

Our Lady of Lourdes High School

COURSE : Foundations for Success in Physics

Syllabus: Summer 2020

Teacher: Mrs. Kimberly Knauf

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COURSE TEXTS:

Khan Academy, Phet Simulations and Labster Labs will be utilized in addition to power points, guided notes, and instructional videos.

COURSE DESCRIPTION: This course is based on the New York State Science Learning Standards (NYSSLYS) standards for physics. It will prepare students to explain accurately, and with appropriate depth, general physics and algebraic concepts.

COURSE OBJECTIVES: This course is designed to provide students with a comprehensive exploration of the scientific principles and mathematical principles that are fundamental to students' success in physics. It will enable students to master the concepts, rules, relationships, and laws of Physics to assist the student in further studies of Physics or another related field and in everyday life.

PRIMARY LEARNING OUTCOMES:

By the end of this course, each student will be able to:

- Solve measurement and conversion problems using the metric system and correct prefixes,
- Define accuracy and precision.
- Determine the number of significant figures in a measurement and perform calculations.
- Define and calculate density, rearrange and manipulate equations.
- Perform vector quantity problems using vector components.
- Use scientific inquiry, mathematical analysis and engineering designs, as appropriate, to pose questions, seek answers, and develop solutions.
- Understand the relationships and common themes that connect science, mathematics and technology.
- Connect real world situations and problems with concepts in Physics in order to better understand, analyze, make informed decisions and contribute to the world around us.

COURSE POLICIES:

A contract outlining summer course policies and procedures will be provided to the students and parents. All parties must agree to and sign this contract before the course begins

COURSE OUTLINE AND MAPPING:

Our Lady of Lourdes High School

Week 1: Basic Physics Concepts, Measurement and Physics Algebraic skills

- What is Physics?
- Scientific Notation
- Metric System: base units, prefixes, and conversions
- Significant Figures: Accuracy vs. Precision, Uncertainty in Measurement
- Fundamental Measures and Measurement in Practice
- Direct and Indirect Relationships
- Manipulating Equations and Algebraic Manipulation

Week 2: Vectors and Scalars

- Properties of Vectors
- Vectors and Scalars: Magnitude and Direction; Examples of Vector and Scalar Quantities
- Adding Vectors Graphically and Algebraically: Commutative Property of Vector Addition; Head-to-Tail Configuration; Parallelogram of Force
- Vector Resolution; Horizontal and Vertical Components
- Labster lab Vectors/Scalars and Phet simulation Vector Addition

Week 3: Kinematics

- Motion in One Dimension
- Motion and Movement
- Average/Instantaneous Speed and Velocity
- Uniform Linear Motion
- Laboratory Activities: Phet: Forces and Motions basics
- Acceleration

Week 4: Mechanics: Forces and Newton's Laws of Motion

- The Force of Gravity Phet Simulation :Gravity Force Lab
- Balanced Forces vs. Unbalanced Forces: The Net Force
- Newton's 1st Law of Motion: Inertia
- Newton's 2nd Law of Motion: Basic Problems; Elevator Problems; Inclined Planes
- Newton's 3rd Law of Motion: Action-Reaction Pairs
- Labster Lab: Newton's Laws of Motion