

# Life Science

GRADE 7

Cells	Simple Organisms, Fungi, and Plants	Human Body Systems
Heredity, Evolution and Classification	Introduction to Animals	

## STANDARD 1

*The student understands and uses scientific concepts and principles.*

To meet this standard, the student will:

**Benchmark 7.1.1: Investigate the diversity of living organisms and how they can be compared and classified scientifically**

**Indicators:**

- 7.1.1.1 Identify the principle characteristics used to classify living things
- 7.1.1.2 Use characteristics to classify living organisms into groups with similar features
- 7.1.1.3 Explain the differences between plants, animals, and bacteria using structural and functional characteristics of cells
- 7.1.1.4 Demonstrate the process for the development of a dichotomous key.
- 7.1.1.5 Classify organisms based on physical characteristics using a dichotomous key.
- 7.1.1.6 Understand that similarity of design (*homologous structures*) is evidence of an efficient blueprint, not macro-evolutionary adaptation
- 7.1.1.7 Recognize the original complexity in design by the Almighty Creator that attributes to the diversity of living organisms (e.g. God created all things distinctively and purposefully)

**Benchmark 7.1.2: Describe the structure and function of cells, tissues, organs, and organ systems.**

**Indicators:**

- 7.1.2.1 Explain that cells take in nutrients in order to grow and divide and to make needed materials.
- 7.1.2.2 Relate cell structures (cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria) to basic cell functions.
- 7.1.2.3 Explain that cells are organized into tissues, tissues into organs, organs into systems, and systems into organisms.
- 7.1.2.4 Describe the Human Body Organization and Structure
- 7.1.2.5 List and describe the 11 organs systems of the humans body
- 7.1.2.6 Identify how organ systems work together to maintain homeostasis
- 7.1.2.7 Explain that tissues, organs, and organ systems serve the needs cells have for oxygen, food, and waste removal.
- 7.1.2.8 Describe how the structural and functional body systems of plants and animals operate to keep the organism alive
- 7.1.2.9 Describe tissues, organs, and systems as structural and functional components which enable plants and animals to live

**Benchmark 7.1.3: Recognize how biological traits are passed on to successive generations**

**Indicators:**

- 7.1.3.1 Explain the role of genes and chromosomes in the process of inheriting a specific trait.
- 7.1.3.2 Define and explain the stages of mitosis and meiosis.
- 7.1.3.3 Predict genotype and phenotype ratios of possible offspring using a Punnett Square.

Key: 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

- 7.1.3.4 Compare and contrast that organisms reproduce asexually and sexually (bacteria, protists, fungi, plants & animals).
- 7.1.3.5 Recognize that selective breeding can produce plants or animals with desired traits.

**Benchmark 7.1.4: Examine the dependence of organisms on one another and their environments.**

**Indicators:**

- 7.1.4.1 Demonstrate in a food web that matter is transferred from one organism to another and can recycle between organisms and their environments
- 7.1.4.2 Explain in a food web that sunlight is the source of energy and that this energy moves from organism to organism
- 7.1.4.3 Compare and contrast sexual and asexual
- 7.1.4.4 Examine and classify local flora and fauna
- 7.1.4.5 Describe how balance among producers, consumers, and decomposers is achieved and how it affects ecosystems
- 7.1.4.6 Explain the processes of photosynthesis and respiration separately and as a complete natural system

**Benchmark 7.1.5: Construct and use models to predict, test, and understand scientific phenomena**

**Indicators:**

- 7.1.5.1 Evaluate the strengths and limitations of models encountered in daily life
- 7.1.5.2 Construct and interpret scale drawings of biological systems

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## STANDARD 2

*The student conducts scientific investigations to expand understanding of the natural world.*

**To meet this standard, the student will:**

### **Benchmark 7.2.1: Plan and implement scientific investigations**

#### **Indicators:**

- 7.2.1.1 Distinguish between an observation and an inference
- 7.2.1.2 Develop questions and testable hypotheses in response to observations
- 7.2.1.3 Use appropriate tools to collect data and safely test a hypothesis
- 7.2.1.4 Individually and collaboratively plan an experiment and analyze issues affecting the design
- 7.2.1.5 Conduct a safe, controlled experiment
- 7.2.1.6 Develop and communicate procedures, predictions, descriptions, results, explanations, conclusions, and models from evidence
- 7.2.1.7 Understand and follow proper safety procedures

