

PETERS TOWNSHIP SCHOOL DISTRICT

CORE BODY OF KNOWLEDGE

INVESTIGATIONS IN PHYSICAL SCIENCE

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:

Investigations in Physical Science is designed to explore the fundamental concepts of the physical sciences in an integrated, application based manner. Using classroom discussions, laboratory investigations, and other hands-on processes, students will investigate the scientific phenomena that occur in everyday life with a minimum of mathematical application. Students will develop thinking and process skills as they investigate topics including: lab safety, measurement, motion, machines, energy, matter and its changes, sound, light and other aspects of the environment that are a part of physical science. Emphasis will be placed upon establishing connections between classroom knowledge and real world applications. This course will address the standards in a hands-on experiential manner.

STUDY SKILLS:

- Students are required to maintain an organized science binder.
- Students will adequately prepare for quizzes and exams through the development of formula reference cards as well as good study habits.
- Students will pre-lab all laboratory activities to maximize student achievement and provide a safe science classroom.

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
- 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

5. UNIVERSE, GALAXIES AND THE SOLAR SYSTEM

- Gravity in the universe
- The Theory of the origin of the universe (The Big Bang theory)
- Galaxy classification and the Milky Way galaxy
- Stellar evolution and the H-R diagram
- Formation of the solar system
- Properties and characteristics of planets, moons and other components in solar system
- Properties, characteristics, and motion of our moon and its importance to the solar system

6. 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

7. 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

MATERIALS (and Supplemental materials used in course):

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

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