

DOWNEY UNIFIED SCHOOL DISTRICT
Middle School Course Outline

Course Title: Life Science (One Year)

Grade Level: 7

Prerequisites: None

Course Description:

Life Science presents the basics of biological science, emphasizing the continuity and comparability of living systems and their components, needs, and histories. The classification of living things will be based on evaluation, which explains both similar and diverse paths taken by different groups. Scientific method, science process skills, and career exploration are integrated into the content areas. Life Science emphasizes the importance of positive and negative relationships of organisms to their environment. This course also includes a unit of study, which covers D.A.R.E. and health education.

Student Performance

Objectives for this

Course:

CELL BIOLOGY

1. All living organisms are composed of cells, from just one to many trillions, whose details usually are visible only through a microscope. As a basis for understanding this concept, students will:
 - a. Compare the similarity of cell function in all living organisms.
 - b. Compare and contrast the characteristics that distinguish plant cells from animal cells, including chloroplasts and cell walls.
 - *c. Explain that the nucleus is the site for genetic information in plant and animal cells.
 - *d. Illustrate how chloroplasts capture sunlight energy for photosynthesis and how mitochondria release energy for the work that cells do.
 - *e. Illustrate how cells divide to increase their numbers through a process of mitosis, which results in two daughter cells with identical sets of chromosomes.
 - f. Give examples how multicellular organisms develop as their cells differentiate.

GENETICS

2. A typical cell of any organism contains genetic instructions that specify its traits. Those traits may be modified by environmental influences. As a basis for understanding this concept, students will:

*Indicates KEY STANDARDS for emphasis.

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- *a. Compare and contrast the differences between the life cycles and reproduction of sexual and asexual organisms.
- b. Demonstrate how sexual reproduction produces offspring that inherit half their genes from each parent.
- *c. Give examples of how an inherited trait can be determined by one or more genes.
- *d. Explain that plant and animal cells contain many thousands of different genes, and typically have two copies of every gene. The two copies (or alleles) of the gene may or may not be identical, and one may be dominant in determining the phenotype while the other is recessive.
- *e. Identify that DNA is the genetic material of living organisms, and is located in the chromosomes of each cell.

BIOLOGICAL EVOLUTION

3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations. As a basis for understanding this concept, students will:
- *a. Describe how genetic variation and environmental factors are causes of evolution and diversity of organisms.
 - *b. Explain the reasoning used by Darwin in making his conclusion that natural selection is the mechanism of evolution.
 - *c. Synthesize how independent lines of evidence from geology, fossils, and comparative anatomy provide a basis for the theory of evolution.
 - d. Construct a simple branching diagram to classify living groups of organisms by shared derived characteristics, and expand the diagram to include fossil organisms.
 - e. Give examples of the extinction of a species occurring when the environment changes and the adaptive characteristics of a species are insufficient for its survival.

EARTH AND LIFE HISTORY (EARTH SCIENCE)

4. Evidence from rocks allows us to understand the evolution of life on Earth. As the basis for understanding this concept, students will:

*Indicates KEY STANDARDS for emphasis.

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- a. Compare how earth's processes of today are similar to those that occurred in the past and explain how geologic processes have large cumulative effects over long periods of time.
- b. Give examples of how the history of life on Earth has been disrupted by major catastrophic events, such as major volcanic eruptions or the impact of an asteroid.
- c. Diagram the rock cycle including the formation of new sediment and rocks. Rocks are often found in layers with the oldest generally on the bottom.
- d. Explain the evidence from geologic layers and radioactive dating indicate the Earth is approximately 4.6 billion years old, and that life has existed for more than 3 billion years.
- e. Analyze evidence from the fossil record showing how life and environmental conditions have changed.
- f. Describe and/or give examples of how movements of the Earth's continental and oceanic plates through time, with associated changes in climate and geographical connections, have affected the past and present distribution of organisms.
- *g. Explain significant developments and extinctions of plant and animal life on the geologic time scale.

STRUCTURE AND FUNCTION IN LIVING SYSTEMS

5. The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function. As a basis for understanding this concept, students will:
 - *a. Describe in plants and animals the levels of organization for structure and function, including cells, tissues, organs, organ systems, and the whole organism.
 - b. Explain how organ systems function because of the contributions of individual organs, tissues, and cells. The failure of any part can affect the entire system.
 - *c. Demonstrate how bones and muscles work together to provide a structural framework for movement.
 - d. Explain how the reproductive organs of the human female and male generate eggs and sperm, and how sexual activity may lead to fertilization and pregnancy.
 - e. Describe the function of the umbilicus and placenta during pregnancy.
 - f. Illustrate the structures and processes by which flowering plants generate pollen and ovules, seeds, and fruit.

*Indicates KEY STANDARDS for emphasis.

