Course Outline
Astronomy

Module and Topic	Name	2010 Virginia Standards of Learning
Developmental Module: *The purpose of this module is to review skills that students need in order to be successful in other areas of the course.*		
Module 1: What is Astronomy?		
Topic 1	Astronomy - The Basics	
Topic 2	Scientific Inquiry	**ES.1 a** volume, area, mass, elapsed time, direction, temperature, pressure, distance, density, and changes in elevation/depth are calculated utilizing the most appropriate tools; **ES.1 b** technologies, including computers, probeware, and geospatial technologies, are used to collect, analyze, and report data and to demonstrate concepts and simulate experimental conditions; **ES.1 c** scales, diagrams, charts, graphs, tables, imagery, models, and profiles are constructed and interpreted; **ES.1 e** variables are manipulated with repeated trials; and **ES.1 f** current applications are used to reinforce Earth science concepts. **ES.2 a** science explains and predicts the interactions and dynamics of complex Earth systems; **ES.2 b** evidence is required to evaluate hypotheses and explanations; **ES.2 c** observation and logic are essential for reaching a conclusion; and **ES.2 d** evidence is evaluated for scientific theories.
Topic 3	Tilt, Rotation, and Revolution	**ES.3 a** position of Earth in the solar system;
Topic 4	Lunar Phases	**ES.3 b** sun-Earth-moon relationships (seasons, tides, and eclipses);

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Topic 5	Eclipses	**ES.3 b** sun-Earth-moon relationships (seasons, tides, and eclipses);
Module 2: Constellations		
Topic 1	The Celestial Sphere	**ES.13 b** the origin and evolution of stars, star systems, and galaxies.
Topic 2	Getting Familiar With Constellations	**ES.13 b** the origin and evolution of stars, star systems, and galaxies.
Topic 3	Sky Maps, Planispheres, and Planetariums	**ES.1 c** scales, diagrams, charts, graphs, tables, imagery, models, and profiles are constructed and interpreted; **ES.1 d** maps and globes are read and interpreted, including location by latitude and longitude;
Module 3: Historical Astronomy		
Topic 1	Ancient Astronomers	
Topic 2	The Age of Astronomy	
Topic 3	Modern Astronomy	
Module 4: Radiation and the Electromagnetic Spectrum		
Topic 1	Atoms - The Basics	**CH.2 a** average atomic mass, mass number, and atomic number;
Topic 2	Light and the Spectrum	**PH.9 a** the properties, behaviors, and relative size of radio waves, microwaves, infrared, visible light, ultraviolet, X-rays, and gamma rays;
Topic 3	Blackbody Radiation	
Topic 4	Doppler Effect	**ES.13 b** the origin and evolution of stars, star systems, and galaxies. **PH.9 b** fundamental wave processes;
Module 5: Astronomical Tools		
Topic 1	Tools of the Trade	
Topic 2	Optical Telescopes	**PH.9 b** fundamental wave processes;
Topic 3	Radio Telescopes	
Topic 4	Space Telescopes	

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Module 6: **The Sun**		
Topic 1	Parts of the Sun	**ES.3 c** characteristics of the sun, planets and their moons, comets, meteors, and asteroids;
Topic 2	Nuclear Processes	**ES.3 c** characteristics of the sun, planets and their moons, comets, meteors, and asteroids;
Topic 3	Solar Activity	**ES.3 c** characteristics of the sun, planets and their moons, comets, meteors, and asteroids;
Module 7: **Stars**		
Topic 1	The Mass-Luminosity Relationship	**ES.13 b** the origin and evolution of stars, star systems, and galaxies.
Topic 2	The Hertzsprung-Russell Diagram (H-R)	**ES.13 b** the origin and evolution of stars, star systems, and galaxies.
Topic 3	Distance and Parallax	**ES.13 b** the origin and evolution of stars, star systems, and galaxies.
Topic 4	The Life Cycle of Stars	**ES.13 b** the origin and evolution of stars, star systems, and galaxies.
Module 8: **Groups of Stars**		
Topic 1	Star Systems	**ES.13 b** the origin and evolution of stars, star systems, and galaxies.
Topic 2	Galaxies	**ES.13 b** the origin and evolution of stars, star systems, and galaxies.
Topic 3	The Milky Way Galaxy	**ES.13 b** the origin and evolution of stars, star systems, and galaxies.
Topic 4	Cosmology	**ES.13 a** cosmology including the Big Bang theory;
Module 9: **The Solar System**		
Topic 1	The Formation of the Solar System	**ES.3 c** characteristics of the sun, planets and their moons, comets, meteors, and asteroids;
Topic 2	The Terrestrial Planets	**ES.3 c** characteristics of the sun, planets and their moons, comets, meteors, and asteroids;
Topic 3	The Jovian Planets	**ES.3 c** characteristics of the sun, planets and their moons, comets, meteors, and asteroids;
Topic 4	The Dwarf Planets	**ES.3 c** characteristics of the sun, planets and their moons, comets, meteors, and asteroids;

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Topic 5	Other Members of the Solar System	**ES.3 c** characteristics of the sun, planets and their moons, comets, meteors, and asteroids;
Module 10: Astronomical Organizations and Space Exploration		
Topic 1	The History of Space Exploration	**ES.3 d** the history and contributions of space exploration.
Topic 2	Worldwide Organizations	**ES.3 d** the history and contributions of space exploration.
Topic 3	The Future of Exploration	**ES.3 d** the history and contributions of space exploration.
Topic 4	Is There Life Out There?	**ES.3 d** the history and contributions of space exploration.