Physics offers a curriculum that emphasizes students’ understanding of fundamental physics concepts while helping them acquire tools to be conversant in a society highly influenced by science and technology.

The course provides students with opportunities to learn and practice critical scientific skills within the context of relevant scientific questions. Topics include the nature of science, math for physics, energy, kinematics, force and motion, momentum, gravitation, chemistry for physics, thermodynamics, electricity, magnetism, waves, nuclear physics, quantum physics, and cosmology.

Scientific inquiry skills are embedded in the direct instruction, wherein students learn to ask scientific questions, form and test hypotheses, and use logic and evidence to draw conclusions about the concepts. Lab activities reinforce critical thinking, writing, and communication skills and help students develop a deeper understanding of the nature of science.

Throughout this course, students are given an opportunity to understand how physics concepts are applied in technology and engineering. Journal and Practice activities provide additional opportunities for students to apply learned concepts and practice their writing skills.

This course is built to state standards and informed by the American Association for the Advancement of Science (AAAS) Project 2061 benchmarks and the National Science Education Standards.

Length: Two semesters

**UNIT 1: INTRODUCTION TO PHYSICS**

**LESSON 1: THE PROCESS OF SCIENCE**

**Study: The Nature of Physics**
Learn what is and is not science; what the study of physics is; tools used by scientists; and the role of science in society.
Duration: 0 hrs 45 mins Scoring: 0 points

**Quiz: The Nature of Physics**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

**Study: Scientific Methods**
Learn about designing and performing experiments and collecting data.
Duration: 0 hrs 45 mins Scoring: 0 points

**Quiz: Scientific Methods**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

**Journal: Pseudoscience Around You**
Write about topics in physics that connect to daily life.
Duration: 0 hrs 40 mins Scoring: 20 points

**LESSON 2: MATH IN PHYSICS**

**Study: Algebra in Physics**
Review basic algebra skills.
Duration: 0 hrs 45 mins Scoring: 0 points

**Quiz: Algebra in Physics**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points
Study: Units and Measurement
Review the usefulness of using units in scientific measurement; learn about significant figures and measurement error; learn about SI units; convert between units.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Units and Measurement
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Graphing
Learn about different types of graphs and their suitability for sets of data; learn how to graph data as well as interpolate and extrapolate data based on a graph.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Graphing
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 3: MATH FOR MOTION

Study: Introduction to Vectors
Learn the difference between scalar and vector quantities and how to use vectors appropriately.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Introduction to Vectors
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Vector Operations
Learn how to add vector quantities by resolving into their components.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Vector Operations
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Trigonometry
Learn how trigonometry is applied to physics problems involving angles.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Trigonometry
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Practice: Introduction to Physics
Practice problem-solving skills related to concepts in the lesson.
Duration: 1 hr 30 mins Scoring: 25 points

LESSON 4: DOING SCIENCE: INTRODUCTION TO PHYSICS

Study: Physics and the World
Learn about the process of scientific inquiry.
Duration: 0 hrs 40 mins Scoring: 0 points

Quiz: Physics and the World
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Lab: Measuring and Estimating
Use scientific methods and skills to perform a lab experiment.
Duration: 1 hr 30 mins Scoring: 50 points

**Discuss: Measuring and Estimating Lab**
Discuss the results of your lab.
Duration: 0 hrs 20 mins Scoring: 15 points

**LESSON 5: INTRODUCTION TO PHYSICS WRAP-UP**

**Review: Unit Review**
Prepare for the unit test by reviewing key concepts and skills.
Duration: 0 hrs 30 mins Scoring: 0 points

**Test (CS): Computer-Scored Unit Test**
Take a computer-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

**Test (TS): Teacher-Scored Unit Test**
Take a teacher-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

**UNIT 2: ENERGY**

**LESSON 1: ENERGY AND FORCES**

**Study: Types of Energy**
Learn about different types of energy and examples of each type.
Duration: 0 hrs 45 mins Scoring: 0 points

**Quiz: Types of Energy**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

**Study: Forces**
Learn about the four fundamental forces and how the strengths of the different forces vary with distance.
Duration: 0 hrs 45 mins Scoring: 0 points

**Quiz: Forces**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

**LESSON 2: CONSERVATION OF ENERGY**

**Study: Calculating Energy**
Learn how to calculate the kinetic energy of a moving object and the potential energy of a system; learn how temperature is related to the kinetic energy of molecules.
Duration: 0 hrs 45 mins Scoring: 0 points

