SCIENCE

2nd Grade

Sample Lesson

CHRISTIAN SCHOOLS INTERNATIONAL

Science 2

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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 2
What Bones Are in Your Body?

Objectives

Students will

- identify major bones in the body
- explain the functions of major bones

Vocabulary

eye sockets—the openings in the skull that hold and protect the eyes
pelvis (PEL-vuhs)—the bucket-shaped part of the skeleton formed by the two hip bones
rib cage—the part of the skeleton that protects the heart and lungs
skull—the part of the skeleton that protects the brain
spine—the backbone

Preparation/Materials

Let's Find Out: What's a Spine Like?

√ tube-shaped pasta, 11 pieces per team
√ yarn, about 45 cm per team
√ needles with large eyes, one per team. Optional: thread the yarn through the needles.
√ mini marshmallows, 10 per team. Skewer five to a toothpick to simplify distribution and to make the hole through which students will string them.

Discussion: Bones

√ chicken or turkey vertebra (optional)
√ pork or beef ribs (optional)
√ x-ray or diagram of hands and feet (optional)

Discussion: Many Bones for Many Purposes

√ skeletal model or picture of human skeleton (optional)

Activity: My Bones

√ butcher paper, one piece per student (a little longer than they are tall)
√ crayons or markers
√ scissors, one per student

Activity: The Skeletal System

√ activity sheet, one per student

Background

The bones in the human skeleton are grouped into four main categories: the skull, the spinal column (spine), the ribs, and the limb (arm and leg) bones.

The skull consists of 28 flat bones that enclose and protect the brain. Children's skull bones aren't fused together; this allows for the bones to grow. In adults the bones are fused together.

The spine consists of 33 small disc-shaped bones called vertebrae. The bones at the base of the spine fuse together as a person matures. By the time a person is 25 years old the lowest four bones have fused to become the tailbone (coccyx) and the five bones directly above those have fused to become the sacrum. Thus, an adult's backbone consists of 26 bones instead of the 33 that children have. The vertebrae are separated by cartilage discs, which cushion the bones, enable movement, and protect the brain from jolts. The spine protects the spinal cord, a bundle of nerves that carries the impulses from the brain to the rest of the body.

Twelve sets of ribs protect the heart and lungs.

Each arm has three bones—one upper bone (the humerus) and two lower bones (the radius and the ulna). The humerus joins to the shoulder blade (scapula). In the legs the large upper bone (femur) joins to two lower bones (fibula and tibia). The femur joins to the hip bones (pelvis), which are large, flat bones that support the body and hold inner organs. In females the pelvis expands for childbirth.

Both hands and feet have many separate, small bones. The hands consist of the wrist bones (carpals), the palm bones (metacarpals), and the finger bones (phalanges). The feet consist of the ankle bones (tarsals), foot bones (metatarsals), and toe bones (phalanges).

Different Bones

Your bones are all different shapes. They are all different sizes. Each bone has a special job to do.

Feel your head. Can you feel how hard it is? You're feeling your skull. The **skull** is the part of the skeleton that protects the brain. It's made of many flat bones. They fit tightly so that they can't move. That helps protect your brain.

Fast Fact

Growing

Small babies have spaces between some of their skull bones. These bones soon grow together.

Let's find out

What's a Spine Like?

You will need

- √ 11 pieces of tube-shaped pasta
- √ yarn
- √ needle with large eye
- √ 10 mini marshmallows

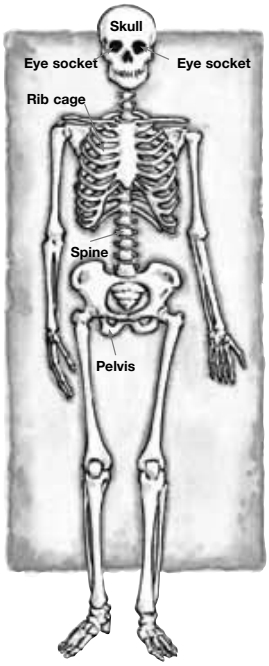
Do this

1. Tie one pasta piece to the end of the yarn. Thread the yarn through the needle.
2. Squash one marshmallow. Put the needle through its middle. Pull the marshmallow down to the pasta piece.
3. Put a pasta piece on the yarn.
4. Repeat steps 2 and 3 until all of the pasta pieces and marshmallows are on the yarn.
5. Tie the end of the yarn to the last pasta piece.
6. Remove the needle.
7. Which is like bone—the pasta pieces or the marshmallows?
8. Which is like cartilage—the pasta pieces or the marshmallows?
9. Does your backbone bend? Why?
10. Why do you think that God puts cartilage between the bones? Write down your ideas.

