nervous System at Risk?
- Lesson 8: What Things Attack Your Nervous System?
- Lesson 9: How Can I Care for My Nervous System?

Unit 3: Investigating the Diversity of Life

- Lesson 1: What Are the Similarities and Differences among Living Things?
- Lesson 2: How Are Living Things Classified?
- Lesson 3: What Are Fish, Amphibians, and Reptiles Like?
- Lesson 4: What Are Birds and Mammals Like?
- Lesson 5: What Are Invertebrates Like?
- Lesson 6: What Are Plants Like?
- Lesson 7: How Do Plants Make Food?
- Lesson 8: What Are Bacteria, Fungi, and Protists Like?
- Lesson 9: How Are Living Things Connected?

Unit 4: Investigating Energy

- Lesson 1: What Are the Different Forms of Energy?
- Lesson 2: How Does Energy Change Form?
- Lesson 3: What Are Our Sources of Energy?
- Lesson 4: How Can We Use Energy Wisely?

Unit 5: Investigating Electricity

- Lesson 1: What Is Electrical Energy?
- Lesson 2: How Can We Be Safe around Electricity?
- Lesson 3: How Does Electric Current Flow through Circuits?
- Lesson 4: How Are Electricity and Magnetism Related?
- Lesson 5: How Do We Generate Electrical Energy?
- Lesson 6: How Can We Conserve Electrical Energy?
- Lesson 7: What Is Electronics?

Unit 6: Investigating Matter

- Lesson 1: What Is Matter?
- Lesson 2: What Are Elements Like?
- Lesson 3: What Are Compounds?
- Lesson 4: How Do the States of Matter Compare?
- Lesson 5: How Do Properties of Different Substances Compare?
- Lesson 6: How Does Matter Change?

Unit 7: Investigating Weather

- Lesson 1: How Does the Atmosphere Relate to Weather?
- Lesson 2: How Does Moisture Behave in the Atmosphere?
- Lesson 3: What Is the Nature of Weather?
- Lesson 4: What Is Climate?
- Lesson 5: What Factors Make up Weather?
- Lesson 6: How Are Weather Factors Measured?
- Lesson 7: How Do Weather Patterns Help Us Predict Weather?
- Lesson 8: How Do Weather Systems Form?

Unit 8: Investigating Flight

- Lesson 1: How Do We Do Technology?
- Lesson 2: What Are the Features of Living Things That Fly?
- Lesson 3: How Were Flying Machines Developed?
- Lesson 4: How Does Air Support Flight?
- Lesson 5: How Do Gravity and Lift Relate to Flight?
- Lesson 6: How Do Thrust and Drag Relate to Flight?
- Lesson 7: How Can We Control Flight?
- Lesson 8: How Are Airplanes Designed?
- Lesson 9: How Well Does My Flying Device Perform? (teacher guide only)
- Lesson 10: How Can We Be Good Stewards with Our Airplanes? (teacher guide only)

Lesson 11
What Changes Happen in the Fall?

Objectives

Students will

- investigate and describe changes that occur in seasonal cycles in the characteristics, behaviors, and locations of living things
- describe characteristics of fall
- raise questions about the world around them and seek answers to some of them by making careful observations and trying things out
- make predictions based on an observed pattern of animal behavior in the fall

Vocabulary

autumn—another name for the season of fall
cycle—circle, something that repeats

Structuring the Curriculum

This lesson works best during the fall in a deciduous forest area that experiences leaf color changes, but alternatives are included for other times of the year and other regions. Incorporate the activities that are feasible in your area.

While many people associate fall with leaves changing colors, pumpkins ripening, and the first frost, warmer parts of the continent experience some seasonal changes marked by different changes. In the fall the days shorten and are generally cooler than in mid-summer. If you live in a warmer climate, adapt this lesson to highlight your seasonal changes.

