



## ASTRONOMY

*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 Astronomy course is an in-depth study of the solar system, its sun and stars, the structure of the universe, and the dynamic nature of the cosmos. The course includes investigations of the physical world, studies of new astronomical discoveries, hypotheses and conclusions regarding new and evolving ideas, and key scientific principles of a vast universe. By emphasizing conceptual learning, investigation of historical and new discoveries and by utilizing technology, the student will gain powerful tools to assist in unlocking the secrets of the universe.

### COURSE GOALS

- Apply knowledge of mathematics and science to the study of astronomy
- Analyze past, current, and future manned space programs
- Use experimental design to develop and implement an investigation related to concepts in astronomy
- Integrate the use of computers, CD-ROMs and other technical apparatus in the process of problem solving
- Visit and discuss space exploration at local planetariums and museums
- Work in collaborative groups and use real-world management skills for decision-making and problem solving

### PREREQUISITES

Earth Science (prerequisite)

Algebra II (prerequisite or co-requisite)

### OPTIONS FOR NEXT COURSE

Physics (Algebra II prerequisite or co-requisite)

Chemistry (Algebra II prerequisite or co-requisite)

Oceanography (Earth Science prerequisite)

Advanced Placement Environmental Science (Biology and Chemistry prerequisites)

Advanced Placement Biology (Biology and Chemistry prerequisites)

Advanced Placement Chemistry (Chemistry prerequisite)

Advanced Placement Physics (Algebra II/Trigonometry prerequisite)

### REQUIRED STUDENT TEXTBOOK

*Horizons: Exploring the Universe Tenth Edition, Seeds (Brooks/Cole, Thomson Learning, 2008)*

### MINIMUM REQUIREMENTS

- Demonstrate knowledge and understanding of all core objectives through laboratory investigations, oral and written quizzes, tests, research and reports
- Participate in the core laboratory experiences and adhere to all safety procedures
- Prepare written reports for core laboratory experiences
- Read and share current literature on relevant topics
- Participate in student-centered investigations that combine scientific processes and knowledge with scientific reasoning and critical thinking
- Investigate, design, and present a final research project that demonstrates the feasibility of living in space

## **The Instructional Objectives That Comprise the Astronomy Course are Listed as Follows From the Prescribed Curriculum:**

- Demonstrate safe practices in the classroom, laboratory, and field
- Identify the components of a laboratory activity
- Utilize different techniques to interpret and organize data
- Analyze the motions of the Earth around the Sun to the causation of days, years, and seasons
- Explain the effects of the motions of the Earth/Moon/Sun system
- Identify the different components of the celestial sphere
- Identify the constellations and reasons for studying astronomy
- Investigate the historical contributions of individuals to the development of astronomy
- Explain the nature of light
- Relate the types of instruments which collect electromagnetic radiation
- Analyze the spectral emissions
- Explain the sun's basic properties
- Recognize how distance to stars is measured
- Compare apparent magnitude and absolute magnitude
- Relate the luminosity, temperature, and mass of stars to determine the luminosity classification
- Recognize binary stars and their behaviors
- Explain the formation of stars
- Relate stellar evolution to the classification of stars
- Describe the death of stars
- Determine how neutron stars and black holes are formed
- Identify basic characteristics and properties of the Milky Way galaxy
- Explain the origin and morphology of the Milky Way galaxy
- Explain galaxies of the universe
- Describe peculiar galaxies and quasars
- Evaluate the principles of cosmology
- Describe the origin of the solar system
- Compare and contrast the Terrestrial and Jovian planets
- Appraise the moon as Earth's satellite
- Compare meteorites, asteroids, comets, and Trans-Neptunian objects
- Recognize the principles that govern rocketry
- Summarize the history of space exploration
- Identify the major contributions of the space program
- Identify the major spin-offs from space exploration
- Justify continued exploration in space

## **Core Areas For Laboratory Experiences**

- Safety
- Laboratory procedures
- Use of instrumentation
- Data collection
- Charts/graphs/tables interpretation
- Building a telescope
- Scale model of sun, Earth and planets
- Determining the sun's altitude using a sundial
- The night sky
- Newton's Laws
- Spectrograph
- Using a telescope
- Distance by parallax
- Classification of galaxies
- Geology of the moon and planets
- Creating a model of a solar system



# **VIRGINIA BEACH CITY PUBLIC SCHOOLS**

A H E A D O F T H E C U R V E

## **MISSION STATEMENT**

**The Virginia Beach City Public Schools, in partnership with the entire community, will empower every student to become a life-long learner who is a responsible, productive and engaged citizen within the global community.**

## **DEPARTMENT OF CURRICULUM AND INSTRUCTION**

**2512 George Mason Drive P.O. Box 6038**

**Virginia Beach, VA 23456-0038**

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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 Curriculum and Instruction, Director of Secondary Instructional Services, Virginia Beach City Public Schools, 2512 George Mason Drive, P.O. Box 6038, Virginia Beach, VA 23456-0038, Telephone (757) 263-1070 or (757) 263-1429, fax (757) 263-1412.