



VIRGINIA BEACH CITY PUBLIC SCHOOLS

CHARTING THE COURSE

Department of Teaching & Learning *Parent/Student Course Information*

Advanced Life Science *(SC 4118)* *One year* *Grade 7*

Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department.

COURSE DESCRIPTION

The Advanced Science 7 course is a rigorous life science program that encourages students to address real-world science issues. The instructional program incorporates technology, community resources, laboratory experimentation and field-based activities designed to foster critical thinking and problem-solving skills. A major goal of this course is to encourage student-directed research. Students will take the Standards of Learning (SOL) test for Grade 8 Science. The course is recommended for highly motivated students with exceptional work and study habits, a high interest in science and advanced math, reading, and writing skills.

COURSE GOALS

- Develop an understanding of concepts and principles in the life sciences
- Develop problem-solving and decision-making skills through experimentation, research and discussion
- Develop an awareness of the interdisciplinary nature of science and its relevance to society
- Develop basic communication and technology skills
- Explore the application of scientific principles in careers and in other areas of interest
- Complete selected advanced activities and labs

PREREQUISITE

Advanced Science 6 or a teacher recommendation for advanced science **and** successful completion of the electronic Physical Science Modules, which are monitored by instructional staff.

OPTIONS FOR NEXT COURSE

Earth Science

REQUIRED TEXTBOOK

VBCPS Advanced Life Science 7 FlexBook

MINIMUM REQUIREMENTS

- Demonstrate knowledge and understanding of all core objectives through laboratory investigations, issue investigations, projects, oral and/or written tests, quizzes and reports
- Participate in the laboratory experiences, adhering to all safety procedures
- Prepare written reports for laboratory activities
- Conduct an independent science investigation
- Investigate career opportunities and areas of interest in the life sciences
- Demonstrate an understanding of the role of technology in science

*Virginia Standards of Learning
Advanced Science 7*

The Life Science standards emphasize a more complex understanding of change, cycles, patterns, and relationships in the living world. Students build on basic principles related to these concepts by exploring the cellular organization and the classification of organisms; the dynamic relationships among organisms, populations, communities, and ecosystems; and change as a result of the transmission of genetic information from generation to generation. Students build on scientific investigation skills by independently identifying questions and planning investigations. Students evaluate the usefulness and limits of models and support their conclusions using evidence. Mathematics, computational thinking, and experience in the engineering design process gain importance as students advance in their scientific thinking.

- LS.1 The student will demonstrate an understanding of scientific and engineering practices by
- a) asking questions and defining problems
 - ask questions and develop hypotheses to determine relationships between independent and dependent variables
 - offer simple solutions to design problems
 - b) planning and carrying out investigations
 - independently and collaboratively plan and conduct observational and experimental investigations; identify variables, constants, and controls where appropriate and include the safe use of chemicals and equipment
 - evaluate the accuracy of various methods for collecting data
 - take metric measurements using appropriate tools and technologies including the use of microscopes
 - c) interpreting, analyzing, and evaluating data
 - identify, interpret, and evaluate patterns in data
 - construct, analyze, and interpret graphical displays of data
 - compare and contrast data collected by different groups and discuss similarities and differences in their findings
 - consider limitations of data analysis and/or seek to improve precision and accuracy of data
 - use data to evaluate and refine design solutions
 - d) constructing and critiquing conclusions and explanations
 - construct explanations that include qualitative or quantitative relationships between variables
 - construct scientific explanations based on valid and reliable evidence obtained from sources (including the students' own investigations)
 - differentiate between a scientific hypothesis and theory
 - e) developing and using models
 - construct and use models and simulations to illustrate, predict, and/or explain observable and unobservable phenomena, life processes, or mechanisms
 - evaluate limitations of models
 - f) obtaining, evaluating, and communicating information
 - read scientific texts, including those adapted for classroom use, to obtain scientific and/or technical information
 - gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication
 - construct, use, and/or present an argument supported by empirical evidence and scientific reasoning

LS.2 The student will investigate and understand that all living things are composed of one or more cells that support life processes, as described by the cell theory. Key ideas include

- a) the development of the cell theory demonstrates the nature of science;
- b) cell structure and organelles support life processes;
- c) similarities and differences between plant and animal cells determine how they support life processes;
- d) cell division is the mechanism for growth and reproduction; and
- e) cellular transport (osmosis and diffusion) is important for life processes.