Preparation/Materials

√ Bible

Discussion: Cycle

√ picture of a bicycle
√ picture of a tricycle

Discussion: Cycles in God's World

√ white posterboard circle. Divide one side of the circle in half. Color one half black and leave the other white to represent day and night. Turn the circle over, divide this other side into quarters, and write the names of the seasons in the quarters.
√ four pie-shaped pieces that fit the quarters. Decorate each with drawings or stickers that represent one of the seasons. (These are used later in the lesson.)
√ tape

Discussion: Fall Observations

Option A

√ fresh apple

Option B

- √ artificial, colored leaves
- √ pictures of fall trees

Activity: Autumn Scene

Options A and B

- √ white paper, one sheet per student
- √ crayons
- √ yellow, orange, red, and brown construction paper (for **Option A**) or colors that represent a fall scene in your region (for **Option B**), several large scraps per student
- √ glue

Option C

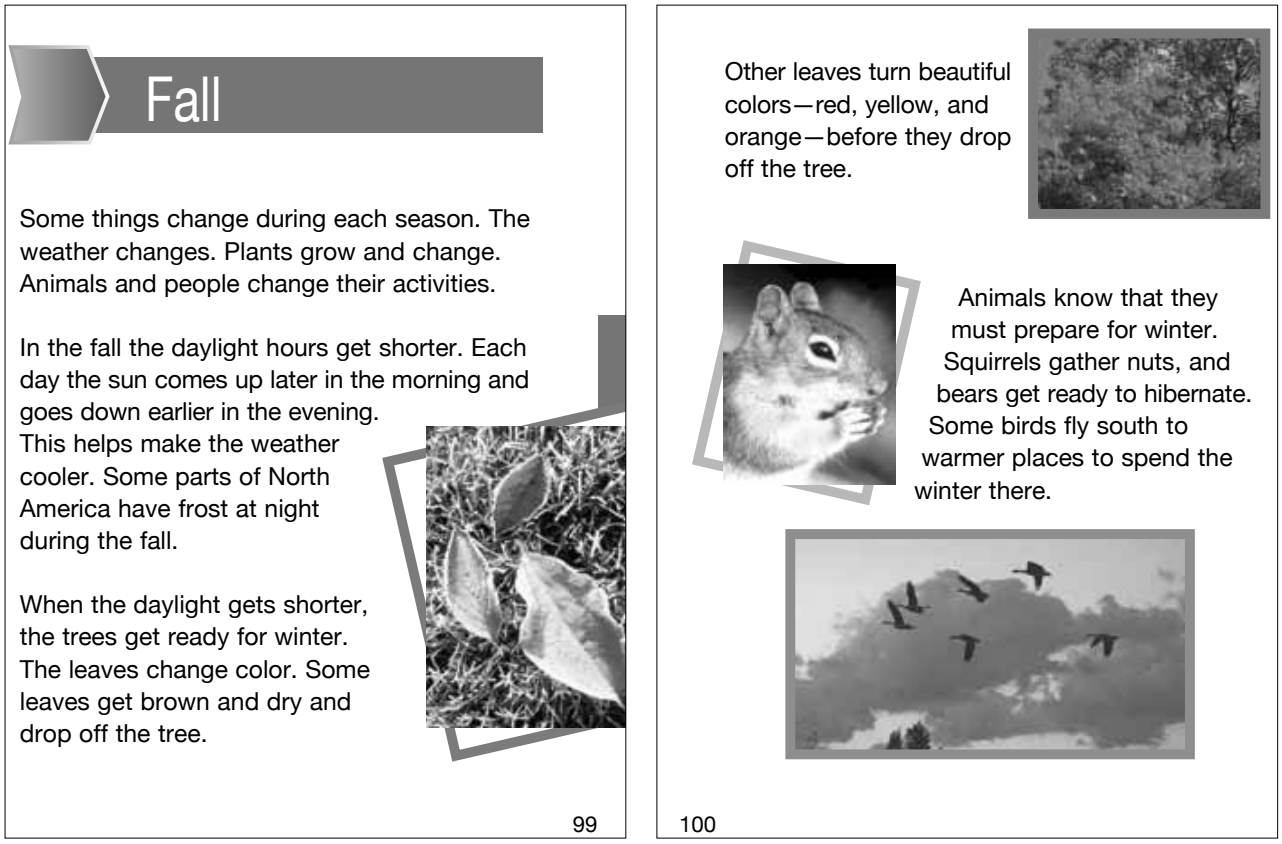
- √ Make a large brown construction paper trunk to fit on a bulletin board.
- √ yellow, orange, red, and brown construction paper, enough for each student to outline their hand
- √ scissors, one per student

Background

Many regions experience four distinct seasons because the Earth is tilted on its axis as it orbits the sun. The Northern Hemisphere has fall and winter when the South Pole is tilted toward the sun. This means that during these months we receive fewer hours of direct sunlight because the angle of the rays is less direct, yielding less heat. Areas near the equator don't experience as great a fluctuation of daylight hours or angle of the sun's rays, so they don't experience four seasons as the temperate zone generally does.