Discover

1. Play a game of Simon Says, having students find bones by identifying body parts.
   - Simon says, Put your hands on your head. What shape are the bones in your head? (Answers will vary but may include round or curved.)
   - Simon says, Put your hands on your thigh. What shape is the bone in your thigh? (It's long and narrow.)
   - Simon says, Put your hands on your forearm. What shape are the bones in your forearm? (They're long and narrow.)
   - Simon says, Put your hands on your ribs. Feel your ribs. What shape are the rib bones? (They're curved, long, and narrow.) How many ribs can you count? (Answers will vary.)
   - Simon says, Bend over and put your hands on your backbone. Feel your backbone. What does it feel like? (It's bumpy.) The backbone is also called the spine.

2. Have students complete **Let's Find Out: What's a Spine Like?** (page 35) in the student text.
   7. *Which is like bone—the pasta or the marshmallows? (The pasta is like the bone.)*
   8. *Which is like cartilage—the pasta or the marshmallows? (The marshmallows are like the cartilage.)*
   9. *Does your backbone bend? Why? (Yes. It bends because it is made up of smaller bones. It bends at the joints between the bones.)*



Gently feel the bone around your eye. This is the edge of your eye socket. **Eye sockets** are the openings in the skull that hold and protect the eyes. Can you feel how this works?

Your skull has other holes, too. Which holes let sounds get to your brain? Which holes let air get into your body? The skull also holds your teeth.

Fast Fact

Smallest Bone

The smallest bone in the body is inside your ear.

Bend over. Can you feel the bumps up your back? That's your **spine**, or backbone. Your head sits on top of your spine. Your spine is made of 33 small bones. Between the bones is cartilage. Cartilage cushions the bones when you walk. Otherwise walking would hurt your back. Bones don't bend. But your spine bends because there is space between the bones.

Try This

Count Your Bones

Reach around your body. Can you feel the bumps along your spine? Each bump is a bone. How many bones can you count in your spine?

Develop

1. **Discussion: Bones.** Discuss each set of bones.

   Spine. Ask the following questions.

   - How many bones can you feel in your spine? (Answers will vary. Students this age will probably have 33 bones, but they probably can't feel all of them.)
   - Do bones bend? (No.)
   - How does your spine bend? (It's made of many smaller bones with spaces in between.)

   Optional. Introduce the term *vertebrae*, and show students a single chicken or turkey vertebra and the hole that goes through it. Explain that the spinal cord—a nerve that acts like a telephone cord that brings signals to and from the brain—runs through the openings in the vertebrae. Point out that the vertebrae protect the spinal cord.

   Skull. Ask the following questions.

   - What shape is your skull? (It's round.)
   - What is inside your skull? (The brain is inside the skull.)
   - Why is the skull important? (It protects the brain.)

   Explain that the skull is attached to top of the backbone. Point out that while everyone is similar, God makes each person different. Each person's skull is unique. Eye socket placement, cheekbone width, chin width, skull height, etc. are different among people. These things contribute to why we look different.

Let's find out

Do You Shrink During the Day?

You will need

- ✓ paper
- ✓ tape
- ✓ a ruler

Do this

1. Tape a sheet of paper on the wall at head height.
2. First thing in the morning, measure your height. Ask an adult to put a ruler flat on your head. Mark the paper where the ruler meets the wall.
3. Measure your height again right after school.
4. Measure your height again just before bed.
5. Were you the same height all day?
6. If not, when were you tallest?
7. Why do you think this happened?

Feel your sides. How many ribs can you count? You have 12 pairs of ribs. They form a cage. The **rib cage** is the part of the skeleton that protects the heart and lungs. Most ribs are attached to the spine in back. Some are also attached to the

breastbone in the front. The bottom four ribs are attached only to the spine.