LS.3 The student will investigate and understand that there are levels of structural organization in living things. Key ideas include

- a) patterns of cellular organization support life processes;
- b) unicellular and multicellular organisms have comparative structures; and
- c) similar characteristics determine the classification of organisms.

LS.4 The student will investigate and understand that there are chemical processes of energy transfer which are important for life. Key ideas include

- a) photosynthesis is the foundation of virtually all food webs; and
- b) photosynthesis and cellular respiration support life processes.

LS.5 The student will investigate and understand that biotic and abiotic factors affect an ecosystem. Key ideas include

- a) matter moves through ecosystems via the carbon, water, and nitrogen cycles;
- b) energy flow is represented by food webs and energy pyramids; and
- c) relationships exist among producers, consumers, and decomposers.

LS.6 The student will investigate and understand that populations in a biological community interact and are interdependent. Key ideas include

- a) relationships exist between predators and prey and these relationships are modeled in food webs;
- b) the availability and use of resources may lead to competition and cooperation;
- c) symbiotic relationships support the survival of different species; and
- d) the niche of each organism supports survival.

LS.7 The student will investigate and understand that adaptations support an organism's survival in an ecosystem. Key ideas include

- a) biotic and abiotic factors define land, marine, and freshwater ecosystems; and
- b) physical and behavioral characteristics enable organisms to survive within a specific ecosystem.

LS.8 The student will investigate and understand that ecosystems, communities, populations, and organisms are dynamic and change over time. Key ideas include

- a) organisms respond to daily, seasonal, and long-term changes;
- b) changes in the environment may increase or decrease population size; and
- c) large-scale changes such as eutrophication, climate changes, and catastrophic disturbances affect ecosystems.

LS.9 The student will investigate and understand that relationships exist between ecosystem dynamics and human activity. Key ideas include

- a) changes in habitat can disturb populations;
- b) disruptions in ecosystems can change species competition; and
- c) variations in biotic and abiotic factors can change ecosystems.

LS.10 The student will investigate and understand that organisms reproduce and transmit genetic information to new generations. Key ideas include

- a) DNA has a role in making proteins that determine organism traits;
- b) the role of meiosis is to transfer traits to the next generation; and
- c) Punnett squares are mathematical models used to predict the probability of traits in offspring.

LS.11 The student will investigate and understand that populations of organisms can change over time. Key ideas include

- a) mutation, adaptation, natural selection, and extinction change populations;
- b) the fossil record, genetic information, and anatomical comparisons provide evidence for evolution; and
- c) environmental factors and genetic variation, influence survivability and diversity of organisms.

6.4 The student will investigate and understand that there are basic sources of energy and that energy can be transformed. Key ideas include

- b) Earth's energy budget relates to living systems and Earth's processes;

6.6 The student will investigate and understand that water has unique physical properties and has a role in the natural and human-made environment. Key ideas include

- e) large bodies of water moderate climate; and
- f) water is important for agriculture, power generation, and public health.

6.7 The student will investigate and understand that air has properties and that Earth's atmosphere has structure and is dynamic. Key ideas include

- a) air is a mixture of gaseous elements and compounds;
- b) the atmosphere has physical characteristics;
- c) properties of the atmosphere change with altitude;
- d) there is a relationship between air movement, thermal energy, and weather conditions;
- e) atmospheric measures are used to predict weather conditions; and
- f) weather maps give basic information about fronts, systems, and weather measurements.

