

**PETERS TOWNSHIP SCHOOL DISTRICT**

**CORE BODY OF KNOWLEDGE (CBK)**

**PHYSICAL SCIENCE ACADEMIC**

**GRADE 9**

For each of the sections that follow, students may be required to understand, apply, analyze, evaluate or create the particular concepts being taught.

**COURSE DESCRIPTION**

Physical Science Academic is a five period per week course offered to ninth grade academic students. Physical Science Academic is a survey course designed to provide a solid foundation in the physical sciences in order to help students better understand phenomena that occur in everyday life. This course is structured around physics, earth and space science and chemistry. Students will learn about the scientific method and its application in solving problems and developing new ideas. Mathematical problem solving strategies will be introduced to develop principles discussed in the classroom and investigated in lab activities. Although there is not a dedicated lab period for this course, lab activities and opportunities for hands-on experiences are regularly integrated into the classroom environment. Topics to be addressed include the scientific methodology, measurement and problem solving, motion, forces and Newton's Laws, work, energy, power and machines, waves, sound and light, electricity and magnetism, the universe, galaxies and the solar system, matter, its properties and changes, and the atom, periodic table and bonding, and the Chemistry of Life. Applications of the concepts and principles discussed to everyday life will be stressed so that the student has a better understanding of the physical world.

**STUDY SKILLS**

- Students will be given unit assignments for each topic with problems that are representative to those on the topic exam.
- Time during class will be utilized to practice more complex example problems that are representative to those on the topic exam.
- Students are encouraged to work in study groups on homework assignments and to prepare for exams so that they can self-reflect on their true level of understanding of the course material.

**MAJOR UNIT THEMES:**

**1. INTRODUCTION AND MATHEMATICAL METHODS**

- Study skills for science success
- The nature of science

- Lab safety
- Scientific methodology
- Metric measurement and problem solving
- Graphing

## **2. MOTION, FORCES AND NEWTON'S LAWS**

- Identify the different types of motion
- Describe motion using position, velocity and acceleration
- Solving problems of motion
- The nature of forces
- Newton's Three Laws of Motion
- Applications of Newton's Second Law of Motion – including friction and circular motion
- Law of Universal Gravitation – including free fall and projectile and satellite motion
- Linear momentum and its conservation

## **3. WORK, ENERGY AND POWER**

- Work and power
- Machines – including types, mechanical advantage and efficiency
- Forms of energy and their transformations
- Methods of energy transfer – conduction, convection and radiation
- Alternative energy sources
- Mechanical energy
- Law of Conservation of Mechanical Energy

## **4. WAVES, SOUND AND LIGHT**

- Transverse and longitudinal waves
- Mechanical and electromagnetic waves
- Wave properties, characteristics and behaviors
- Nature, properties, characteristics and behaviors of sound waves
- Musical instruments and sound
- Nature of light
- Electromagnetic spectrum
- Reflection and refraction – including light and color
- Mirrors and lenses and the images they form

## **5. MATTER, ITS PROPERTIES AND CHANGES**

- Classification of matter – elements, compounds and mixtures
- Physical and chemical properties
- Physical and chemical changes
- States of matter
- Change of state and energy transformations in matter

## **6. ATOMS, PERIODIC TABLE AND BONDING**

- Models of the atom and atomic theory
- Parts of the atom
- Isotopes
- Periodic table – its origin, use and organization
- Valence electrons and bonding
- Ionic and covalent bonding

## **7. THE CHEMISTRY OF LIFE**

- Chemical Reactions
- The Chemistry of Water
- The Molecular Diversity of Life (Carbon)
- Acids, Bases, pH, and buffers

## **MATERIALS**

TEXTBOOK: Holt Science Spectrum – Physical Science; Dobson, Holman & Roberts; Holt, Rinehart and Winston; 2004

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