

### SCIENCE SEQUENCE

Grade	Course Title	Length	Meeting Time	Required or Elective
7	Science 7	Full Year	Daily	Required
8	Earth and Space Science 8	Full Year	Daily	Required
9	Physical Science	Full Year	Daily	Required
	Or Honors Physical Science			
10	Biology	Full Year	Daily	Required
	Or Honors Biology	Full Year	Daily	
11	Chemistry	Full Year	Daily	Elective
	Ecology	Full Year	Daily	Elective
	Anatomy and Physiology	Full Year	Daily	Elective
	Physics	Full Year	Daily	Elective
12	Chemistry	Full Year	Daily	Elective
	Ecology	Full Year	Daily	Elective
	Anatomy and Physiology	Full Year	Daily	Elective
	Physics	Full Year	Daily	Elective

**Guideline:** State rules stipulate all students must complete three years of science to graduate from high school; Four-year college/universities also require three years of science for admittance.

Students may substitute both crop and animal science for a third-year of science. However, this requires approval by the principal. Additionally, this is not the best route for those interested in attending a four-year university.

## SCIENCE DEPARTMENT

### PHILOSOPHY

The study of science involves the student in the process of discovery, problem solving, and the analysis of experimental data. A knowledge of science will allow the student to make informed choices in the care and use of world resources.

### STANDARDS

THE STUDENT WILL:

- 1) Demonstrate the ability to gather, analyze, and synthesize information from laboratory work, field experience, and media resources.
- 2) Apply the scientific method or other accepted problem solving technique to pose questions, and generate and test possible solutions based on the collected data.
- 3) Utilize scientific knowledge and ideas as they apply to real world situations.
- 4) Think critically and logically to identify relationships between evidence and explanations.
- 5) Understand and evaluate the impact of science and technology on ethical issues and moral values and their reciprocal relationship.
- 6) Demonstrate the ability to use technology and mathematics appropriate to the task.

### CAREERS IN THE SCIENCE FIELD:

Agriculturalist	Geologist	Podiatrist
Astronomer	Horticulturalist	Professor
Audiologist	Hydrologist	Radiologist
Biochemist	Laboratory Technician	Respiratory Therapist
Biologist	Mechanic	Surveyor
Biomedical Engineer	Medical Technician	Teacher
Chemist	Meteorologist	Technical Writer
Dietitian	Nurse	Veterinarian
DNR Officer	Optometrist	X-ray Technician
Engineer	Park Ranger	Water Plant Operator
Environmentalist	Pharmacist	Geneticist
Farmer	Physical Therapist	Fishery Biologist
Physician	Physicist	Forester

<b>NUMBER:</b>	721/722	<b>TITLE:</b>	Physical Science
<b>GRADE(S):</b>	9	<b>MEETING TIME</b>	Daily
<b>LENGTH:</b>	Year	<b>CREDIT:</b>	5 per semester

**COURSE SUMMARY:**

The students will increase their knowledge and skills in algebra, the scientific method, problem solving, critical thinking, standard measurements, conversions, and graphing, and learn how to apply these to the world outside the classroom.

Areas of study from physics will include:

- |                      |                                       |
|----------------------|---------------------------------------|
| 1. Projectile motion | 4. Energy and waves (sound and light) |
| 2. Forces            | 5. Simple Machines                    |
| 3. Laws of motion    |                                       |

Areas of study from chemistry will include:

- |                         |  |
|-------------------------|--|
| 1. Properties of matter | 5. Use and understanding of the periodic table |
| 2. Behavior of elements | 6. Energy (quantum) theory                     |
| 3. Reactions            | 7. Acids, bases, and salts                     |
| 4. Solutions            | 8. Basic stoichiometry and balancing equations |

<b>NUMBER:</b>	723/724	<b>TITLE:</b>	Honors Physical Science
<b>GRADE(S):</b>	9	<b>MEETING TIME</b>	Daily
<b>LENGTH:</b>	Year	<b>CREDIT:</b>	5 per semester
<b>Guideline:</b>	Honors guidelines apply		

**COURSE SUMMARY**

Students will increase their knowledge and skills in algebra, the scientific method, problem solving, critical thinking, standard measurements, conversions, and graphing, and learn how to apply these to the world outside the classroom.

