



Science 7 GT

Semester A Summary:

Gifted and Talented Science 7A uses multiple media sources to foster scientific inquiry and spark curiosity as the student explores topics such as cells, body systems, reproductive strategies, and genetics. The student will investigate cell structure in plants and animals and discover how organisms use cells to perform complex life functions. They will also identify and describe the functions of several body systems including the respiratory, circulatory, digestive, and excretory systems. Additionally, the student will evaluate reproductive strategies and genetics to discover the important roles they play in the survival of organisms. Throughout the course, the student will engage in activities that promote critical thinking, explore increasingly complex conceptual relationships, and encourage them to be curious about the world they live in and explore ways to test and apply their ideas.

Semester A Outline

1. Course Overview

1. Science 7 Course Overview Quick Check

2. Cells

1. Cells Introduction
2. Characteristics of Cells
 - In this section, you will describe the cell as the smallest living unit.
3. Plant and Animal Cells
 - In this section, you will compare the structure and functions of plant and animal cells.
4. Modeling Cells
 - In this section, you will describe the parts of a cell.
 - In this section, you will develop a model to identify the parts of a cell.
5. Cellular Transport
 - In this section, you will explain why cellular transport is important for life processes.
6. Organelles
 - In this section, you will explain how the organelles of a cell help the cell's function
7. Unicellular and Multicellular
 - In this section, you will compare the cell of a unicellular organism to specialized cells of multicellular organisms.
8. Mitosis
 - In this section, you will create a model to show how mitosis leads to the growth and repair of cells in multicellular organisms.
 - In this section, you will explain how mitosis is related to cancer.
9. Cells Apply
 - In this section, you will design an imaginary cell from an organism and

describe what functions this kind of cell will perform.

10.Cells Review

11.Cells and Body Systems Unit Test

3. **Body Systems**

1. Body Systems Introduction

2. Multicellular Organisms

- In this section, you will make a claim about how multicellular organisms can use single cells to perform complex life functions.

3. Body Systems Hierarchy

- In this section, you will explain how multicellular organisms are organized from cells through organ systems.

4. Respiratory and Circulatory Systems

- In this section, you will describe the respiratory and circulatory systems.

5. Digestive and Excretory Systems

- In this section, you will describe the digestive and excretory systems.

6. Nervous System

- In this section, you will describe the nervous system.

7. Sensory Receptors

- In this section, you will identify and make connections between sensory receptors and how organisms use and store sensory information.

8. The Eye

- In this section, you will explain the composition and function of the eye.

9. Homeostasis

- In this section, you will explain how organisms maintain internal stability.
- In this section, you will determine the effect of external factors on organisms' internal stability.

10.Body systems Portfolio 1

- In this portfolio activity, you will compare human body systems with the body systems of other organisms, and prepare a presentation comparing one other organism's systems with those of the human body.
- In this section, you will describe all of the major human body systems.
- In this section, you will compare the cardiovascular system of birds to humans.

11.Body Systems Portfolio 2

- In this section, you will compare the skeletal system of humans and insects.
- In this section, you will compare the body systems of any type of organism to human body systems.
- In this section, you will research features of an organism's major body systems by identifying key search terms.

12.Body Systems Portfolio 3

- In this section, you will contrast each major body system using research from multiple sources
- In this section, you will design a presentation of research results.

13.Body Systems Review

14.Body Systems Unit Test

4. **Reproductive Success**

1. Reproductive Success Introduction

2. Reproduction in Flowering Plants

- In this section, you will identify and describe the reproductive structures of plants that grow flowers.

3. Non-Flowering Plants Reproduction

- In this section, you will identify and describe reproductive structures of

plants that do not grow flowers.

4. Successful Plant Reproduction

- In this section, you will argue how certain plant structures affect the probability that plants will reproduce successfully. You will base your argument on factual evidence and scientific reasoning.

5. Animal Behaviors

- In this section, you will identify and describe the behaviors of animals that affect reproduction.
- In this section, you will explain how animal responses to environmental stimuli (including hibernation and migration) allow them to survive and reproduce.

6. Analyzing Factors

- In this section, you will argue how animal behaviors affect the probability that animals will reproduce successfully. You will base your argument on factual evidence and scientific reasoning.