Note that the Earth is essentially the same distance away from the sun all year long—it's only the tilt of the Earth that causes seasonal differences. (Students often hold the misconception that somehow the Earth is farther from the sun when we have cooler seasons and closer when we have warmer seasons.)

Scientists mark the "astronomical seasons" according to the Earth's motion around the sun. The autumnal equinox begins on September 22 or 23 for the Northern Hemisphere, at which time it receives 12 hours of daylight and 12 hours of darkness. Fall continues through mid-December. In the Southern Hemisphere autumn weather occurs from March until early June.

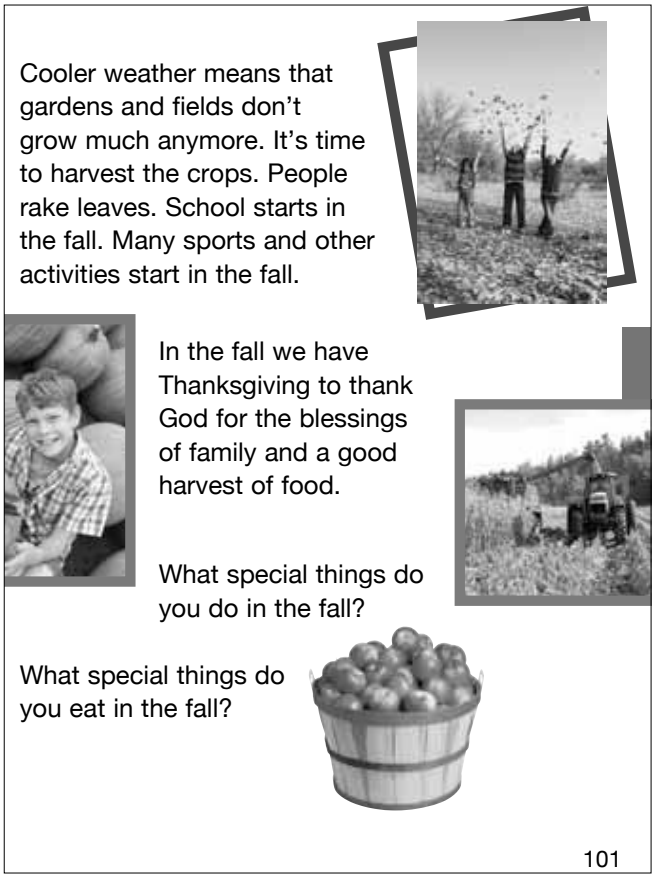


Discover

1. **Discussion: Cycles.** Ask the following question. "What is a cycle?" (Students may think of a bicycle or a tricycle. It may be helpful to show students a picture of a tricycle and a bicycle. Point out that *bi* means "two" and *tri* means "three." Lead students to the idea that a cycle is a circle.)

2. **Discussion: Cycles in God's World.** Show the black-and-white side of the posterboard circle to students. Explain that this circle shows some cycles that God makes in our world. A cycle is something that happens again and again, in the same order. The colors on the circle represent a cycle that happens every day. Have students guess what the cycle is. (Day and night.) Run your finger around the perimeter of the circle to emphasize that a cycle keeps going.

   Turn the circle over. Explain that this side of the circle shows a cycle that happens every year. Different parts of the year are called seasons. Each season is different. Ask the following questions.
   - What season were we in when school started? (Presumably fall.)
   - What season comes after that one? (Winter comes next.)
   - I wonder how fall is different from other seasons. What do you wonder about the fall? (Invite students to pose "I wonder" questions that relate to the seasons. Notice and encourage any wonderings that would lead to investigations that students could do. Encourage questions that deal not only with the weather aspects of the season but also with the cyclical behaviors and activities of animals and people.)