Feel your ribs, and take a big breath. Did your ribs move? The bones in your rib cage are attached by cartilage. They can move when you breathe.

You have two hip bones. Together they form a shape like a bucket. The bucket-shaped part of the skeleton formed by the two hip bones is called the **pelvis** (PEL-vuhs). Put your hands on your hips. Can you feel two hip bones?

Try This

Make a Skeleton

Lie down on a large sheet of paper. Have a partner trace around your body.

Draw a skeleton on your paper body with crayons.

Cut out your paper body. Hang it on the wall. It will remind you of your great bones.

Ribs. Ask the following questions.

- Feel your sides. How many ribs can you count? (Answers will vary, but there are 12 pairs of ribs—24 total.)
- What shape is each rib? (It's narrow and curved.)
  Optional. Display pork or beef ribs from a butcher to show the shape of individual ribs. Explain that ribs are attached to the spine at the back. Have students touch their breastbones, and explain that most of the ribs are also attached to their breastbone.
- What kind of shape do the ribs make when they're all together? (They make a cage.)
- What parts of the body are inside the space that the ribs make? (The heart, the lungs, and the liver are in this space.)

Hips. Ask the following questions.

- Put your hands on your hips. How many hip bones do you have? (Two.)
- What do hip bones look like? (They're flat, broad, and curved. Together they form a bucket shape.)
- What other bones do you think the hip bones are connected to? (They're connected to the lower end of the spine and the upper leg bones.)

Arms, Legs, Hands, Feet. Ask the following questions.

- Feel the bones in your legs, arms, hands, and feet. What are the bones in your legs and arms like? (They're long and narrow.)

Your hips are attached to the end of your spine and to your leg bones. Hips help you to stand up. Your pelvis also keeps your insides from slipping down when you stand up.

One big bone connects your pelvis to your knee. There are two long bones from your knee to your foot. Leg bones are four times stronger than concrete. But they are much lighter than concrete.

Strange Truth

Funny Bone

Have you ever hit that tender spot on your elbow? It hurts!

People call that spot your "funny bone." But it's not really a bone. It's a nerve.

Nerves let you feel things. When you hit your "funny bone" just the right way, a tingly feeling goes down your arm.

Your feet have many small bones. Wiggle your toes. Can you tell that there are many bones in your feet?

Each arm has three long bones. One bone connects the elbow to the shoulder blade. Two bones connect your elbow to your wrist. They allow you to twist your hands. Hold your palms up. Now turn your hand so that your palms face down. Can you feel your arm bones moving?

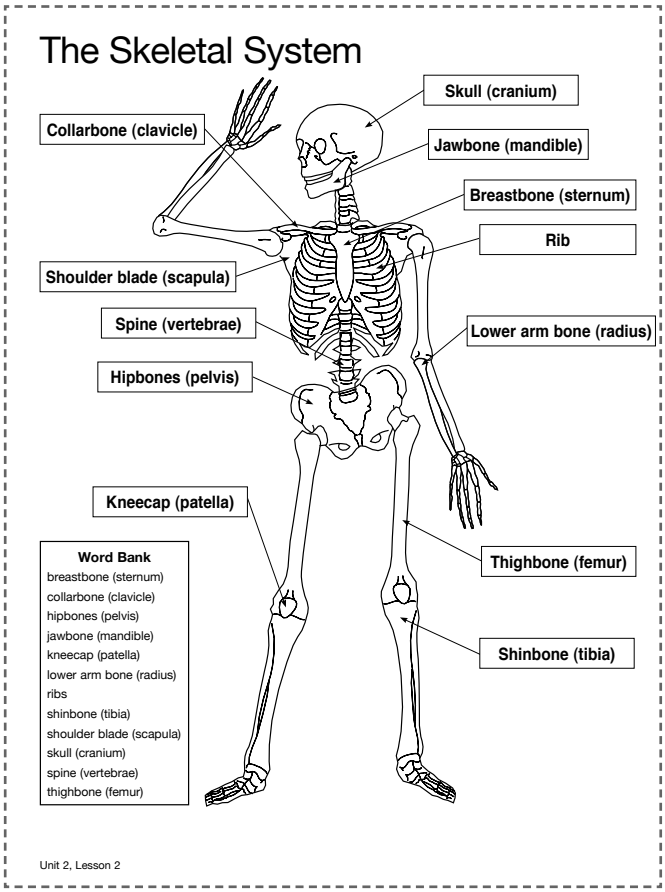
You have 27 bones in each hand. They let you bend your hands many ways. How many ways can you move your hands and wrists?

