Curriculum Development
In the Fairfield Public Schools

FAIRFIELD PUBLIC SCHOOLS

FAIRFIELD, CONNECTICUT

GRADE 7 SCIENCE

APPROVED 09/12/2006

GRADE 7 SCIENCE

Statement Of Purpose

Grade 7 science has its emphasis on living things and their interactions with their environment. It focuses on developing an understanding of the human body starting from the cellular level. An understanding of these concepts is essential for individuals to make informed choices with regard to their environment and advancing scientific technology.

Audience

Grade 7 students

Prerequisites

None

Design and Description

Grade 7 science is a heterogeneous class that meets one period per day. The major topics are: characteristics of living things, structures and interactions of organisms, systems of the human body, and cellular reproduction.

Course Objectives

Students will:

- develop scientific inquiry, literacy and numeracy skills.
- identify characteristics of living things.
- describe factors that affect the survival of living things.
- differentiate between animal and plant cells.
- describe the structures and functions of each major organelle in plant and animal cells. describe the structures and functions of the human digestive, respiratory, circulatory, musculo-skeletal and nervous systems.
- describe both the helpful and harmful relationships between microbes and humans.
- identify common strategies to prevent food spoilage due to microbes.
- describe the processes of mitosis and meiosis.
- describe the role of meiosis in gender determination.
- compare and contrast the functions of mitosis and meiosis.
- distinguish among DNA, genes and chromosomes and describe their interrelationships.

Science Standards

Matter and Energy in Ecosystems

An ecosystem is composed of all populations that are living in a certain space and the physical factors with which they interact.

Students will describe how abiotic factors, such as temperature, water, and sunlight, affect the ability of plants to create their own food through photosynthesis.

Students will explain how populations are affected by predator-prey relationships.

Students will describe common food webs in different Connecticut ecosystems.

Structure and Function
Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.

Students will describe the basic structures of an animal cell, including nucleus, cytoplasm, mitochondria and cell membrane, and how they function to support life.

Students will describe the structures of the human digestive, respiratory and circulatory systems, and explain how they function to bring oxygen and nutrients to the cells and expel waste materials.

Students will explain how the human musculo-skeletal system supports the body and allows movement.

Science and Technology in Society
Technology allows us to improve food production and preservation, thus improving our ability to meet the nutritional needs of growing populations.

Students will describe how freezing, dehydration, pickling and irradiation prevent food spoilage caused by microbes.

Heredity and Evolution
Reproduction is a characteristic of living systems and it is essential for the continuation of every species.

Students will explain the similarities and differences in cell division in somatic and germ cells.

Students will describe how genetic information is organized in genes on chromosomes, and explain sex determination in humans.

Information and Technology Standards (to be added)

Essential Questions

- How do matter and energy flow through ecosystems?
- How are organisms structured to ensure efficiency and survival?
- How do science and technology affect the quality of our lives?
- What processes are responsible for life's unity and diversity?

Focus Questions

- What are the characteristics of living things and the factors that affect their survival?
- What are the structures and functions of animal and plant cells?
- What are the processes and functions of mitosis and meiosis?

- What are the interrelationships among DNA, genes and chromosomes?
- How do the structures of living things allow them to carry out their life functions?
- How do the interactions between microbes and humans affect our daily lives?

UNITS of STUDY

Unit 1: Introduction to Life

Science Standards

Matter and Energy in Ecosystems

An ecosystem is composed of all the populations that are living in a certain space and the physical factors with which they interact.

Students will describe how abiotic factors, such as temperature, water and sunlight, affect the ability of plants to create their own food through photosynthesis.

Essential Question

- How do matter and energy flow through ecosystems?

Focus Question

- What are the characteristics of living things and the factors that affect their survival?

Core Topics

- Characteristics of living things
- Factors that affect the survival of living things

Unit Objectives

Students will be able to:

- identify characteristics of living things.
- describe factors that affect the survival of living things.