3. Suggest that you investigate to find out the answers to some of their questions. Remind students about how to make careful observations. Discuss how their observations could be measured and recorded. (Students might use thermometers to measure temperature, their rain gauges to measure rainfall during a week of this season, and a clock or stopwatch to measure how much daylight there is on a fall day.)

4. **Discussion: Fall Observations.**
   Option A. Take students outside. If your location and the time of year allow, choose a cool fall day, perhaps the morning of the first frost. Take an apple along without letting students see it. Have students to use their senses to observe what is special about this time of year. Ask the following questions.
   - What do your eyes tell you about the fall? (The leaves of trees have changed from green to yellow, orange, red, and brown. Chlorophyll levels drop in the leaves as the days shorten so the leaves change their color. Squirrels are gathering nuts. Birds are flying overhead in a V formation.) Have students gather leaves and examine them closely. Marvel together at their beauty and at God's creativity.
   - Close your eyes. What do your ears tell you about the fall? (The wind is blowing dry leaves on the ground. Squirrels are making noise.)
   - What does your nose tell you about the fall? (The leaves smell different than they did in the summer. Perhaps someone nearby has a fire in the fireplace.) Hold the apple near each student's nose, and have them observe this fall smell.

- What does your skin tell you about the fall? How do you feel? (It's chilly. The air is crisp.) Compare the temperature of this day to summer temperatures students will have experienced.
- What does your tongue tell you about the fall? (Discuss seasonal foods that are generally eaten in the fall in your area.)

Give students an opportunity to set up any simple investigations that stem from their "I wonder" questions. Arrange to follow up with these investigations to make further observations, if appropriate.

Option B. Display artificial, colored leaves and pictures of trees in fall. Ask the following questions.

- What do your eyes tell you about these leaves? (They are red, yellow, orange, and brown.)
- Were the leaves always these colors? (No, they used to be green.)
- When do the leaves change colors? (Explain that in some parts of the world, leaves change color in the fall.)
- What happens to the leaves after they change color? (They fall off the trees.)
- What would your ears hear if you were walking through fallen leaves? (Crinkle, crunch, swish, swoosh.)
- How does the air feel different in fall than in summer? (It's cooler than in summer.)

Develop

1. **Activity: Autumn Scene**

   Option A. Have students make autumn trees. Have them use a brown crayon to draw a trunk and branches on a blank piece of paper. Next have them cut or tear scraps of yellow, orange, red, and brown paper into leaf shapes and glue the leaves on the tree. If you wish, collect their work to assemble later with the tree project from the winter, spring, and summer lessons for a booklet entitled "A Tree through the Seasons."

   Option B. Have students make a picture using the above torn scrap technique that depicts some of the fall characteristics of your area.

   Option C. As a class, assemble a bulletin board. Make a tree trunk with brown construction paper. Have each student trace one of their hands on yellow, orange, red, or brown paper to represent leaves. They should cut out the leaf shapes, sign their names, and tape the leaves to the tree. Some students might choose to place their leaves in midair or at the bottom of the trunk to represent falling leaves.

2. Ask the following questions.
   - In the fall leaves change colors and fall off trees. What else happens to plants in the fall? (Apples, pumpkins, and other crops are ready to be harvested. Many flowers stop blooming.)

- Does the fall weather affect what clothes you wear? (Answers will vary.)
- What clothes would you wear in the fall? (Answers will vary.)
- Does the changing weather affect the kinds of things that you do? (Answers will vary.)
- What kinds of things do people do in fall? (Children start going to school. People get their yards and homes ready for winter by harvesting their gardens and raking leaves.)
- How does the fall affect animals? (Remind students of any animals that they may have observed during their time outside. Ask students to predict what those animals might be doing based on their observed behavior—e.g., squirrels gather nuts as a food supply for the winter, birds fly south to find warmer habitat for the winter, and bears and other animals grow a heavy coat of fur to insulate them for the winter. Comment on God's provision for his creatures through all the seasons of the year.)
- Will it always be fall? Tell the students that God promised that the seasons will keep on changing. He created the world in such a way that there would be different seasons. They are part of his good plan. You might read aloud or paraphrase Genesis 8:22.
- What are the other seasons? (Winter, spring, and summer are the other seasons.)