Topics in Honors Physical Science will be covered at a more rigorous pace, in more detail, and with less in-class repetition of factual information than in the other physical science course. Communication of scientific ideas, higher order thinking, and experimental design will be stressed.

Areas of study from chemistry include:

- elements & atoms
- understanding the Periodic Table
- stoichiometry and balancing equation
- chemical reactions

Areas of study from environmental science include:

- Earth systems

- climate change
- plate tectonics
- Earth formation
- dating materials
- solar system
- stars
- space

Areas of study from physics include:

- laws of motion
- projectile motion
- forces
- energy & waves (sound & light)
- simple machines
- electricity

<b>NUMBER:</b>	731/732	<b>TITLE:</b>	Biology
<b>GRADE(S):</b>	10	<b>MEETING TIME</b>	Daily
<b>LENGTH:</b>	Year	<b>CREDIT:</b>	5 per semester

**COURSE SUMMARY:** The student will:

1. Identify external and internal structures of a variety of organisms and relate structure to function.
2. Discuss how organisms take in, use and store energy.
3. Examine reproduction and the passing of traits at the cellular level.
4. Solve genetic problems using the principles of heredity.
5. Analyze current uses of biotechnology and identify moral and ethical arguments regarding controversial issues.
6. Analyze the interdependence of organisms within ecosystems and their dependency on the environment.
7. Identify and evaluate evolutionary processes by creating a variety of student artifacts.
8. Investigate and communicate results of scientific inquiries.

Biology provides students with the opportunity to examine organisms of various levels of complexity, anatomy and physiology of higher plants and animals (including humans), genetics, evolution, adaptations and development.

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<b>NUMBER:</b>	743/744	<b>TITLE:</b>	Honors Biology
<b>GRADE(S):</b>	<b>10</b>	<b>MEETING TIME</b>	Daily
<b>LENGTH:</b>	Year	<b>CREDIT:</b>	5 per semester
<b>Guideline:</b>	Honors guidelines apply		

**COURSE SUMMARY:** The student will:

1. Identify internal and external structures of organisms from all kingdoms and understand how their structures relate to their functions.
2. Demonstrate and discuss energy production, use, and storage in living organisms.
3. Examine reproduction and the passing of traits at the cellular level.
4. Solve genetic problems using the principles of heredity.
5. Analyze current uses of biotechnology and identify moral and ethical arguments regarding controversial issues.
6. Analyze the relationships between organisms in an ecosystem, and their interdependency with their environment.
7. Compare, contrast, and evaluate evolutionary processes.
8. Design, investigate, and communicate the results of scientific inquiries.

Topics in Honors Biology will be covered at a more rigorous pace and in more detail and with less in-class repetition of factual information than in the other biology course. Acquisition and communication of scientific information is carried out using a variety of technological tools. Communication, research, and higher order thinking skills are stressed through the design and implementation of a personal research project.

<b>NUMBER:</b>	761/762	<b>TITLE:</b>	Chemistry
<b>GRADE(S):</b>	11-12	<b>MEETING TIME</b>	Daily
<b>LENGTH:</b>	Year	<b>CREDIT:</b>	5 per semester

**COURSE SUMMARY:**

Students will develop a workable knowledge of the following chemical concepts:

1. Chemistry Terminology
2. Atomic Structure
3. The mole, chemical reaction equations and stoichiometry
4. Electron structure
5. The periodic table
6. Naming chemicals, predicting their structures and properties
7. Types of chemical bonds and their properties
8. Solid, liquid and gas dynamics
9. Chemistry of water
10. Chemistry in biological and environmental systems

The focus of this class is understanding matter and its interactions. The laboratory, problem solving techniques, lecture/discussion, demonstrations, and practical analysis will be used to develop a strong ability to evaluate chemical concepts.

