

I. PROGRAM LEARNING OUTCOMES

1. The student will be able to demonstrate mastery of the content of the elementary school curriculum.
2. The student will be able to develop and demonstrate delivery of elementary school curriculum in English and the heritage language.
3. The student will be able to use (demonstrate) a variety of teaching strategies to meet the learning needs of bilingual elementary school students.
4. The student will be able to assess and evaluate elementary school student learning at both the formative and summative levels.
5. The student will be able to organize and manage a classroom environment for learning.
6. The student will be able to demonstrate and use background knowledge in the following areas: learning theories and principles, human development, language development, technology, educational foundations, sociocultural issues and individual and group motivation.
7. The student will be able to demonstrate professionalism.

II. COURSE OUTCOMES:

A. General

1. To introduce science. To explain differences between science and religion, and allow students to demonstrate the scientific method.
2. To introduce the basic structure and function of cells, tissues, organs, systems, and organisms.
3. To describe and explain the interactions between living things and their environment.
4. Illustrate the diversity and adaptations among living things.
5. To describe and explain food production in organisms and how energy is used as a continual cycle for life
6. To introduce heredity and reproduction in organisms.
7. To explain biological changes that have, and continue to shape our lives.
8. To allow students to practice incorporating life science teaching methods into the classroom.

B. Specific

- 1. To introduce science. To explain differences between science and religion, and allow students opportunities to demonstrate use of the scientific method.**

Student Learning Outcomes	Suggested Assessment
1.1 Define science	Students will provide a correct definition science.
1.2 Examine differences between science and religion	Students will demonstrate in writing, differences between science and religion.
1.3 Identify the steps of the scientific method	Students will correctly outline the steps involved in the scientific method on a quiz.
1.4 Demonstrate use and understanding of the scientific method	Students will utilize the scientific method in practical application. Student will demonstrate scientific method techniques in at least three lab exercises. Evaluation of understanding will be reflected in written lab reports assigned following lab work.

- 2. To introduce the basic structure and function of cells, tissues, organs, systems, and organisms.**

Student Learning Outcomes	Suggested Assessment
2.1 Students will define organism	On a quiz, students will provide a definition of organism and list characteristics of organisms.
2.2 Identify all living things are made of smaller parts	Students will be asked to provide examples of objects that are comprised of smaller objects.
2.3 Describe how smaller parts of living things contribute to the operation and well being of entire organisms.	Students will provide examples of living things and how different structures contribute to different functions of the organism.
2.4 Identify that all organisms are made up of one or more cells.	Student will use microscopes to examine single-celled and multicellular organism. Students will draw what they see and describe the composition of organisms.
2.5 Students will understand the compositional relationship of cells, tissues, organs, and systems.	Students will diagram the sequential and compositional relationship between cells, tissues, organs, and systems.
2.6 Differentiate between structures and functions of plant and animal cells.	Students will identify 10 or more organelles from both plant and animal cells and describe the function of each.
2.7 Observe and describe cell division as it occurs in sequential stages.	Students will be able to identify the various stages of mitosis and meiosis and the processes

	that are occurring in each.
2.8 Understand cell membranes are selectively permeable and that certain molecules may enter the cell while others may not.	Student will demonstrate in writing the selectively-permeable nature of the cell membrane by identifying materials that can and cannot enter the cell.