7. Analyzing Factors Discussion

8. Reproductive Success Apply

9. Reproductive Success Review

10. Reproductive Success Unit Test

5. **Reproductive Strategies**

1. Reproductive Strategies Introduction

2. Asexual Reproduction Strategies

- In this section, you will describe asexual reproduction processes.

3. Modeling Asexual Reproduction

- In this section, you will devise a model to describe why asexual reproduction leads to offspring with identical genetic information.

4. Asexual and Sexual Reproduction

- In this section, you will compare sexual and asexual reproduction.

5. Modeling Sexual Reproduction

- In this section, you will use a model to explain why sexual reproduction leads to offspring with genetic variation.

6. Reproductive Strategies Apply

7. Reproductive Strategies Review

8. Reproductive Strategies Unit Test

6. **Genetics**

1. Genetics Introduction

2. Genes and Chromosomes

- In this section, you will describe the relationship between genes and chromosomes, and heredity.
- In this section, you will describe the relationship between genes and chromosomes.

3. Meiosis

- In this section, you will model the role of meiosis in the transfer of traits from one generation to the next.

4. Define Genotypes and Phenotypes

- In this section, you will describe genotypes and phenotypes.

5. Relate Genotypes and Phenotypes

- In this section, you will explain the relationship between genotypes and phenotypes.

6. What Are the Chances?

- In this section, you will use Punnett squares to mathematically model the passing of traits from parents to offspring.

7. Explain Effects of Mutations
 - In this section, you will explain the different ways that mutations may affect the structure and function of an organism.
8. Genetic Factors and Growth
 - In this section, you will use scientific evidence to explain how genetic factors influence the growth of organisms.
9. Genetics Apply
10. Genetics Review
11. Genetics Unit Test

7. Matter and Energy

1. Matter and Energy Introduction
2. Making Food
 - In this section, you will explain the steps in the process of photosynthesis.
3. Photosynthesis Portfolio 1
 - In this portfolio activity, you will perform two investigations to show that plant leaves take in carbon dioxide and release oxygen at a measurable rate during photosynthesis
 - In this section, you will describe photosynthesis in a labeled drawing
4. Photosynthesis Portfolio 2
 - In this section, you will describe how the data that you plan to collect will be relevant to your investigation
 - In this section, you will conduct an investigation that provides evidence that in photosynthesis, leaves take in carbon dioxide and release oxygen at a measurable rate
5. Photosynthesis Portfolio 3
 - In this section, you will analyze the accuracy and precision of the data, whether the data provides the required evidence required, and the limitations of the investigation.
6. Breaking Down Food
 - In this section, you will explain the steps in the process of cellular respiration.
7. Flow of Energy
 - In this section, you will use data to create a written or visual model showing how plants support energy flow.
8. Recycling of Carbon
 - In this section, you will use a diagram to describe the carbon cycle
9. Recycling of Nitrogen
 - In this section, you will use a diagram to describe the nitrogen cycle.
10. Recycling of Water
 - In this section, you will learn how water moves through ecosystems via the water cycle
11. Energy and Matter in an Ecosystem
 - In this section, you will create a model that connects the cycling of matter with the flow of energy among living and nonliving parts of an ecosystem
12. Matter and Energy Apply
 - In this section, you will create a diagram to show how water cycles in an ecosystem.
13. Matter and Energy Review
14. Matter and Energy Unit Test

Semester B Summary:

Gifted and Talented Science 7B uses multiple media sources to foster scientific inquiry and spark curiosity. Throughout this course, the student will discover ways that scientists use data, models, and technology to gather and apply information.

This course explores the role of plants and photosynthesis in the cycling of matter and the flow of energy into and out of organisms. The student will analyze and interpret data to determine the effects of resource availability on biodiversity among populations in an ecosystem.

The topics of evolution, natural selection, and scientific classification are also presented throughout this course. The student will analyze and interpret data for patterns in the fossil record that document the change of life forms and examine genetic variations of a population over time. The student will also learn how scientists classify organisms based on similar characteristics.