**GUIDELINE:** Successful completion of Algebra 1.

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<b>NUMBER:</b>	763/764	<b>TITLE:</b>	Ecology
<b>GRADE(S):</b>	11-12	<b>MEETING TIME</b>	Daily
<b>LENGTH:</b>	Year	<b>CREDIT:</b>	5 per semester

**COURSE SUMMARY** The goal of this class is to develop knowledgeable and informed citizens capable of considering ecological benefits and consequences in everyday decisions.

The student will

1. Develop a working knowledge of basic ecological concepts and apply them to laboratory and field experiences
2. Conduct basic sampling and analysis of data
3. Identify relationships between components of the environment and understand that all systems depend on each other.
4. Demonstrate an understanding of the concepts of:
  - a. Ecological relationships including symbiotics
  - b. Conservation and use of resources
  - c. Environmental health

The focus of this course is on the interactions of ecological systems. Laboratory and field experiences will be used extensively to develop students' skills in gathering and interpreting data and applying concepts to improve problem-solving skills. Mathematical applications will be limited.

<b>NUMBER:</b>	771/772	<b>TITLE:</b>	Anatomy & Physiology
<b>GRADE(S):</b>	11-12	<b>MEETING TIME</b>	Daily
<b>LENGTH:</b>	Year	<b>CREDIT:</b>	5 per semester

**COURSE SUMMARY:** This introduction to Anatomy and Physiology consists of an overview of the systems of the human body at the cellular, organ and whole body levels, with comparisons to animal biology.

The student will be expected to:

1. Utilize accepted terminology.
2. Understand fundamental concepts of the anatomy and physiology of the human.
3. Develop the ability to apply concepts in lab situations and in daily life.

Anatomy and Physiology consists of an overview of the systems of the human body. The class will include projects and labs and emphasize the practical application of this knowledge to facilitate communication with health care professionals and to evaluate consumer health claims. Students will be required to observe and participate in dissections of animal specimens.

Anyone interested in learning about the structure of his or her body and how it works should consider this class.

**GUIDELINE:** Successful completion of Biology

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<b>NUMBER:</b>	781/782	<b>TITLE:</b>	Physics
<b>GRADE(S):</b>	11-12	<b>MEETING TIME</b>	Daily
<b>LENGTH:</b>	Year	<b>CREDIT:</b>	5 per semester

**COURSE SUMMARY:**

The student will use variables, algebra, graphs, logic and problem solving skills to explore and understand:

1. One-dimensional motion

2. Projectile motion
3. Forces
4. Uniform circular motion & gravitation
5. Work & energy
6. Linear collisions & momentum
7. Torque & angular momentum
8. Simple harmonic motion
9. Waves & sound
10. Electric charge and static force
11. DC circuits

Students completing this course will be capable of applying physics concepts to everyday problems and using mathematical formulas to solve one-variable equations. Laboratory experiences will be designed to give students an opportunity to develop problem solving and critical thinking skills, as applied to real world situations.

<b>NUMBER:</b>	745/746	<b>TITLE:</b>	Scientific Research Methods
<b>GRADE(S):</b>	10-12	<b>MEETING TIME</b>	Daily
<b>LENGTH:</b>	Year	<b>CREDIT:</b>	5 per semester

**COURSE SUMMARY:** Scientific Research Methods is an inquiry-based course that allows students to engage in scholarly research with the objective of creating a unique scientific project. Students are encouraged to investigate topics that stimulate their innate curiosity. Throughout the course, students will complete units related to the six essential research skills:

1. Critical-thinking and reasoning
2. Critical reading
3. Inquiry and research
4. Argumentation
5. Communicating Publicly
6. Collaboration