



VIRGINIA BEACH CITY PUBLIC SCHOOLS CHARTING THE COURSE

Department of Teaching & Learning Parent/Student Course Information

Advanced Science (SC 4106) One year Grade 6

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

Advanced Science 6 is a rigorous, activity-based physical science course involving students in the exploration of chemistry and physics. Students will utilize experimental design to conduct scientific investigations. Major topics of study will include matter and energy, force and motion, heat, light, sound and Earth science. A variety of instructional approaches including technology integration and inquiry-based learning will be used to help students develop an understanding of the role of science in their lives. This course is recommended for highly motivated students with strong mathematics and reading and writing skills.

Students who successfully complete this course may be recommended for Advanced Life Science in Grade 7. These students will take the Grade 8 Science Standards of Learning (SOL) test at the end of grade 7. Students taking this test will be eligible to take Earth Science in Grade 8.

COURSE GOALS

- Provide a broad content base in physical science
- Develop problem-solving and decision-making skills through experimentation, research and discussion
- Develop an understanding of the interdisciplinary nature of science and its relevance to society
- Develop communication and technology skills
- Complete selected advanced activities and labs

PREREQUISITE

Fifth grade science and a teacher recommendation for advanced science

OPTIONS FOR NEXT COURSE

Advanced Life Science 7

REQUIRED TEXTBOOK

VBCPS Advanced Science 6 FlexBook

MINIMUM REQUIREMENTS

- Demonstrate knowledge and understanding of objectives through hands-on activities, projects, oral and/or written tests, quizzes and lab reports
- Participate in the hands-on investigations, adhering to all safety procedures
- Demonstrate the ability to conduct independent science investigations
- Demonstrate an understanding of the role of technology in science

*Virginia Standards of Learning
Advanced Science 6*

- PS.1 The student will demonstrate an understanding of scientific skills and processes by:
- a) Asking questions and defining problems
 - Ask questions that require empirical evidence to answer
 - Develop hypotheses indicating 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, including the safe use of chemicals and equipment
 - Evaluate the accuracy of various methods for collecting data
 - Take metric measurements using appropriate tools and technologies
 - Apply scientific ideas or principles to design, construct, and/or test a design of an object, tool, process or system
 - c) Interpreting, analyzing, and evaluating data
 - Construct and interpret data tables showing independent and dependent variables, repeated trials, and means
 - Construct, analyze, and interpret graphical displays of data and consider limitations of data analysis
 - Apply mathematical concepts and processes to scientific questions
 - Use data to evaluate and refine design solutions to best meet criteria
 - d) Constructing and critiquing conclusions and explanations
 - Construct scientific explanations based on valid and reliable evidence obtained from sources (including the students' own investigations)
 - Construct arguments supported by empirical evidence and scientific reasoning
 - Generate and compare multiple solutions to problems based on how well they meet the criteria and constraints
 - Differentiate between a scientific hypothesis, theory, and law
 - e) Developing and using models
 - Construct, develop and use models and simulations to illustrate and/or explain observable and unobservable phenomena
 - Evaluate limitations of models
 - f) Obtaining, evaluating, and communicating information
 - Read scientific texts, including those adapted for classroom use, to determine the central idea and/or 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 oral and written argument supported by empirical evidence and scientific reasoning
- PS.2 The student will investigate and understand that matter is composed of atoms. Key ideas include
- a) our understanding of atoms has developed over time;
 - b) the periodic table can be used to predict the chemical and physical properties of matter; and
 - c) the kinetic molecular theory is used to predict and explain matter interactions.
- PS.3 The student will investigate and understand that matter has properties and is conserved in chemical and physical processes. Key ideas include
- a) pure substances can be identified based on their chemical and physical properties;

- b) pure substances can undergo physical and chemical changes that may result in a change of properties;
- c) compounds form through ionic and covalent bonding; and
- d) balanced chemical equations model the conservation of matter.

- PS.4 The student will investigate and understand that the periodic table is a model used to organize elements based on their atomic structure. Key uses include
- a) symbols, atomic numbers, atomic mass, chemical groups (families), and periods are identified on the periodic table; and
 - b) elements are classified as metals, metalloids, and nonmetals.
- PS.5 The student will investigate and understand that energy is conserved. Key ideas include
- a) energy can be stored in different ways;
 - b) energy is transferred and transformed; and
 - c) energy can be transformed to meet societal needs.
- PS.6 The student will investigate and understand that waves are important in the movement of energy. Key ideas include
- a) energy may be transferred in the form of longitudinal and transverse waves;
 - b) mechanical waves need a medium to transfer energy;
 - c) waves can interact; and
 - d) energy associated with waves has many applications.
- PS.7 The student will investigate and understand that electromagnetic radiation has characteristics. Key ideas include
- a) electromagnetic radiation, including visible light, has wave characteristics and behavior; and
 - b) regions of the electromagnetic spectrum have specific characteristics and uses.
- PS.8 The student will investigate and understand that work, force, and motion are related. Key ideas include
- a) motion can be described using position and time; and
 - b) motion is described by Newton's laws.
- PS.9 The student will investigate and understand that there are basic principles of electricity and magnetism. Key ideas include
- a) an imbalance of charge generates static electricity;
 - b) materials have different conductive properties;
 - c) electric circuits transfer energy;
 - d) magnetic fields cause the magnetic effects of certain materials;
 - e) electric current and magnetic fields are related; and
 - f) many technologies use electricity and magnetism.
- 6.2 The student will investigate and understand that the solar system is organized and the various bodies in the solar system interact. Key ideas include
- a) matter is distributed throughout the solar system;
 - b) planets have different sizes and orbit at different distances from the sun;
 - c) gravity contributes to orbital motion; and
 - d) the understanding of the solar system has developed over time.

- 6.3 The student will investigate and understand that there is a relationship between the sun, Earth, and the moon. Key ideas include
- Earth has unique properties;
 - the rotation of Earth in relationship to the sun causes day and night;
 - the movement of Earth and the moon in relationship to the sun causes phases of the moon;
 - Earth's tilt as it revolves around the sun causes the seasons; and
 - the relationship between Earth and the moon is the primary cause of tides.
- 6.4 The student will investigate and understand that there are basic sources of energy and that energy can be transformed. Key ideas include
- the sun is important in the formation of most energy sources on Earth;
 - radiation, conduction, and convection distribute energy; and
 - energy transformations are important in energy usage.
- 6.5 The student will investigate and understand that all matter is composed of atoms. Key ideas include
- atoms consist of particles, including electrons, protons, and neutrons;
 - atoms of a particular element are similar but differ from atoms of other elements;
 - elements may be represented by chemical symbols;
 - two or more atoms interact to form new substances, which are held together by electrical forces (bonds);
 - compounds may be represented by chemical formulas;
 - chemical equations can be used to model chemical changes; and
 - a few elements comprise the largest portion of the solid Earth, living matter, the oceans, and the atmosphere.
- 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
- water is referred to as the universal solvent;
 - water has specific properties;
 - thermal energy has a role in phase changes;
 - water has a role in weathering;
- 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
- natural resources are important to protect and maintain;
 - renewable and nonrenewable resources can be managed;
 - major health and safety issues are related to different forms of energy;

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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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