6.8 The student will investigate and understand that land and water have roles in watershed systems. Key ideas include

- a) a watershed is composed of the land that drains into a body of water;
- b) Virginia is composed of multiple watershed systems which have specific features;
- c) the Chesapeake Bay is an estuary that has many important functions; and
- d) natural processes, human activities, and biotic and abiotic factors influence the health of a watershed system.

6.9 The student will investigate and understand that humans impact the environment and individuals can influence public policy decisions related to energy and the environment. Key ideas include

- a) natural resources are important to protect and maintain;
- c) major health and safety issues are associated with air and water quality;
- d) major health and safety issues are related to different forms of energy;
- e) preventive measures can protect land-use and reduce environmental hazards; and
- f) there are cost/benefit tradeoffs in conservation policies.

Aaron C. Spence, Ed.D., Superintendent
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Produced by the Department of Teaching and Learning.
For further information, please call (757) 263-1070.

Notice of Non-Discrimination Policy

Virginia Beach City Public Schools does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation/gender identity, pregnancy, childbirth or related medical condition, disability, marital status, age, genetic information or veteran status in its programs, activities, employment, or enrollment, and provides equal access to the Boy Scouts and other designated youth groups. School Board policies and regulations (including, but not limited to, Policies 2-33, 4-4, 5-7, 5-19, 5-20, 5-44, 6-33, 6-7, 7-48, 7-49, 7-57 and Regulations 4-4.1, 4-4.2, 5-44.1, 7-11.1, 7-17.1 and 7-57.1) provide equal access to courses, programs, enrollment, counseling services, physical education and athletic, vocational education, instructional materials, extracurricular activities and employment.

Title IX Notice: Complaints or concerns regarding discrimination on the basis of sex or sexual harassment should be addressed to the Title IX Coordinator, at the VBCPS Office of Student Leadership, 641 Carriage Hill Road, Suite 200, Virginia Beach, 23452, (757) 263-2020, Mary.Dees@vbschools.com (student complaints) or the VBCPS Department of School Leadership, 2512 George Mason Drive, Municipal Center, Building 6, Virginia Beach, Virginia, 23456 (757) 263-1088, Elizabeth.Bryant@vbschools.com (employee complaints). Additional information regarding Virginia Beach City Public Schools' policies regarding discrimination on the basis of sex and sexual harassment, as well as the procedures for filing a formal complaint and related grievance processes, can be found in School Board Policy 5-44 and School Board Regulations 5-44.1 (students), School Board Policy 4-4 and School Board Regulation 4-4.3 (employees), and on the School Division's website at Diversity, Equity and Inclusion/Title IX. Concerns about the application of Section 504 of the Rehabilitation Act should be addressed to the Section 504 Coordinator/Executive Director of Student Support Services at (757) 263-1980, 2512 George Mason Drive, Virginia Beach, Virginia, 23456 or the Section 504 Coordinator at the student's school. For students who are eligible or suspected of being eligible for special education or related services under IDEA, please contact the Office of Programs for Exceptional Children at (757) 263-2400, Plaza Annex/Family and Community Engagement Center, 641 Carriage Hill Road, Suite 200, Virginia Beach, VA 23452.

The School Division is committed to providing educational environments that are free of discrimination, harassment, and bullying.

Students, staff, parents/guardians who have concerns about discrimination, harassment, or bullying should contact the school administration at their school. Promptly reporting concerns will allow the school to take appropriate actions to investigate and resolve issues. School Board Policy 5-7 addresses non-discrimination and anti-harassment, Policy 5-44 addresses sexual harassment and discrimination based on sex or gender. Policy 5-36 and its supporting regulations address other forms of harassment.

Alternative formats of this publication which may include taped, Braille, or large print materials are available upon request for individuals with disabilities. Call or write the Department of Teaching and Learning, Virginia Beach City Public Schools, 2512 George Mason Drive, P.O. Box 6038, Virginia Beach, VA 23456-0038. Telephone 263-1070 (voice); fax 263-1424; 263-1240 (TDD) or email him at Keith.Goodman@vbschools.com.

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