### **Benchmark 7.2.2: Think logically, analytically, and creatively**

#### **Indicators:**

- 7.2.2.1 Approach questions and problems using several different strategies
- 7.2.2.2 Distinguish between evidence, explanation, and opinion
- 7.2.2.3 Make predictions and create explanations by drawing inferences and recognizing patterns and relationships (especially mathematical relationships)
- 7.2.2.4 Describe the thought processes associated with a particular series of actions

### **Benchmark 7.2.3: Practice the principles of scientific inquiry**

#### **Indicators:**

- 7.2.3.1 Recognize and demonstrate that science is one way of looking at the world
- 7.2.3.2 Accurately record and report a series of observations
- 7.2.3.3 Give proper credit to informative sources
- 7.2.3.4 Explain the importance of openness, honesty, and skepticism in science
- 7.2.3.5 Analyze a set of knowledge and recognize what is still unknown or unanswered
- 7.2.3.6 Recognize the logical process of basing conclusions on evidence
- 7.2.3.7 Recognize that scientific knowledge is always changing but is based on evidence
- 7.2.3.8 Recognize that observations can be influenced by the beliefs of the observer
- 7.2.3.9 Recognize that scientific understanding can come from unexpected results

### **Benchmark 7.2.4: Understand the relationship between evidence and scientific explanation**

#### **Indicator:**

- 7.2.4.1 Properly use terms such as hypothesis, law, principle, and theory to describe scientific explanations

Key: 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

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## STANDARD 3

*The student applies science knowledge and skills to solve problems and meet challenges.*

To meet this standard, the student will:

**Benchmark 7.3.1: Identify problems and challenges in which science knowledge and skills can be applied**

**Indicators:**

- 7.3.1.1 Analyze a relevant problem or challenge which is related to science or technology
- 7.3.1.2 Identify the components of the problem and criteria for finding a suitable solution
- 7.3.1.3 Write a hypothesis

**Benchmark 7.3.2: Research, design, and test a variety of ways to address problems and/or challenges**

**Indicators:**

- 7.3.2.1 Record the steps to test the hypothesis
- 7.3.2.2 Identify and collect necessary equipment and materials
- 7.3.2.3 Use scientific tools and methods to individually and collaboratively research, design, test, and compare alternative solutions to a problem
- 7.3.2.4 Evaluate and explain solutions to a problem under various constraints

**Benchmark 7.3.3: Evaluate solutions and consequences**

**Indicators:**

- 7.3.3.1 Using criteria for a suitable solution compare and evaluate solutions and consequences
- 7.3.3.2 Using the evaluation results, determine which solution is best and predict the consequences of its implementation

Key: 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

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## STANDARD 4

*The student uses effective communication skills and tools to build and demonstrate understanding of science.*

To meet this standard, the student will:

**Benchmark 7.4.1:** Use listening, observing, and reading skills to obtain scientific information

**Indicators:**

- 7.4.1.1 Listen to and paraphrase someone describe his/her own observations
- 7.4.1.2 Ask questions to clarify
- 7.4.1.3 Read, understand, and summarize informative science text

**Benchmark 7.4.2:** Use writing and speaking skills to organize and express science ideas

**Indicators:**

- 7.4.2.1 Construct, interpret, and utilize line graphs and other graphical displays of information
- 7.4.2.2 Write informative reports that make proper use of scientific terminology, data, formulas, symbols, diagrams, tables, and graphs
- 7.4.2.3 Articulate information orally to convince an audience

**Benchmark 7.4.3:** Use effective communication strategies and tools to prepare and present science information

**Indicators:**

- 7.4.3.1 Use software programs and other technology to collect data, access and process information, and prepare reports
- 7.4.3.2 Recognize and interpret chemical equations
- 7.4.3.3 Clearly present information as evidence to support a conclusion

Key: 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

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## STANDARD 5

*The student understands how science knowledge and skills are connected to other subject areas and real-life situations.*

To meet this standard, the student will:

**Benchmark 7.5.1: Use mathematics to enhance scientific understanding**

**Indicator:**

- 7.5.1.1 Use statistical methods, estimation skills, symbols, graphs, numbers, and tables to make predictions and describe and analyze results

**Benchmark 7.5.2: Understand the relationship between science and technology**

**Indicators:**

- 7.5.2.1 Investigate how scientific inquiry and technological design are used in various careers
- 7.5.2.2 Explain how scientific inquiry results in knowledge which can improve technological designs and vice versa