Sample Assessment

- Create an Organism Project

Pacing

5 weeks

Unit 2: Cell Structure and Reproduction

Science Standards

Structure and Function

Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.

Students will describe the basic structures of an animal cell, including nucleus, cytoplasm, mitochondria, and cell membrane, and how they function to support life.

Heredity and Evolution

Reproduction is a characteristic of living systems and it is essential for the continuation of every species.

Students will explain the similarities and differences in cell division in somatic and germ cells.

Students will describe how genetic information is organized in genes on chromosomes, and explain gender determination in humans.

Essential Questions

- How are organisms structured to ensure efficiency and survival?
- What processes are responsible for life's unity and diversity?

Focus Questions

- What are the structures and functions of animal and plant cells?
- What are the processes and functions of mitosis and meiosis?
- What are the interrelationships among DNA, genes and chromosomes?

Core Topics

- Structures and functions of nucleus, cytoplasm, mitochondria, and cell membrane of plant and animal cells
- Cellular respiration vs. photosynthesis
- Cell division in somatic and germ cells
- Gender determination
- Interrelationship among DNA, genes and chromosomes

Unit Objectives

Students will be able to:

- differentiate between animal and plant cells.
- compare the processes of cellular respiration and photosynthesis.
- describe and locate the structures of major organelles in plant and animal cells. including the nucleus, cytoplasm, mitochondria, and cell membrane, and explain their functions.
- outline the processes of mitosis and meiosis.
- explain the role of meiosis in gender determination.

- compare and contrast the functions of mitosis and meiosis.
- distinguish among DNA, genes and chromosomes and describe their interrelationships.

Sample Assessment

- Cell Travel Brochure
- Cell Analogy PowerPoint Project

Pacing

9 weeks

Unit 3: Structures and Interactions of Living Things

Science Standards

Structure and Function

Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.

Students will describe the structures of the human digestive, respiratory, and circulatory systems, and explain how they function to bring oxygen and nutrients to the cells and expel waste materials.

Students will explain how the human musculo-skeletal system supports the body and allows movement.

Science and Technology in Society

Technology allows us to improve food production and preservation, thus improving our ability to meet the nutritional needs of growing populations.

Students will describe how freezing, dehydration, pickling and irradiation prevent food spoilage caused by microbes.

Essential Question

- How are organisms structured to ensure efficiency and survival?

Focus Questions

- How do the structures of living things allow them to carry out their life functions?
- How do the interactions between microbes and humans affect our daily lives?

Core Topics

- Structures and functions of major human body systems, including:
    1. Digestive System – major components, digestive processes, role of digestion to provide nutrients to cells.
    2. Respiratory System – major components, role of respiration to provide oxygen to cells and remove carbon dioxide.
    3. Circulatory System – major components, role of circulatory system to transport life-sustaining materials to cells and remove waste from cells.
    4. Musculo-Skeletal System – role of musculo-skeletal system to support the body and allow movement.
    5. Nervous System – major components, role of nervous system to regulate all body functions.
- Interrelationships among human body systems
- Current medical topics in the media
- Healthy lifestyle practices
- Preventative strategies for food spoilage
- Helpful and harmful microbes

Unit Objectives

Students will be able to:

- identify and describe the structures and functions of the human digestive, respiratory, circulatory, musculo-skeletal and nervous systems.
- apply knowledge of human body systems to:
    1. analyze current medical topics in the media.
    2. practice healthy lifestyle choices.
- explain both the helpful and harmful relationships between microbes and humans.
- identify common strategies to prevent food spoilage due to microbes including freezing, dehydration, pickling, and irradiation.

Sample Assessment

- "We Got the Beat" Inquiry Lab
- Diaphragm Model Building Activity

Pacing

20 weeks
3 weeks per body system
1 week inquiry activity
4 weeks enrichment time for additional labs and activities relating to the human body