Throughout the course, the student will engage in activities that promote critical thinking, explore increasingly complex conceptual relationships, and encourage them to be curious about the world they live in and explore ways to test and apply their ideas.

Semester B Outline

1. Course Overview

1. Science 7 Course Overview

2. Plants

1. Plants Introduction

2. Plant Processes

- In this section, you will explain how photosynthesis, respiration, and transpiration work together to meet a plant's needs.
- In this section, you will summarize how abiotic factors of biomes affect the ability of organisms to grow, survive, and/or create their own food through photosynthesis.

3. Plant Structure

- In this section, you will explain how the structures inside of plants transport food and water.
- In this section, you will summarize the basic structures and functions of flowering plants required for survival and defense.

4. Plant Response

- In this section, you will compare the structures and processes plants use for defense, survival, and reproduction.
- In this section, you will explain how plants respond to external stimuli to help them survive in an environment.

5. Environmental Factors

- In this section, you will plan and complete a scientific investigation to see how changes in factors like air, water, light, minerals, or space affect the growth of a flowering plant.
- In this section, you will interpret data to describe how plants respond to factors such as temperature, light, touch, water, and gravity.

6. Plants Apply

- In this section, you will create a presentation showing what you have learned about the structures of plants and the the function those structures play in the plants life and survival.

7. Plants Review

8. Plants Unit Test

3. Population and Ecosystems

1. Population and Ecosystems Introduction

2. Interdependence of Organisms

- In this section, you will examine the interdependence of organisms with one another by gathering, studying, and sharing information.
 - In this section, you will examine the interdependence of organisms with their environments by gathering, studying, and sharing information.
3. Relationships Among Organisms
 - In this section, you will describe specific relationships, such as predator/prey, and symbiotic relationships between organisms.
 - In this section, you will explain how you can make predictions about patterns of interactions that develop between organisms in an ecosystem.
 4. Resource Scarcity and Survival
 - In this section, you will identify how scarce resources can affect the survival of organisms and populations.
 - In this section, you will describe how populations in a community interact and depend on each other for survival.
 5. Scarcity Affects Populations
 - In this section, you will examine a population where scarce resources have had an impact on organisms in an ecosystem.
 6. Physical Factors
 - In this section, you will explain how changes to physical factors of an ecosystem affect populations.
 7. Biological Factors
 - In this section, you will explain how changes to biological factors of an ecosystem affect populations.
 8. Human Activity and Change
 - In this section, you will explain how human activity may change ecosystems and populations.
 - In this section, you will explain how changes in physical and biological factors in a habitat can be helpful or harmful to native plants and animals.
 9. Claiming Factors Affect Populations
 - In this section, you will find evidence to support a claim that changes to physical or biological factors of an ecosystem affect populations.
 10. Population and Ecosystems Portfolio 1
 - In this portfolio activity, you will design and conduct a simulation to investigate the effects of resource availability on populations.
 - In this section, you will identify evidence of the effects of resource availability on organisms and their populations in an ecosystem.
 - In this section, you will describe data collected as evidence for the effects of resource availability.
 11. Population and Ecosystems Portfolio 2
 - In this section, you will interpret graphs of data about the relationship between a population of organisms in an ecosystem and the resources available in that ecosystem.
 12. Population and Ecosystems Portfolio 3
 - In this section, you will display data from the investigation.
 - In this section, you will interpret data from the investigation.
 13. Population and Ecosystems Review
 14. Population and Ecosystems Unit Test

4. **Biodiversity**

1. Biodiversity Introduction
2. Biodiversity Defined
 - In this section, you will describe biodiversity of an ecosystem.
3. Invasive Species

