Unit 1: Introduction to Physics

Content Area: **Science**
Course(s):
Time Period: **Marking Period 1**
Length: **3 Weeks**
Status: **Published**

Summary

This unit may be done separately as its own unit, or the content may be distributed throughout the unit on Kinematics as the skills described here are needed. This unit describes what physics is, and provides a general overview of the major areas of physics. Methods of science and experimental techniques are discussed. The tools of scientific measurement, including signficant figures, scientific notation, and units, are introduced. Students will review mathematical tools such as linear equations and slope, with particular emphasis placed on graphical methods. Review of necessary algebra skills will be included as needed.

Revised: July 2021

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
TECH.9.4.12.CT.2	Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
	Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.
	Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.
	Developing and Using Models
	Analyzing and Interpreting Data

Essential Questions/Enduring Understandings

ESSENTIAL QUESTIONS

How can mathematics be used in conjunction with language to communicate ideas in physics?

How do scientists go about the process of doing science?

ENDURING UNDERSTANDINGS

Mathematics provides a common language to communicate the ideas of Physics across national boundaries and different cultures.

Objectives

Students will be able to identify activities and fields that involve the major areas within physics.
Students will be able to measure objects using SI units, and convert from one unit to another.
Students will be able to answer mathematical questions in scientific notation and using significant figures.
Students will be able to design a testing experiment and make a prediction of its outcome based on a hypothesis.

Students will be skilled at algebraic functions.
Students will be skilled at knowing and using scientific notation, SI Units and Unit Conversions

Learning Plan

At the beginning of the year, students will be introduced to the Investigative Science Learning Environment (ISLE) cycle, which includes observational experiments, generating hypotheses, coming up with testing experiments and predicting their outcomes, making judgements about their experiments, and applying new scientific knowledge to other circumstances.

Students will practice using the ISLE cycle to answer some or all of the following questions: What makes the sound when a balloon pops? Where does the water on the outside of a cold glass come from? Why does my science teacher have 17 TVs (or tennis rackets, or cameras, or whatever) in their house?

Students will discuss the benefits of having a uniform measurement system that is used internationally, then practice using and converting to SI units.This will involve small group work, possible measurement labs such as the Lid Lab, and individual practice. Students will also work with graphs, starting with linear relationships, and review the mathematical equations that go with certain shapes of graph.

Individual practice with scientific notation and significant figures will be included in this unit.

If there is time and need, students may also complete a lab experience emphasizing the relevance and use of significant figures. One example is the Popcorn Lab.

Assessment

Formative Assessment: practice problem assignments , exit tickets,

Summative Assessment: quiz on important skills , SI Unit/ Conversion Lab If this unit is done on its own and not incorporated into the Kinematics unit, then a unit test may be given.

Benchmark Assessment: Skills from this unit will be assessed on the midterm and final, as they are critical

skills for the whole year.

Alternative Assessment: Student Presentation on Units, Conversions, Significant Figures

Materials

Computer with PowerPoint or Google Slides and internet access

Textbook PHYSICS: PRINCIPLES AND PROBLEMS, Glencoe

Calculators, Rulers, Metersticks, colored pencils, graph paper, balloons, unpopped popcorn kernels, digital scales, ice, access to water, small bins, paper bags, plastic produce bags, pins

Integrated Accommodation and Modifications

FOR SPECIAL EDUCATION STUDENTS , ELL, AT RISK AND STUDENTS GIFTED STUDENTS

https://docs.google.com/spreadsheets/d/18XhAi7Rm-E8LJwO4uMQS7ZEh0dh3NxYbTFH2IoHLH7Y/edit?usp=sharing