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- g. Relate the structures of the eye and ear to their functions.
- *h. Name and describe the symptoms and prevention of the major sexually transmitted diseases.
- *i. List and describe the immediate and long-term undesirable physiologic, cosmetic and social consequences of substance abuse (drugs, alcohol, tobacco, inhalants, etc.) including reasons adolescents say they use substances.
- *j. Identify peer norms and social influences that promote substance abuse, and demonstrate effective refusal skills.
- k. explain the Safety Surrender Baby Law (SB 1386), which states that any infant less than 3 days old may be surrendered to any hospital emergency room, fire station in Los Angeles County without arrest or prosecution as long as it is determined that the infant was not intentionally harmed.

PHYSICAL PRINCIPLES IN LIVING SYSTEMS (PHYSICAL SCIENCE)

- 6. Physical principles underlie biological structures and functions. As a basis for understanding this concept students will:
 - *a. Describe how visible light is a small band within a very broad electromagnetic spectrum.
 - b. Explain that for an object to be seen, light emitted by or scattered from it must be detected by the eye.
 - c. Illustrate how light travels in straight lines if the medium it travels through does not change.
 - d. Explain how simple lenses are used in a magnifying glass, the eye, a camera, a telescope, and a microscope.
 - e. Identify that white light is a mixture of many wavelengths (colors) and describe how retinal cells react differently to different wavelengths.
 - f. Give examples how light can be reflected, refracted, transmitted, and absorbed by matter.
 - g. Diagram the angle of reflection of a light beam is equal to the angle of incidence.
 - *h. Compare joints in the body (wrist, shoulder, and thigh) with structures used in machines and simple devices (hinge, ball-and-socket, and sliding joints).

*Indicates KEY STANDARDS for emphasis.

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- i. Explain how levers confer mechanical advantage and how the application of this principle applies to the musculoskeletal system.
- *j. Demonstrate that contraction of the heart generates blood pressure and that heart valves prevent backflow of blood in the circulatory system.

INVESTIGATION AND EXPERIMENTATION:

Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform investigations.

Students will:

- a. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.
- b. Utilize a variety of print and electronic resources (including the World Wide Web) to collect information as evidence as part of a research project.
- *c. Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence.
- d. Construct scale models, maps and appropriately labeled diagrams to communicate scientific knowledge (e.g., motion of Earth's plates and cell structure).
- e. Communicate the steps and results from an investigation in written reports and verbal presentations.

*Indicates KEY STANDARDS for emphasis.

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Instructional Strategies

1. Lecture/note-taking
2. Observation/demonstration
3. Laboratory hands-on experimentation
4. Written assignments
5. Group projects
6. Audio-visual aids
7. Tests
8. Games/simulations
9. Reading/responding to text, graphs, charts, magazines

Instructional Units

<u>Weeks</u>	<u>Unit – Organized by Standards Unit</u>
1	Investigation and Experimentation <i>(In addition to the 1-week of concentrated study, the instruction of investigation and experimentation is also integrated throughout the course.)</i>
7	Cell Biology
6	Genetics
6	Biological Evolution
6	Earth and Life History
8	Structure and Function in Living Systems (including Health/D.A.R.E.)
1-2	State Assessment/Review

<u>Weeks</u> <i>(1 day = .2 week)</i>	<u>Unit – Organized by Text/Chapter</u>
1	Chapter 1: Cell Structure and Function
1.2	Chapter 2: Cell Processes and Energy
1	Chapter 3: Genetics – The Science of Heredity
1	Chapter 4: Modern Genetics
1	Chapter 5: Evolution
2	Chapter 6: Earth's History
2	Chapter 7: Living Things
1.6	Chapter 8: Viruses and Bacteria
1.6	Chapter 9: Protists and Fungi
1.4	Chapter 10: Introduction to Plants
1.8	Chapter 11: Seed Plants
1.6	Chapter 12: Sponge, Cnidarians, and Worms
2	Chapter 13: Mollusks, Arthropods, and Echinoderms

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2	Chapter 14: Fishes, Amphibians, and Reptiles
2	Chapter 15: Birds and Mammals
1	Chapter 16: Healthy Body Systems
1.6	Chapter 17: Bones, Muscles, and Skin
1.6	Chapter 18: Food and Digestion
1.6	Chapter 19: Circulation
1.2	Chapter 20: Respiration and Excretion
1.6	Chapter 21: Fighting Disease
1.6	Chapter 22: The Nervous System
1.6	Chapter 23: The Endocrine System and Reproduction
<u>1-2</u>	State Assessment/Review
Total: 36 Weeks	

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Evaluation

Performance-based projects and testing
Teacher observation
Homework
Tests & quizzes
Completion and quality of assignments

Materials and Resources

Student Textbook:

Focus on Life Science
Science Explorer – California Edition
Prentice Hall