

## **PHYSICS (LAB SCIENCE)**

Grade Level: 10,11,12

Credit: 0.5 or 1.0

Prerequisites: Algebra I, first Semester Algebra II

This is an honors level lab course that includes labs and projects focused on critical thinking, creativity, and understanding the scientific process. The course emphasizes core concepts of Algebra-based Physics preparing the student for future college-level Physics courses. The key concepts of the course have a focus on mechanical physics with introductory level electromagnetics and wave mechanics.

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### **Physics Honors Lessons**

#### **Teacher Message**

#### **Unit 1: Energy, Force, and Work**

Lesson 1--A Balloon

Lesson 2--What is Physics

Lesson 3--Forms of Energy

Lesson 4--Balloon Rocket 1

Lesson 5--Work and Energy

Lesson 6--Balloon Rocket 2

Lesson 7--Force and Inertia

Lesson 8--Balloon Rocket 3

Lesson 9--Force, Mass, and Acceleration

Lesson 10--Action and Reaction



## **Unit 2: Graphical Motion**

- Lesson 11--Motion and Energy Summary
- Lesson 12--Interpreting and Creating Graphs
- Lesson 13--Paper Helicopter
- Lesson 14--Ramp and Ball
- Lesson 15--Understanding a Graphical Motion
- Lesson 16--Bouncing a Ball
- Lesson 17--Elasticity
- Lesson 18--Equations of Uniformly Accelerated Motion
- Lesson 19--Mousetrap Catapult
- Lesson 20--Projectile Motion and Range

## **Unit 3: Conservation Laws: Energy and Momentum**

- Lesson 21--The Big Picture
- Lesson 22--The Big Picture: Momentum
- Lesson 23--Collisions with Hi-Bounce Balls
- Lesson 24--Conservation of Motion
- Lesson 25--Work, Force, and Energy in Simple Machines
- Lesson 26--Work, Power, and Efficiency
- Lesson 27--Rotational Motion
- Lesson 28--Review

## **Unit 4: Heat and Matter**

- Lesson 29--Heat and Temperature
- Lesson 30--Temperature and Temperature Scales



Lesson 31--Heat and Work

Lesson 32--Latent Heat

Lesson 33--Heating Water

Lesson 34--Heating and Cooling Curve

### **Unit 5: Periodic Motions: Vibrations and Waves**

Lesson 35--Hooke's Law

Lesson 36--Mass on a Spring

Lesson 37--Energy in Periodic Motion

Lesson 38--Wavelength and Velocity on a Spring

Lesson 39--Boundary and Wave Interaction

Lesson 40--Standing Waves and Resonance

Lesson 41--The Doppler Effect

Lesson 42--Light-Focal Length

Lesson 43--Reflection and Refraction of Light

Lesson 44--The Colors of Pigment

### **Unit 6: Fields: Electrical, Magnetic, Gravitational**

Lesson 45--Gravitation and Satellites

Lesson 46--Gravity According to Einstein

Lesson 47--Electric Fields

Lesson 48--Static Electricity

Lesson 49--Circuits

Lesson 50--Electromagnet

Lesson 51--Connections



Lesson 52--Fundamental Particles

Lesson 53--Special Relativity

Lesson 54--Quantum Mechanics