**Quiz: Calculating Energy**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

**Study: Conservation of Energy**
Learn how energy transforms and is conserved in simple and complex systems; learn how to perform calculations that illustrate the law of conservation of energy.
Duration: 0 hrs 45 mins Scoring: 0 points

**Quiz: Conservation of Energy**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points
Journal: Energy and You
Write about topics in physics that connect to daily life.
Duration: 0 hrs 40 mins Scoring: 20 points

LESSON 3: USEFUL ENERGY

Study: Work and Power
Learn how to differentiate between energy and work and between work and power; learn how to calculate work done and power produced in simple systems.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Work and Power
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Machines and Efficiency
Learn about different types of simple machines and their mechanical advantages; learn how to calculate work done by simple machines.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Machines and Efficiency
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Energy and Sustainability
Learn about the advantages and disadvantages of different energy sources; learn how to apply scientific reasoning to analyze socially relevant energy issues.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Energy and Sustainability
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Practice: Energy
Practice problem-solving skills related to concepts in the lesson.
Duration: 1 hr 30 mins Scoring: 25 points

LESSON 4: DOING SCIENCE: ENERGY

Study: Physics Experiments
Learn about the process of scientific inquiry.
Duration: 0 hrs 40 mins Scoring: 0 points

Quiz: Physics Experiments
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Lab: Conservation of Energy
Use scientific methods and skills to perform a lab experiment.
Duration: 1 hr 30 mins Scoring: 50 points

Discuss: Conservation of Energy Lab
Discuss the results of your lab.
Duration: 0 hrs 20 mins Scoring: 15 points

LESSON 5: ENERGY WRAP-UP

Review: Unit Review
Prepare for the unit test by reviewing key concepts and skills.
Duration: 0 hrs 30 mins Scoring: 0 points
Test (CS): Computer-Scored Unit Test
Take a computer-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

Test (TS): Teacher-Scored Unit Test
Take a teacher-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

UNIT 3: KINEMATICS

LESSON 1: DISPLACEMENT, VELOCITY, AND ACCELERATION

Study: Displacement and Velocity
Learn how to solve problems involving distance; speed; time; and velocity; learn how to draw and interpret a position-time graph.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Displacement and Velocity
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Acceleration
Learn how to solve problems involving acceleration; learn how acceleration relates to velocity; to displacement; and to time.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Acceleration
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Free Fall
Learn how to solve problems involving the force of gravity acting on an object.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Free Fall
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Journal: Vectors and Motion
Write about topics in physics that connect to daily life.
Duration: 0 hrs 40 mins Scoring: 20 points

LESSON 2: NONLINEAR MOTION

Study: Projectile Motion
Learn how to solve problems involving two-dimensional trajectories.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Projectile Motion
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Circular Motion
Learn how to solve problems involving circular motion.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Circular Motion
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points
Study: Relative Motion
Learn about frames of reference; learn how to solve motion problems using a variety of frames of reference.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Relative Motion
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Practice: Kinematics
Practice problem-solving skills related to concepts in the lesson.
Duration: 1 hr 30 mins Scoring: 25 points

LESSON 3: DOING SCIENCE: KINEMATICS
Study: Organizing and Analyzing Experimental Results
Learn about the process of scientific inquiry.
Duration: 0 hrs 40 mins Scoring: 0 points

Quiz: Organizing and Analyzing Experimental Results
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Lab: Kinematics
Use scientific methods and skills to perform a lab experiment.
Duration: 1 hr 30 mins Scoring: 50 points

Discuss: Kinematics Lab
Discuss the results of your lab.
Duration: 0 hrs 20 mins Scoring: 15 points

LESSON 4: KINEMATICS WRAP-UP
Review: Unit Review
Prepare for the unit test by reviewing key concepts and skills.
Duration: 0 hrs 30 mins Scoring: 0 points

Test (CS): Computer-Scored Unit Test
Take a computer-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

Test (TS): Teacher-Scored Unit Test
Take a teacher-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

UNIT 4: DYNAMICS

LESSON 1: FORCE AND MOTION
Study: Newton’s Laws
Learn how Newton’s laws can be applied to everyday situations.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Newton’s Laws
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Force Problems
Learn how to construct and interpret free-body diagrams for situations involving both balanced and unbalanced forces.
Duration: 0 hrs 45 mins Scoring: 0 points
LESSON 2: CALCULATIONS WITH FORCES