3. To describe and explain the interactions between living things and their environment.

Student Learning Outcomes	Suggested Assessment
3.1 Define ecology	Students will define ecology on a quiz.
3.2 Describe how organisms use their senses to interact with their environment.	Students will identify their five senses, the structures associated with each, and how they function.
3.3 Determine the interrelationship among plants, animals, and their environment.	Identify trophic relations. Students will define and provide examples of the following: consumer, producer, predator, prey, and scavenger.
3.4 Describe how the environment and the organisms that live in it can be affected by pollution.	Students will identify disturbances and how they may affect organisms within an ecosystem.
3.5 Specify the distinction between living and non-living things.	Students will define and provide examples of biotic and abiotic things.
3.6 Investigate the relationship among organisms in a specific ecosystem.	Students will be able to characterize interspecies relations as competition, predation, symbiotic, or neutral.
3.7 Describe ways that organisms are able to change their environment.	Students will provide examples of species that can alter the environment as well as species that serve as habitat for other species.
3.8 Characterize the nature of symbiotic relationships.	Given examples and descriptions of different symbiotic relations, students will categorize them as commensalisms, mutualism, or parasitism on a test.
3.9 Identify the major biomes of the world.	Students will define biome. Students will be asked to name four biomes and provide characteristics of each.

4. Illustrate the diversity and adaptations among living things.

Student Learning Outcomes	Suggested Assessment
4.1 Determine which features help living things survive in different environments.	Students will define adaptation and provide examples of both plant and animal adaptations.
4.2 Identify the differences among plants and animals of the same kind.	Instructor will lead students in identifying physical variations among classmates. Students will then identify variations with plant and animal species.
4.3 Explain that plants and animals can be grouped according to similarities and differences	Students will be able to classify groups of organisms based on their physical characteristics.

in their characteristics.	Students will be asked to explain the evolutionary basis for similarities and divergence of species.
4.4 Determine which adaptations help organisms to survive in particular environments.	In writing, students will relate adaptations of organisms to evolution and natural selection.
4.5 Identify characteristics used by scientists to classify organisms into different categories.	Students will construct a dichotomous key to group the classes of vertebrates.

5. To describe and explain food production in organisms and how energy is used as a continual cycle for life.

Student Learning Outcomes	Suggested Assessment
5.1 Explain the basic requirements of all living things.	As a class, students will brainstorm the requirements of sustaining life for various organisms.
5.2 Identify the basic parts of a plant	Given generalized plant and flower diagrams, students will be able to identify key structures and describe their functions.
5.3 Describe how plants and animals use food for energy	Students will define energy and state how organisms use energy.
5.4 Identify the function of specific structures in organisms that allow them to obtain and use energy	Students will describe energy usage on cellular and organismal levels.
5.5 Compare relationships within food chains	Students will construct aquatic and terrestrial food chains. Students will be able to define both food chain and food web. Students will be able to identify and label trophic levels within a food chain or food web.
5.6 Distinguish between the photosynthesis, transpiration, and respiration process	On a test, students will write a paragraph describing the processes of photosynthesis, transpiration, and respiration.

6. To introduce heredity and reproduction in organisms.

Student Learning Outcomes	Suggested Assessment
6.1 Explain that living things reproduce	Students will define reproduction.
6.2 Explain that offspring tend to resemble their parents.	Students will convey, in writing, an understanding of the terms genes, chromosomes, and genetics foundations.
6.3 Describe how the appearance of plants and animals change as they mature.	Students will define the terms larvae, direct development, and metamorphosis.
6.4 Determine which characteristics are passed from parent to offspring.	Students will construct Punnett Squares and predict genotypic and phenotypic results from known parent crosses.
6.5 Describe the life cycles of different organisms.	Students will brainstorm examples of organisms that undergo radical morphological changes as they mature. Students will correctly label diagrams indicating the stages of insect development from egg through adult.

6.6 Relate how reproduction is necessary for the survival of a species.	Class will discuss the importance of reproduction for maintaining species and genetic diversity.
6.7 Illustrate the difference between sexual and asexual reproduction.	Students will define both sexual and asexual reproduction and provide one example of each.
6.8 Identify the differences between dominant and recessive traits.	Students will explain the expression of dominant and recessive traits in offspring.
6.9 Investigate the relationship among DNA, genes, chromosomes, and the genetic code of life.	Students will explain that the genetic code provides a map for the complete construction of an organism. Students will explain that the genetic code is comprised of chromosomes, that chromosomes are constructed of genes, and genes are made from DNA.