- In this section, you will define and describe invasive species and their effects on biodiversity.
- 4. Changing Coral Reef
 - In this section, you will examine the changing biodiversity of a coral reef ecosystem.
- 5. Ecosystem Services
 - In this section, you will explain the value of biodiversity across ecosystems to humans.
- 6. Biodiversity and Ecological Health
 - In this section, you will explain how to measure the health of an ecosystem through its biodiversity.
- 7. Making Compost
 - In this section, you will identify and describe design solutions for maintaining biodiversity and ecosystem services.
- 8. Reducing Food Waste
 - In this section, you will determine the value of competing design solutions for maintaining biodiversity and ecosystem services.
- 9. Biodiversity Portfolio 1
 - In this section, you will identify an ecosystem for which to design a solution for maintaining biodiversity.
 - In this section, you will identify an ecosystem for which to design a solution for maintaining biodiversity.
 - In this section, you will brainstorm design solutions for the chosen ecosystem.
- 10. Biodiversity Portfolio 2
 - In this section, you will identify and describe possible issues and general costs of design solutions.
 - In this section, you will describe and explain your design solution.
- 11. Biodiversity Portfolio 3
 - In this section, you will compare your design solution to other possible solutions for the same ecosystem.
 - In this section, you will present your design solution.
- 12. Biodiversity Review
- 13. Biodiversity Unit Test

5. Evolution

1. Evolution Introduction
2. Walking and Swimming Whales
 - In this section, you will examine fossil record examples that demonstrate the existence, diversity, extinction, and change of life forms throughout the history of life on Earth, assuming that natural laws are the same today as in the past.
3. Are Dinosaurs Still With Us?
 - In this section, you will explain how the patterns in fossil records show the existence, diversity, extinction, and change of life forms throughout the history of life on Earth, assuming that natural laws are the same today as in the past.
 - In this section, you will understand the difference between a hypothesis and a theory.
4. Understanding Human Evolution
 - In this section, you will model the relationship between humans and other primates.
 - In this section, you will interpret data about patterns in the fossil record to

compare and contrast hominins.

- In this section, you will explain how scientists' understanding about human evolution changes as they find new evidence.
5. Are Whales and Hippos Related?
 - In this section, you will use scientific ideas to explain how the similarities and differences of the anatomies of modern organisms suggest evolutionary relationships.
 - In this section, you will evaluate information from multiple sources in terms of credibility, accuracy, and possible bias.
 6. Evolution of the Horse
 - In this section, you will use scientific ideas to explain how the similarities and differences between the anatomies of modern and fossil organisms suggest evolutionary relationships.
 7. Comparing Vertebrate Embryos
 - In this section, you will use pictures to identify and interpret linear and nonlinear relationships, including patterns of similarities in the embryos of multiple species.
 8. Stages of Development
 - In this section, you will use patterns of similarities and changes in embryo development to describe evidence for how diverse species are related.
 9. Evolution Apply
 10. Evolution Review
 11. Evolution Unit Test

6. **Natural Selection**

1. Natural Selection Introduction
2. Define Natural Selection
 - In this section, you will describe the process of natural selection.
3. Explain Natural Selection
 - In this section, you will explain how natural selection leads to certain traits being more common than others in a population.
4. Genetic Variation Over Time
 - In this section, you will explain the genetic variations of a population over time due to natural selection.
5. Traits, Survival, and Reproduction
 - In this section, you will describe how genetic variations of traits in a population make it more likely that some individuals will survive and reproduce in a specific environment.
6. Probability of Survival
 - In this section, you will describe how genetic variations of traits in a population make it more likely that some individuals will survive and reproduce in a specific environment.
7. Mathematics of Natural Selection
 - In this section, you will calculate how natural selection may lead to increases and decreases of specific traits in populations over time.
8. Human Influence on Traits
 - In this section, you will make connections by gathering information about the technologies that have changed the way humans can affect the inheritance of desired traits in organisms.
9. Human Influence on Traits Discussion
10. Natural Selection Apply
11. Natural Selection Review
12. Natural Selection Unit Test

7. Classification

1. Classification Introduction
2. Common Characteristics
 - In this section, you will develop a model to classify organisms based on common characteristics.
3. Scientific Names
 - In this section, you will explain how an organism's scientific name is based on the shared characteristics of certain levels of taxonomy.
4. Physical Characteristics
 - In this section, you will describe the similarities and differences of major physical characteristics in plants, animals, fungi, protists, and bacteria.
5. Classification Model
 - In this section, you will use models to classify organisms based on the current levels of taxonomy.
6. Evidence for Common Characteristics
 - In this section, you will support claims that all animals share common characteristics by interpreting data related to the differences among animals.
7. Classification Apply
8. Classification Review
9. Classification Unit Test