Study: Free-Body Diagrams
Learn how to solve problems using Newton's second law and how to do calculations involving force and work.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Free-Body Diagrams
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Multiple Forces
Learn how to determine the change of motion of an object acted on by multiple forces; how to solve two-dimensional problems involving balanced forces; and how to calculate the net force on an object.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Multiple Forces
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Friction
Learn how to differentiate between static and kinetic friction and how to solve problems involving frictional forces.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Friction
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Journal: Friction and You
Write about topics in physics that connect to daily life.
Duration: 0 hrs 40 mins Scoring: 20 points

Practice: Dynamics
Practice problem-solving skills related to concepts in the lesson.
Duration: 1 hr 30 mins Scoring: 25 points

LESSON 3: DOING SCIENCE: DYNAMICS

Study: Errors in Experiments
Learn about the process of scientific inquiry.
Duration: 0 hrs 40 mins Scoring: 0 points

Quiz: Errors in Experiments
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Lab: Force of Friction
Use scientific methods and skills to perform a lab experiment.
Duration: 1 hr 30 mins Scoring: 50 points

Discuss: Force of Friction Lab
Discuss the results of your lab.
Duration: 0 hrs 20 mins Scoring: 15 points

LESSON 4: DYNAMICS WRAP-UP

Review: Unit Review
Prepare for the unit test by reviewing key concepts and skills.
Duration: 0 hrs 30 mins Scoring: 0 points

**Test (CS): Computer-Scored Unit Test**
Take a computer-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

**Test (TS): Teacher-Scored Unit Test**
Take a teacher-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

**UNIT 5: MOMENTUM AND GRAVITATION**

**LESSON 1: MOMENTUM**

**Study: Momentum**
Learn how to differentiate between force and energy and between energy and momentum; learn how to calculate the momentum of a mechanical system.
Duration: 0 hrs 45 mins Scoring: 0 points

**Quiz: Momentum**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

**Study: Conservation of Momentum**
Learn how to solve problems involving conservation of momentum and elastic/inelastic collision situations.
Duration: 0 hrs 45 mins Scoring: 0 points

**Quiz: Conservation of Momentum**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

**LESSON 2: HARMONIC MOTION**

**Study: Harmonic Motion**
Learn how to apply the law of conservation of energy to situations involving harmonic motion and how to perform calculations involving Hooke's law.
Duration: 0 hrs 45 mins Scoring: 0 points

**Quiz: Harmonic Motion**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

**Journal: Rhythm in Your Life**
Write about topics in physics that connect to daily life.
Duration: 0 hrs 40 mins Scoring: 20 points

**LESSON 3: PLANETARY PHYSICS**

**Study: Orbits**
Learn how to describe the motion of satellites and planets and how to solve problems involving the gravitational force between two objects.
Duration: 0 hrs 45 mins Scoring: 0 points

**Quiz: Orbits**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

**Practice: Momentum and Gravitation**
Practice problem-solving skills related to concepts in the lesson.
LESSON 4: DOING SCIENCE: MOMENTUM AND GRAVITATION

Study: Evaluating Scientific Conclusions
Learn about the process of scientific inquiry.
Duration: 0 hrs 40 mins Scoring: 0 points

Quiz: The Scientific Community
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Lab: Simple Harmonic Motion
Use scientific methods and skills to perform a lab experiment.
Duration: 1 hr 30 mins Scoring: 50 points

Discuss: Simple Harmonic Motion Lab
Discuss the results of your lab.
Duration: 0 hrs 20 mins Scoring: 15 points

LESSON 5: MOMENTUM AND GRAVITATION WRAP-UP

Review: Unit Review
Prepare for the unit test by reviewing key concepts and skills.
Duration: 0 hrs 30 mins Scoring: 0 points

Test (CS): Computer-Scored Unit Test
Take a computer-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

Test (TS): Teacher-Scored Unit Test
Take a teacher-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

UNIT 6: SEMESTER 1 REVIEW AND EXAM

LESSON 1: SEMESTER 1 REVIEW AND EXAM

Review: Semester 1
Prepare for the final exam by reviewing key concepts and skills.
Duration: 1 hr Scoring: 0 points