Reinforce/Assess

1. As a class, read **Fall** (page 99) in the student text.

2. Ask the following questions.
   - How does the weather change in the fall in some parts of the country? (The air gets cooler.)
   - What else changes in the fall? (The leaves change color. Some plants stop growing. Animals prepare for winter.)
   - What kind of clothes should you wear for fall weather? (Answers may include sweaters, jackets, sweatshirts, and long-sleeved shirts.)
   - What kinds of things do people do in fall? (Answers will vary but may include collect leaves, rake leaves, go to school, play football, and eat apples.)

3. Hold up the posterboard circle with the four-season side toward students. Review the characteristics of fall, and attach the fall quarter-circle in place.

4. Sing the following words to the tune of "She'll Be Coming 'Round the Mountain When She Comes."

   Oh, the leaves turn red and yellow in the fall.
   Oh, the leaves turn red and yellow in the fall.
   Yes, the leaves turn red and yellow.
   The leaves turn red and yellow.
   Oh, the leaves turn red and yellow in the fall.

   Add verses such as the following.
   - Oh, we rake leaves in a pile in the fall.
   - Oh, the night air is much cooler in the fall.
   - Oh, we'll need an extra blanket in the fall.

- Oh, the children go to school in the fall.
- Oh, we eat juicy apples in the fall.

Extend

- Add figures that represent the lesson topic to the “Things God Makes That Change” bulletin board.
- To increase students’ awareness of what seasons are like in other parts of North America, have them become “Season Pen Pals” with first-graders from Christian schools in other regions. Arrange for classes to send letters or e-mails to each other. Consider including a photo of the student doing something outside.
- Have students sort and classify leaves according to color, size, or shape.
- Adopt a specific deciduous tree to follow throughout the year. Encourage students to use their eyes and fingers to observe it.
- Set up a bird and squirrel feeding station near the classroom window. For birds, spread peanut butter over a pine cone, roll it in birdseed, and hang it. For squirrels, set out dry ears of corn. Have students record their observations.
- Help students prepare an apple snack such as apple cobbler, apple pie, or applesauce.
- Study other changes that occur in fall, such as night coming earlier and birds migrating.
- Take a fall nature walk. Collect natural objects for a “Fall Nature Museum” at a touch table.
- Visit an apple orchard, pumpkin patch, or other harvest field.
- Explain that some plants are annuals (plants that have to be planted every year) and that others are perennials (plants that return year after year). Explain that many perennials have a period of rest, dormancy, in the fall and winter. Fall is a good time for planting bulbs that will bloom in the spring. On the school grounds, plant some bulbs, such as crocuses, tulips, or daffodils. Students will enjoy seeing the new life in the spring, although the wait will seem long!
- Show one of the following audiovisual resources: *Animals in Autumn and Winter* or *Children in Autumn* (Encyclopedia Britannica) or *Autumn: Nature’s Sights and Sounds* (Beacon Films).
- Enjoy some of the following fingerplays with students: “Ten Rosy Apples,” “When Leaves Are on the Ground,” “Leaves Are Floating Down,” or “Fall” (*Finger Frolics*).
- Read aloud and have students illustrate some of the following poems: “Autumn Leaves,” “I Like Fall,” and “Rain of Leaves” by Aileen Fisher (*Always Wondering*); “The Mist and All” by Dixie Wilson (*The Merry-Go-Round Poetry Book*); or “Autumn Woods” by James S. Tippett (*Ring Out, Wild Bells*).

- Read *Goodbye, Geese* by Nancy Carlstrom; *Autumnblings: Poems and Paintings* by Douglas Florian; *Beginning to Learn about Autumn* by R.L. Allington and K. Krull; *Red Leaf, Yellow Leaf* by Lois Ehlert; *Fall Is Here! I Love It!* by Elaine Good; *When Autumn Comes* by Robert Maass; or *Pumpkin, Pumpkin* by Jeanne Titherington.

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