Florida Department of Education

COURSE DESCRIPTION - GRADES 9-12, ADULT

Subject Area:	Science
Course Number:	2002440
Previous Course Number:	2002370
Course Title:	Integrated Science III
Credit:	1.0

Will meet graduation requirements for Science

A. **Major Concepts/Content**. This purpose of this course is to provide opportunities to investigate the theories and ideas associated with the biological, earth, and physical sciences in a way that is relevant and usable. Students construct science knowledge by formulating questions, making predictions, planning experiments, making observations, classifying, interpreting and analyzing data, drawing conclusions, and communicating.

The content should include, but not be limited to, the following:

- the nature of science
- the nature of matter
- energy
- force and motion
- processes that shape the Earth
- Earth and space
- processes of life
- how living things react with their environment

B. **Special Note**. This is the third course in a three-course series that also includes Integrated Science I (2002400) and Integrated Science II (2002420). The Integrated Science course series develops comprehensive concepts in science in an integrated and spiraling curriculum. This series addresses all of the Sunshine State Standards for Science at the high school level.

Districts/schools that use this course description are expected to provide more detailed instructional guidelines and curriculum.

Laboratory investigations that include the use of the scientific method, measurement, laboratory apparatus, and appropriate safety procedures are an integral part of this course.

C. Course Requirements. These requirements include, but are not limited to, the benchmarks from the Sunshine State Standards that are most relevant to this course. Benchmarks correlated with a specific course requirement may also be addressed by other course requirements as appropriate. Some requirements in this course are not addressed in the Sunshine State Standards.

Benchmarks from Science, Strand H, should not be taught and assessed in isolation, but should be combined with other benchmarks listed for this course.

After successfully completing this course, the student will:

1. Apply knowledge of the nature of science and scientific habits of mind to solve problems, and employ safe and effective use of laboratory technology.

SC.H.2.4.2 know that scientists control conditions in order to obtain evidence, but when that is not possible for practical or ethical reasons, they try to observe a wide range of natural occurrences to discern patterns.

SC.H.3.4.4 know that funds for science research come from federal government agencies, industry, and private foundations and that this funding often influences the areas of discovery.

2. Analyze the principles of energy.

SC.B.1.4.1 understand how knowledge of energy is fundamental to all the scientific disciplines (e.g., the energy required for biological processes in living organisms and the energy required for the building, erosion, and rebuilding of the Earth).

SC.B.1.4.2 understand that there is conservation of mass and energy when matter is transformed.

SC.B.1.4.3 know that temperature is a measure of the average translational kinetic energy of motion of the molecules in an object.

SC.B.1.4.4 know that as electrical charges oscillate, they create time-varying electric and magnetic fields that propagate away from the source as an electromagnetic wave.

SC.B.1.4.5 know that each source of energy presents advantages and disadvantages to its use in society (e.g., political and economic implications may determine a society's selection of renewable or nonrenewable energy sources).

SC.B.2.4.1 know that the structure of the universe is the result of interactions involving fundamental particles (matter) and basic forces (energy) and that evidence suggests that the universe contains all of the matter and energy that ever existed.

3. Analyze the principles of magnetism, the relationship between magnetism and electricity, and the applications of magnetism and electricity to meters, motors, and generators, and to alternating current situations.

SC.C.2.4.6 explain that all forces come in pairs commonly called action and reaction.

SC.E.2.4.7 know that mathematical models and computer simulations are used in studying evidence from many sources to form a scientific account of the universe.

4. Analyze the relationships among position, displacement, time, velocity, and acceleration in a straight line.

SC.C.1.4.1 know that all motion is relative to whatever frame of reference is chosen and that there is no absolute frame of reference from which to observe all motion.

SC.C.1.4.2 know that any change in velocity is an acceleration.

SC.C.2.4.1 know that acceleration due to gravitational force is proportional to mass and inversely proportional to the square of the distance between the objects.

SC.E.2.4.7 know that mathematical models and computer simulations are used in studying evidence from many sources to form a scientific account of the universe.

5. Analyze the laws of conservation of momentum and energy, and their relationships to work, kinetic energy, potential energy, and power.

SC.A.1.4.3 know that a change from one phase of matter to another involves a gain or loss of energy.

SC.C.2.4.6 explain that all forces come in pairs commonly called action and reaction.

6. Demonstrate understanding of basic principles of atomic theory.

SC.A.2.4.6 understand that matter may act as a wave, a particle, or something else entirely different with its own characteristic behavior.

7. Demonstrate understanding of the structure of energy levels within the atom.

SC.A.1.4.1 know that the electron configuration in atoms determine how a substance reacts and how much energy is involved in its reactions.

SC.A.1.4.2 know that the vast diversity of the properties of materials is primarily due to variations in the forces that hold molecules together.

8. Predict the type of bond formed between elements of different groups in the periodic table.

SC.G.1.4.3 know that the chemical elements that make up the molecules of living things are combined and recombined in different ways.

9. Apply the rules of chemical nomenclature and write balanced chemical equations.

SC.G.1.4.3 know that the chemical elements that make up the molecules of living things are combined and recombined in different ways.

10. Quantitatively apply the mole concept.

11. Demonstrate understanding of energy pathways and selection processes in the natural environment.

SC.E.1.4.3 know the various reasons that Earth is the only planet in our Solar System that appears to be capable of supporting life as we know it.

SC.F.1.4.1 know that the body processes involve specific biochemical reactions governed by biochemical principles.

SC.F.1.4.3 know that membranes are sites for chemical synthesis and essential energy conversions.

SC.G.1.4.2 understand how the flow of energy through an ecosystem made up of producers, consumers, and decomposers carries out the processes of life and that some energy dissipates as heat and is not recycled.

12. Apply knowledge of the biological processes that occur through living systems.

SC.F.1.4.5 know that complex interactions among the different kinds of molecules in the cell cause distinct cycles of activity governed by proteins.

SC.F.1.4.6 know that separate parts of the body communicate with each other using electrical and/or chemical signals.

SC.F.2.4.2 know that every cell contains a “blueprint” coded in DNA molecules that specify how proteins are assembled to regulate cells.

SC.F.2.4.3 understand the mechanisms of change (e.g., mutation and natural selection) that lead to adaptations in a species and their ability to survive naturally in changing conditions and to increase species diversity.

13. Compare geological changes that affect life on Earth.

SC.D.1.4.3 know that changes in Earth's climate, geological activity, and life forms may be traced and compared.

SC.D.1.4.4 know that Earth's systems and organisms are the result of a long, continuous change over time.