Exam: Semester 1
Take a computer-scored exam to demonstrate your mastery of concepts and skills covered in Semester 1.
Duration: 1 hr Scoring: 100 points

Final Exam: Semester 1
Take a teacher-scored exam to demonstrate your mastery of concepts and skills covered in Semester 1.
Duration: 1 hr Scoring: 100 points

UNIT 7: CHEMICAL PHYSICS

LESSON 1: CHEMISTRY FOR PHYSICS

Study: Atomic Structure and the Periodic Table
Learn about the structure of an atom; learn how to use the periodic table to find information about atoms; learn about the history of atomic theory.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Atomic Structure and the Periodic Table
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points
Study: Chemical Bonds
Learn how molecules are different from atoms; learn how molecules form; learn how molecules bond to other molecules.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Chemical Bonds
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Journal: Elements in Daily Life
Write about topics in physics that connect to daily life.
Duration: 0 hrs 40 mins Scoring: 20 points

LESSON 2: INTRODUCTION TO STATES OF MATTER

Study: Movement in Matter
Learn about the various states of matter in terms of kinetic molecular theory; learn why molecules move and how their movements can be measured.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Movement in Matter
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Fluid Dynamics and Buoyancy
Learn about and apply Archimedes’ and Bernoulli’s principles; learn about and apply Pascal’s principle; learn about the unique properties of water.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Fluid Dynamics and Buoyancy
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Practice: Chemical Physics
Practice problem-solving skills related to concepts in the lesson.
Duration: 1 hr 30 mins Scoring: 25 points

LESSON 3: DOING SCIENCE: CHEMICAL PHYSICS

Study: The People of Science
Learn about the process of scientific inquiry.
Duration: 0 hrs 40 mins Scoring: 0 points

Quiz: The People of Science
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Lab: Fluids
Use scientific methods and skills to perform a lab experiment.
Duration: 1 hr 30 mins Scoring: 50 points

Discuss: Fluids Lab
Discuss the results of your lab.
Duration: 0 hrs 20 mins Scoring: 15 points

LESSON 4: CHEMICAL PHYSICS WRAP-UP

Review: Unit Review
Prepare for the unit test by reviewing key concepts and skills.
Duration: 0 hrs 30 mins Scoring: 0 points
UNIT 8: THERMODYNAMICS

LESSON 1: LAWS OF THERMODYNAMICS

Study: Potential Energy in Chemical Reactions
Learn what enthalpy and entropy are; learn the difference between exothermic and endothermic reactions; learn how to draw a potential energy diagram for a chemical reaction.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Potential Energy in Chemical Reactions
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: First Law of Thermodynamics
Learn about the first and second laws of thermodynamics and how to apply them; learn about differences between open, closed, and isolated systems.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: First Law of Thermodynamics
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Second Law of Thermodynamics
Learn how to compare and contrast different methods of heat flow.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Second Law of Thermodynamics
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 2: ENERGY CHANGE

Study: Heat Flow
Learn how work is done in a heat engine and what factors affect its efficiency
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Heat Flow
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Heating, Cooling, and Phase Changes
Learn how to solve problems using specific heat capacity and latent heat values; learn how to determine the final temperature when two objects of different temperatures are in contact.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Heating, Cooling, and Phase Changes
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Practice: Thermodynamics
Practice problem-solving skills related to concepts in the lesson.
**Journal: Endothermic and Exothermic Reactions**
Write about topics in physics that connect to daily life.
Duration: 0 hrs 40 mins Scoring: 20 points

**LESSON 3: DOING SCIENCE: THERMODYNAMICS**

**Study: Scientific Models**
Learn about the process of scientific inquiry.
Duration: 0 hrs 40 mins Scoring: 0 points

**Quiz: Scientific Models**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

**Lab: Thermodynamics**
Use scientific methods and skills to perform a lab experiment.
Duration: 1 hr 30 mins Scoring: 50 points

**Discuss: Thermodynamics Lab**
Discuss the results of your lab.
Duration: 0 hrs 20 mins Scoring: 15 points

**LESSON 4: THERMODYNAMICS WRAP-UP**

**Review: Unit Review**
Prepare for the unit test by reviewing key concepts and skills.
Duration: 0 hrs 30 mins Scoring: 0 points

