Physics
Unit #1 - Intro to Physics
Scientific method, physics & society, units & dimensions, math & problem solving in Physics

Big Ideas

- Physics applies to everything!
- Use of the scientific method
- Fact versus hypothesis (theory)
- Metric system-use of
- Use of correct units scientifically/mathematically

Essential Questions

- How do I use the scientific method in everyday life?
- How are facts different than hypothesis and different from a theory?
- What is studied in Physics?
- What is the main reason for using scientific notation?
- Why do scientists use the metric system in science?
- What are base units and how are prefixes used to modify base units?
- What is dimensional consistency, and how does it apply to physics equations?
- Why is the validity of a hypothesis based solely on its ability to account for known observations and to correctly predict new observations?

Vocabulary

density	Mass	Volume weight
dimensional analysis	Accuracy	Precision
time	Scientific method	Variables
hypothesis	Theory	Law
quantitative	Qualitative	significant figures
Metric units	Scientific notation	

Next Generation Science Standards:

HS-PS2-6. **Communicate scientific and technical information about why the molecular-level structure is importantin the functioning of designed materials.*** [Clarification Statement: Emphasis is on the attractive and repulsive forces that determine the functioning of the material. Examples could include why electrically conductive materials are often made of metal, flexible but durable materials are made up of long chained molecules, and pharmaceuticals are designed to interact with specific receptors.] [*Assessment Boundary: Assessment is limited to provided molecular structures of specific designed materials.*]

HS-PS3-5. **Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.** [Clarification Statement: Examples of models could include drawings, diagrams, and texts, such as drawings of what happens when two charges of opposite polarity are near each other.] [*Assessment Boundary: Assessment is limited to systems containing two objects.*]

HS-PS4-5	**Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.*** [Clarification Statement: Examples could include solar cells capturing light and converting it to electricity; medical imaging; and communications technology.] [*Assessment Boundary: Assessments are limited to qualitative information. Assessments do not include band theory.*]

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 9–12 builds on K–8 and progresses to evaluating the validity and reliability of the claims, methods, and designs. • Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-PS2-6) **Developing and Using Models** Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. • Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-PS3-5)	**PS2.B: Types of Interactions** • Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces between material objects. HS-PS2-6) **PS3.C: Relationship Between Energy and Forces** • When two objects interacting through a field change relative position, the energy stored in the field is changed. (HS-PS3-5)	**Structure and Function** • Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-PS2-6)

Connections to other DCIs in this grade-band:

Articulation of DCIs across grade-bands:
MS.PS1.A (HS-PS2-6); **MS.PS2.B** HS-PS2-6); **MS.PS2.B** HS-PS3-5);

Common Core State Standards Connections:

ELA/Literacy -

RST.11-12.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (*HS-PS2-6)*

Mathematics -

MP.2	Reason abstractly and quantitatively. HS-PS3-5)
MP.4	Model with mathematics. HS-PS3-5)
HSN-Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. *(HS-PS2-6)*
HSN-Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. *(HS-PS2-6)*