Miami Dade College

Course Description

PSC1121 | General Education Physical Science | 3.00 credits

A study of the major concepts and principles from each of the following areas: physics, chemistry, and astronomy. Prerequisite: MAT1033.

Competency 1: The student will demonstrate knowledge of the nature of science and several aspects of its history by:

1. Summarizing the steps involved in the scientific method and how this method is used to solve problems.
2. Differentiating between a scientific theory and law.
3. Comparing and contrasting the metric system of measurement to the American system.
4. Understanding that the natural world is complex and that scientists study the world by using simplified systems (models).
5. Understanding that the scientific method is based on a cause-and-effect relationship that is repeatable and consistent.
6. Drawing reasonable conclusions from observations and data.
7. Describing significant contributions made by individuals that have explained the very nature of science.

Competency 2: The student will demonstrate knowledge and application of the concepts of motion by:

1. Applying the definitions of the fundamental quantities of motion -- position, distance, speed, and acceleration.
2. Describing the different types of motion, including one-dimensional and two-dimensional motion (straight line, projectile, circular)
3. Explaining and giving examples of Newton's three laws of motion.
4. Describing and applying the concepts of mass, inertia, weight, and gravity.

Competency 3: The student will demonstrate knowledge of the concepts of energy and work by:

1. Defining and relating work and energy.
2. Differentiating between kinetic and potential energy.
3. Describing the work done by a constant force.
4. Stating and applying the law of conservation of energy.
5. Identifying different types of energy.
6. Describing some of the processes of energy transformation.
7. Understanding that the Sun supplies heat and light energy to the Earth.
8. Discussing the sources and environmental impact of non-renewable and renewable energy sources

Competency 4: The student will demonstrate knowledge of the concepts of temperature and heat by:

1. Inter-converting among the Fahrenheit, Kelvin, and Celsius temperature scales.
2. Differentiating between heat and temperature.
3. Differentiating among conduction, convection, and radiation.
4. Describing the three normal states of matter: solid, liquid, and gas.
5. Discussing the effect that temperature change has on a state of matter.

Competency 5: The student will demonstrate knowledge of the concept of waves by:

1. Identifying the properties of waves.
2. Discussing reflection, refraction, and interference of waves.
3. Discussing standing waves and resonance.
4. Discussing the factors that affect the speed of a wave.

Competency 6: The student will demonstrate knowledge of basic concepts in electricity and magnetism by:

1. Describing electrical forces between objects with positive and negative charges.
2. Stating Ohm's Law and defining its related concepts.

3. Discussing electrical energy transmission and heating effects as they relate to electric currents.
4. Sketching the magnetic field produced by a bar magnet.
5. Describing different sources of magnetic fields.

Competency 7: The student will demonstrate knowledge of the structure of the atom by:

1. Identifying the three major subatomic particles and describing their general arrangement within the atom.
2. Defining isotopes and determining how isotopes differ.
3. Identifying the name and symbol of some common elements.
4. Defining radioactivity and differentiating among various types of nuclear radiation.
5. Recognizing the relationship that exists between mass and energy.

Competency 8: The student will demonstrate knowledge of the nature of matter, its properties and interactions by:

1. Identifying, differentiating among, and giving examples of some of the properties of different classes of matter.
2. Using the Periodic Table to classify elements and describe their properties.
3. Explaining the difference among atoms, ions, and molecules and discussing the relationship that exists between a chemical formula and the elements that are present.
4. Predicting the formula of the ionic compound formed by the combination of ions.
5. Describing ionic and covalent bonds.
6. Distinguishing between physical and chemical properties and changes of matter.
7. Identifying the components of a solution and classifying solutions based on solute concentration.
8. Comparing and contrasting acids and bases.

Competency 9: The student will demonstrate knowledge of the processes that shape the universe by:

1. Describing the formation, nature, and characteristics of stars and galaxies.
2. Describing the Sun, its characteristics, energy source, and its effects on life on Earth.
3. Discussing the organization and structure of our solar system and its planets.
4. Explaining the causes of the phases of the moon and causes of solar and lunar eclipses.
5. Relating the seasons of the year with the position and tilt of the Earth relative to the sun.

Learning Outcomes:

- Use computer and emerging technologies effectively.
- Solve problems using critical and creative thinking and scientific reasoning
- Use quantitative analytical skills to evaluate and process numerical data
- Create strategies that can be used to fulfill personal, civic, and social responsibilities