**Test (CS): Computer-Scored Unit Test**
Take a computer-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

**Test (TS): Teacher-Scored Unit Test**
Take a teacher-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

**UNIT 9: ELECTRICITY AND MAGNETISM**

**LESSON 1: ELECTRICITY**

**Study: Electrostatics**
Learn how to determine the force between two electric charges; learn how to calculate an electric field; learn how to use the right-hand rule to determine the direction of an electric force.
Duration: 0 hrs 45 mins Scoring: 0 points

**Quiz: Electrostatics**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

**Study: Electrical Potential and Capacitance**
Learn the difference between an electric field; potential energy; potential difference; and capacitance; learn how to perform calculations on electrical systems using these concepts.
Duration: 0 hrs 45 mins Scoring: 0 points

**Quiz: Electrical Potential and Capacitance**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

**LESSON 2: ELECTRICAL CIRCUITS**
Study: Current and Resistance
Learn about relationships between current; voltage; resistance; and power; learn how to solve problems using Ohm’s law and how to calculate energy dissipation in a resistor.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Current and Resistance
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Series Circuits
Learn how to diagram series circuits; learn how to determine the current; resistance; or voltage in a circuit; differentiate between complete; open; and short circuits.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Series Circuits
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Parallel and Combined Circuits
Learn how to diagram parallel and combined circuits; learn how to determine the current; resistance; or voltage in a parallel circuit.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Parallel and Combined Circuits
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Journal: Circuits in Your Home
Write about topics in physics that connect to daily life.
Duration: 0 hrs 40 mins Scoring: 20 points

LESSON 3: MAGNETISM AND ELECTROMAGNETISM

Study: Magnetism
Learn about properties of magnetic fields.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Magnetism
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Electromagnetism
Learn how magnetic fields can produce electric fields, and vice versa; learn about properties of electromagnetic waves.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Electromagnetism
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Practice: Electricity and Magnetism
Practice problem-solving skills related to concepts in the lesson.
Duration: 1 hr 30 mins Scoring: 25 points

LESSON 4: DOING SCIENCE: ELECTRICITY AND MAGNETISM

Study: Testing Scientific Solutions
Learn about the process of scientific inquiry.
Duration: 0 hrs 40 mins Scoring: 0 points
Quiz: Testing Scientific Solutions
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Lab: Circuit Building
Use scientific methods and skills to perform a lab experiment.
Duration: 1 hr 30 mins Scoring: 50 points

Discuss: Circuit Building
Discuss the results of your lab.
Duration: 0 hrs 20 mins Scoring: 15 points

LESSON 5: ELECTRICITY AND MAGNETISM WRAP-UP

Review: Unit Review
Prepare for the unit test by reviewing key concepts and skills.
Duration: 0 hrs 30 mins Scoring: 0 points

Test (CS): Computer-Scored Unit Test
Take a computer-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

Test (TS): Teacher-Scored Unit Test
Take a teacher-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

UNIT 10: WAVES

LESSON 1: INTRODUCTION TO WAVE MOTION

Study: Introduction to Waves
Learn about different types of waves; about properties of waves; and about how waves move; learn how to solve problems involving wave speed; frequency; and wavelength.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Introduction to Waves
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Wave Interactions
Learn about how waves interact with media and with other waves; learn the differences between constructive and deconstructive interference.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Wave Interactions
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 2: SOUND AND LIGHT

Study: Sound
Learn about the properties of sound waves; about the Doppler effect with respect to sound waves; and about practical applications of sound waves in technology and engineering.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Sound
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Light
Learn about the regions of the electromagnetic spectrum and how electromagnetic waves travel; learn how to solve problems involving electromagnetic wave speed; frequency; and wavelength; learn about engineering applications of electromagnetic waves.

Duration: 0 hrs 45 mins Scoring: 0 points

**Quiz: Light**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

**Journal: Sounds You Hear**
Write about topics in physics that connect to daily life.
Duration: 0 hrs 40 mins Scoring: 20 points

**LESSON 3: OPTICS**

**Study: Introduction to Optics**
Learn how to draw and interpret ray diagrams; learn about the process of image formation; learn how light reflects and refracts.
Duration: 0 hrs 45 mins Scoring: 0 points

**Quiz: Introduction to Optics**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

**Study: Lenses and Mirrors**
Learn how to solve problems using lens and mirror equations.
Duration: 0 hrs 45 mins Scoring: 0 points