7. To explain biological changes that have, and continue to shape our lives.

Student Learning Outcomes	Suggested Assessment
7.1 Describe that some plants and animals that once lived are no longer found on Earth.	Students will define extinction and provide 4 examples of extinct organisms.
7.2 Relate how fossils show connections between organisms lived in the past and those that live in the present.	Students will outline similarities and differences between living and extinct species.
7.3 Explain that extinction has occurred in the past and continues today.	Classroom discussions will cover causes of previous mass extinctions and question whether similar extinctions may occur again.
7.4 Investigate the fossil evidence found in sedimentary rock layers.	Students will describe why fossils are generally associated with sedimentary rock. Students will be able to relate how sedimentary rock layers serve as a geologic calendar of species evolution.
7.5 Identify various types of evidence that indicates that life forms have changed over time.	On a test, students will explain in essay form, 4 specific evidences demonstrating that species evolve.
7.6 Explain how environmental changes are associated with the extinction of a species.	Students will recognize that species diversity is rapidly decreasing. Students will explain three causes of rapid extinction from anthropogenic causes and three reasons for natural species extinction.

8. To allow students to practice incorporating life science teaching methods into the classroom.

Student Learning Outcomes	Suggested Assessment
8.1 Assist other students in learning	Students will be asked to explain various concepts throughout the semester and provide input on questions from their classmates.
8.2 Discuss methods of teaching various concepts	As part of each unit, classroom discussions will include brainstorming activities aimed at discerning different approaches to teaching each unit at the appropriate elementary grade level.

8.3 Construction of elementary school life science lessons.	Each student will be assigned a project to design a life science lesson topic for a particular grade and submit supporting materials showing the objectives, rationale, and evaluation of each method. The lesson itself will be turned in as a Powerpoint presentation to be evaluated by the instructor and the class.
8.4 Practicum application	Students will coordinate their learning in Life Science for Teachers with lessons they will deliver in the third year student practicum.

III. TEXT AND MATERIALS:

Life Science Modules. Compiled by Dr. Mike Dema, 2003

IV. REFERENCE MATERIAL:

Science Insights, Exploring Living Things (Teachers Addition)
FSM Elementary School Science Standards

V. METHODS OF INSTRUCTION:

Lecture and class discussion
Laboratory exercises and demonstrations
Required reading assignments
Content adaptation to elementary classroom use

VI. COURSE CONTENT:

Unit One

Parts of living things, their structure and function, and how they contribute to the operation and well being of entire organisms.
Cell-System structure and function of plants and animals.
Sequential stages of cell division
Organelles and functions

Unit Two

Organisms their senses and the environment
Relationships/Interrelationships of organisms and their environment
Pollutants and their affects on organisms and their environment
Characteristics of living and non-living things
Major biomes found throughout the world.

Unit Three

Survival features of organisms
Similarities and differences of organisms
Classification of organisms

Unit Four

Requirements for all living things
Plant structure
Food and energy

Food chains/webs
Photosynthesis and respiration processes
Relationship between oxygen, carbon dioxide, and living things

Unit Five

Reproduction
Parents their offspring and characteristics
Maturation
Life cycles
Need for reproduction for species survival
Sexual/Asexual reproduction
Dominant and recessive traits
Relationship of DNA, genes, chromosomes, and the genetic code of life
Careers in biotechnology

Unit Six

Relationship between extinction and the environment
Fossils
Evolution

VII. INSTRUCTIONAL COSTS:

Cost of printing and binding the Life Science Modules

VIII. EVALUATION:

Students will be evaluated by 4 tests and 1 comprehensive final exam all worth 100 points. Additionally, student will have 1 lesson project due at the end of the semester. This project is also worth 100 points. Periodic quizzes will be given at the instructor's discretion; these quizzes will not total more than 100 points.

IX. REQUIRED COURSE MATERIALS:

X. ATTENDANCE POLICY:

The students' attendance in this class will strictly adhere to the College of Micronesia-FSM attendance policy.

XI. CREDIT BY EXAMINATION:

None