**Benchmark 7.5.3: Examine the relationship between science and history**

**Indicator:**

- 7.5.3.1 Research and report how individuals, societies, and cultures have influenced the development of science

**Benchmark 7.5.4: Examine the relationship among science, society, and the workplace**

**Indicators:**

- 7.5.4.1 Recognize examples of how science and technology influence everyday life
- 7.5.4.2 Explain how the actions of humans and other events can affect the environment and the supply of resources
- 7.5.4.3 Recognize and explain some short-term and long-term consequences of science and technology in the past and in the future
- 7.5.4.4 Relate science and mathematics to occupational/career areas of interest and recognize the preparation, skills, and knowledge needed to pursue these areas

Key: 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

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## STANDARD 6

*The student understands how science knowledge carries with it responsibility for its application.*

To meet this standard, the student will:

**Benchmark 7.6.1: Understand how science contributes to the treatment of diseases in the maintenance of a healthy lifestyle (Personal and Community Health)**

**Indicators:**

- 7.6.1.1 Explore the nature of viruses and the development of vaccines
- 7.6.1.2 Explore the nature of bacteria, the development of antibiotics, and antibiotic resistance  
(See PE/Health Curriculum: Standards 2 & 3)

**Benchmark 7.6.2: Understands how the use of resources affects population growth and the global environment (Population)**

**Indicators:**

- 7.6.2.1 Understand differential survival based on natural selection
- 7.6.2.2 Explore how limited resources, including food and territory, affect the size of populations

**Benchmark 7.6.3: Understand the importance of maintaining resources and environmental quality (Environmental Quality/Resources)**

**Indicators:**

- 7.6.3.1 Recognize the delicate balance between limited and renewable resources
- 7.6.3.2 Recognize the negative effects of poor resource management

**Benchmark 7.6.4: The student will understand the ethical issues inherent in scientific research (Ethics)**

**Indicators:**

- 7.6.4.1 Explore the effects of overuse of antibiotics
- 7.6.4.2 Explore the distribution of medicines to different geographic regions and economic groups
- 7.6.4.3 Understand the importance of honesty and accuracy in scientific reporting
- 7.6.4.4 Recognize that technology and scientific discoveries can be applied in ways other than how its discoverers intended
- 7.6.4.5 Recognize that science and technology applications cannot be isolated from other aspects of life (ethical, social, and economic)
- 7.6.4.6 Recognize personal and social responsibility when planning and conducting scientific research

Key: 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

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## STANDARD 7

The student *applies a Christian perspective to scientific concepts and principles.*

To meet this standard, the student will:

**Benchmark 7.7.1: Understand that the Bible and the findings of science do not conflict**

**Indicators:**

- 7.7.1.1 Recognize God as the creator of our earth and all life forms.
- 7.7.1.2 Recognize the creation of life as intentional
- 7.7.1.3 Understand that the term evolution refers to gradual changes in characteristics over time
- 7.7.1.4 Examine the difference between macroevolution (species to species change) and microevolution, changes within a species
- 7.7.1.5 Examine Darwin's finches as evidence of Microevolution (evidence shows they were able to interbreed, thus were the same species)

**Benchmark 7.7.2: Understand that the Bible teaches us that God is the creator of everything**

**Indicators:**

- 7.7.2.1 Identify God as the creator of the various life species
- 7.7.2.2 Recognize God as the designer and Creator of every detail of life from the complexities of DNA and cellular function to tissues, organs, body systems and complex organisms.

**Benchmark 7.7.3: Understand that God preserves and controls His creation, the world we study in science, so that it continues to function as He planned**

**Indicator:**

- 7.7.3.1 Explain that the consistent patterns found in the complexities of plants, animals and humans show God's design, control and plans

**Benchmark 7.7.4: Understand that God created everything for His own purpose, and creation is meant to praise and glorify God**

**Indicator:**

- 7.7.4.1 Identify that God created our bodies as awesome and holy and are to be respected, cared for and appreciated as part of God's creation.

**Benchmark 7.7.5: Understand that God uses His creation to teach people eternal truth through the study of science**

**Indicators:**

- 7.7.5.1 Credit God with the wonder of life and the world around us
- 7.7.5.2 Identify examples of patterns and order in life science that point to God as the creator

Key: 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

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