**Quiz: Lenses and Mirrors**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

**Practice: Waves**
Practice problem-solving skills related to concepts in the lesson.
Duration: 1 hr 30 mins Scoring: 25 points

**LESSON 4: DOING SCIENCE: WAVES**

**Study: Applications of Electromagnetic Radiation**
Learn about the process of scientific inquiry.
Duration: 0 hrs 40 mins Scoring: 0 points

**Quiz: Applications of Electromagnetic Radiation**
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

**Lab: Optics**
Use scientific methods and skills to perform a lab experiment.
Duration: 1 hr 30 mins Scoring: 50 points

**Discuss: Optics Lab**
Discuss the results of your lab.
Duration: 0 hrs 20 mins Scoring: 15 points

**LESSON 5: WAVES WRAP-UP**

**Review: Unit Review**
Prepare for the unit test by reviewing key concepts and skills.
Duration: 0 hrs 30 mins Scoring: 0 points

**Test (CS): Computer-Scored Unit Test**
Take a computer-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

Test (TS): Teacher-Scored Unit Test
Take a teacher-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

UNIT 11: MODERN PHYSICS

LESSON 1: NUCLEAR PHYSICS

Study: Nuclear Structure
Learn how competing forces within the nucleus determine its stability; learn how to differentiate between nuclear and chemical reactions; learn how to apply Einstein’s mass-energy equivalence formula to nuclear reactions.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Nuclear Structure
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Radioactivity and Half-Life
Learn about the processes of radioactive decay and the factors that determine the level of danger from various radiation sources; learn how to solve problems using half-life calculations; learn about useful and peaceful applications for nuclear processes.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Radioactivity and Half-Life
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Fission and Fusion
Learn about fission and fusion; learn about common examples of each; learn how forces in the nucleus affect the likelihood of fission or fusion occurring.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Fission and Fusion
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 2: QUANTUM PHYSICS

Study: Atomic Physics and Quantization
Learn about the dual nature of light and key experiments that led to the current understanding of the nature of light; learn about the concept of quantization.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Atomic Physics and Quantization
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Study: Introduction to Relativity
Learn about the importance of the concept of relativity and the difference between general and special relativity; learn about the connection between Newton’s laws and Einstein’s special theory of relativity; learn about the difference between quantum and Newtonian mechanics.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Introduction to Relativity
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points
LESSON 3: COSMOLOGY

Study: Cosmology
Learn about the development of the big bang theory.
Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Cosmology
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Journal: What Do You Think about the Big Bang?
Write about topics in physics that connect to daily life.
Duration: 0 hrs 40 mins Scoring: 20 points

Practice: Modern Physics
Practice problem-solving skills related to concepts in the lesson.
Duration: 1 hr 30 mins Scoring: 25 points

LESSON 4: DOING SCIENCE: MODERN PHYSICS

Study: Evaluating Scientific Claims
Learn about the process of scientific inquiry.
Duration: 0 hrs 40 mins Scoring: 0 points

Quiz: Evaluating Scientific Claims
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Lab: Nuclear Physics
Use scientific methods and skills to perform a lab experiment.
Duration: 1 hr 30 mins Scoring: 50 points

Discuss: Nuclear Physics Lab
Discuss the results of your lab.
Duration: 0 hrs 20 mins Scoring: 15 points

LESSON 5: MODERN PHYSICS WRAP-UP

Review: Unit Review
Prepare for the unit test by reviewing key concepts and skills.
Duration: 0 hrs 30 mins Scoring: 0 points

Test (CS): Computer-Scored Unit Test
Take a computer-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

Test (TS): Teacher-Scored Unit Test
Take a teacher-scored test to assess what you have learned in this unit.
Duration: 1 hr Scoring: 50 points

UNIT 12: SEMESTER 2 REVIEW AND EXAM

LESSON 1: SEMESTER 2 REVIEW AND EXAM

Review: Semester 2
Prepare for the unit test by reviewing key concepts and skills.
Duration: 1 hr Scoring: 0 points

Exam: Semester 2
Take a computer-scored exam to demonstrate your mastery of concepts and skills covered in Semester 2.
Duration: 1 hr Scoring: 100 points
Final Exam: Semester 2
Take a teacher-scored exam to demonstrate your mastery of concepts and skills covered in Semester 2.

Duration: 1 hr  Scoring: 100 points