Physical Science

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

STUDYING PHYSICAL SCIENCE

- define physical science
- work safely in a lab
- use scientific method
- use international System of Units

MOTION

- define motion
- name three basic types of motion
- compare and contrast distance and displacement
- discuss and calculate speed, velocity and acceleration

LAWS OF MOTION

- define inertia
- explain Newton 's three laws of motion
- discuss momentum
- perform calculations based on Newton 's Second Law
- explain action reaction concept of Newton 's Third Law
- define law of conservation of momentum

GRAVITATION

- define acceleration due to gravity
- contrast mass and weight
- explain Newton 's law of gravity

MATTER AND ITS PHASES

- describe the phases of matter
- list characteristics of solids, liquids, and gases
- explain phase changes in matter

PROPERTIES OF MATTER

- define an element
- distinguish between metallic and non-metallic elements
- list properties of an element

- describe changes that may occur when element undergoes physical change
- discuss difference between chemical change and physical change

THE ATOM

- draw a structure of the nucleus and the subatomic particles within in
- describe the basic subatomic particles
- define isotope
- outline the development of the periodic table

THE ATOMIC NUCLEUS

- draw structure of nucleus and subatomic particle within it
- explain radioactive decay
- state the law of conservation of mass-energy
- define nuclear fission and fusion

COMPOUNDS AND MIXTURES

- differentiate between elements and compounds
- write chemical formula for compound
- state the names and kinds of atoms comprising compound
- compare and contrast solutions and mixtures

ATOMIC BONDING

- discuss how valence electrons affect bonding
- differentiate between ionic and covalent bonding
- list properties of ionic and covalent bonded substances
- write electronic formulas for both ionic and covalent compounds

CHEMICAL REACTIONS

- describe a chemical reaction
- explain the different types of chemical reactions

ACIDS AND BASES

- list properties of acids and bases
- describe neutralization reaction
- relate pH scale and acidity of solution

WORK AND MACHINES

- define and calculate work
- describe how machines make work easier

- name six types of simple machines
- explain and calculate mechanical advantage of simple machine
- define a compound and complex machine
- define machine's efficiency

ENERGY AND POWER

- define energy and explain how it is measured
- calculate kinetic and potential energy
- explain and use the Law of Conversation of Energy
- identify different forms of energy
- explain how power is measured

HEAT AND TEMPERATURE

- distinguish between heat and temperature
- relate Kinetic Theory of Matter to motion of particles
- list several sources of heat
- explain how heat can move from one place to another

WAVES

- relate frequency, wavelength, speed, and energy of waves
- distinguish between transverse and compression waves
- discuss wave reflection and refraction
- explain polarize waves
- explain how electromagnetic waves differ and their relationship to the electromagnetic spectrum

LIGHT

- discuss properties of light in terms of the electromagnetic spectrum
- analyze visible spectrum in terms of colors
- explain how objects appeared colored

OPTICS

- discuss how light is reflected by plane, concave and convex mirrors
- discuss how light is refracted by concave and convex lenses
- explain how lenses can affect vision
- describe uses for lenses and mirrors

SOUND

- define sound and its properties
- list and explain properties of sound

- examine how musical instruments produce sound

ELECTRICITY

- define electric change
- explain electric current, voltage, and resistance
- Use Ohm's Law
- describe the two basic types of electric circuits

THE UNIVERSE

- describe how gravity works in the solar system
- describe the moon and its importance to the solar system
- identify the planets of the solar system and their features
- describe the stages of evolution of stars using H-R diagram
- explain the different types of galaxies and identify Earth's galaxy
- explain theories on the origin of the universe including The Big Bang

PLANET EARTH

- identify the different geological layers of the earth
- describe plate tectonics and how it is related to earthquakes
- explain how volcanoes form and where they occur
- identify and describe the properties of the different types of rocks
- explain physical and chemical weathering
- describe erosion and the factors that cause it

THE ATMOSPHERE

- identify the layers of the atmosphere and explain the atmosphere' evolution
- explain the oxygen carbon dioxide cycle and its importance to living organisms
- describe the phases of the water cycle
- explain how winds, and cold/warm fronts are created
- describe various severe weather situations and how they are formed
- distinguish between weather and climate and identify factors that affect Earth's weather

GRADUATION PROJECT

- Physical Science in Our Everyday Lives