

## **PHYSICS LEARNING OBJECTIVES**

### **I. Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.**

1. The learner will use or make systematic observations, accurate measurements, and control variables to formulate and conduct investigations, and to draw conclusions based on specific scientific data.
2. The learner will communicate scientific data and results, with an emphasis placed on data analysis, graphing, and metric measurements.
3. The learner will select and use appropriate tools including technology to make measurements, gather, process, and analyze data from scientific investigations.
4. The learner will demonstrate safe procedures during scientific investigations.

### **II. Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.**

5. The learner will demonstrate an understanding of the application of mathematics to physics.
6. The learner will use critical thinking in applying mathematics to problem solving thus developing an understanding of the relationship of mathematics to physics
7. The learner will illustrate the principles of mechanics, kinematics, and static equilibrium.
8. The learner will apply Newton's three laws of motion to practical situations.
9. The learner will apply the principle of conservation of energy by converting one form of mechanical energy to another.
10. The learner will explore the principle of conservation of momentum as it applies to collisions and recoil.
11. The learner will interpret kinematics, Newton's laws, and the conservation laws as they apply to rotational systems.
12. The learner will relate Newton's law of Universal Gravitation to gravity and orbital motion.
13. The learner will apply the principles of thermal energy and its transfer.
14. The learner will compare the energy processes that take place during phase changes
15. The learner will discuss the principle of thermal expansion.
16. The learner will compare and contrast the laws of thermodynamics.
17. The learner will explore how the kinetic molecular theory can explain the laws of thermodynamics and the conservation of mechanical energy
18. The learner will examine the principles of electrostatics and the conservation of charge.
19. The learner will contrast electric forces, electric fields and potential difference.
20. The learner will apply Ohm's and Kirchoff's laws as they pertain to direct current circuits.
21. The learner will describe the relationship between moving charges and magnetic fields as it relates to the generation of most of the electrical energy we use.
22. The learner will explore the phenomena of reflection, refraction, interference, and diffraction to sound, light and electromagnetic radiation.
23. The learner will contrast the particle and wave models of light.
24. The learner will relate the principles of geometrical optics to lenses, mirrors, prisms, and optical instruments.
25. The learner study the Special Theory of Relativity.

### **III. Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process of diversity of life, and how living organisms interact with each other and their environment.** *None purposefully written for this standard for Physics*

### **IV. Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.** *None purposefully written for this standard for Physics*

### **V. Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures, and societies.**

26. The learner will investigate a modern problem relating to an area of physics and how that problem is being addressed.

**VI. Students understand historical developments in science and technology**

27. The learner will discuss historical developments of various physical concepts and processes.