Think Back

1. What bones protect parts of your body?
2. What bones allow you to move?
3. What do you think your most important bone is? Give a reason for your answer.

- Why do you suppose they are shaped like this? (They let us reach things; they rotate easily in the joints to give us flexibility.)
- How many ways can you move your hands and feet? (Have students explore to find many different ways. Answers will vary.)
- Hold your arms out, palms up. Now, twist your arms so that your palms face down. Which can you move more easily—your hands or your feet? (Hands move more easily.) Why do you suppose this is so? (It has to do with the type of joints—particularly the uniqueness of the thumb, which can be used to grasp things.)
- How many bones do you think are in your hands and feet? (Each hand has 27 bones; each foot has 26 bones.)
- What do you suppose these bones are shaped like? (The shapes vary. If possible, show students an x-ray or diagram of hands and feet, showing the bone's sizes and arrangement.)

2. **Discussion: Many Bones for Many Purposes.** Marvel together at the variety of bones that God made for such different purposes.
   - Which bones did God give for walking? (Leg and feet bones are used for walking.)
   - Which bones did God give for holding things? (Hand and finger bones are used for holding things.)
   - Which bones did God give for protecting important body parts? (The skull, spine, ribs, and pelvis protect important body parts.)



Optional. If you have a skeleton model or picture of a human skeleton, help students identify the bones that have been discussed.

Reinforce/Assess

1. As a class, read **Different Bones** (page 34) in the student text and answer the **Think Back** questions (page 41).
    1. *What bones protect parts of your body? (The skull protects the brain, the rib cage protects the heart and lungs, and eye sockets protect the eyes.)*
    2. *What bones allow you to move? (The arm bones, hand bones, leg bones, foot bones, pelvis, and spine allow for movement.)*
    3. *What do you think your most important bone is? Give a reason for your answer. (Answers will vary. Students should give a reason for their answer. Discuss the fact that all our bones are very important and that life would be hard without any of them. Encourage students to thank God for their bones.)*
2. **Activity: The Skeletal System.** Have students complete the **activity sheet**.

Extend

- Have students complete **Let's Find Out: Do You Shrink during the Day?** (page 38) in student text as homework.
- Sing "Dem Bones." Read the story of the dry bones from Ezekiel 37. You could also read *Dem Bones* by Bob Barner; this book connects the spiritual's lyrics with various facts about bones.
- Learn the scientific names of various bones. (Some are on the activity sheet.) For example, ask students to find their femur as you point to yours. Move quickly through the names of other easy-to-find bones such as the sternum, mandible, scapula, patella, clavicle, humerus, and phalanges. If you have extra time during the school day, play a short game of Simon Says. For example, Simon says, "Point to your patella," "Point to a straight bone," "Touch your skull with your arm bone," etc.
- Have students write stories or poems about bones. You may want to suggest the following titles: The Man/Woman/Child Whose Bones Were Made of Rubber; The Bones and Muscle(s) that Didn't Get Along; The Sad Skeleton; Help! I Broke My Clavicle!
- Have students make skeleton models from straws, pasta, or toothpicks. They can arrange the "bones" and glue them to colored paper to preserve their skeletons.
- Purchase or make cardboard models of the bones in the human body. Put the bones in a pile, and have students sort the bones, classify them, and reconstruct the skeleton.
- Read "The Trouble with George" from *My Listening Ears* by Joanne De Jonge.

Thank you for your interest in Christian Schools International's 2nd Edition Science curriculum!

This sample serves as a great reflection of the other engaging material available for kindergarten through grade 8.

The curriculum tools represented below work great together to assist you as you explore God's creation, promote effective learning, and provide a clear biblical perspective to your students.

Teacher Guide - a comprehensive guide that is informative and easy-to-use with detailed teaching strategies, reduced student text pages, numerous inquiry-based activities, cross-curricular activities, and activity sheets that involve investigating, making observations, experimenting, researching, charting, mapping, and more.

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