

PHYSICAL SCIENCE, SEMESTER A

COURSE OVERVIEW

Physical Science offers a focused curriculum designed around the understanding of foundational physical science concepts, including the nature of matter, energy, and forces, as well as the application of scientific and engineering practices.

Course topics include energy, forces, electromagnetism, waves, matter, chemical reactions, and nuclear reactions. Teacher-scored labs encourage students to apply the scientific method.

Students discover new concepts through guided instruction and confirm their understanding in an interactive, feedback-rich environment. 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.

A variety of activities encourage students to think scientifically. Labs and projects reinforce critical thinking, writing, and communication skills and help students develop a deeper understanding of the nature of science and engineering. Virtual labs allow students to engage in investigations that would otherwise require long periods of observation at remote locations and to explore simulations that scientists use to test predictions. In discussion activities, students compare their lab results and exchange ideas about their investigations. Practice and explore activities provide additional opportunities for students to apply learned concepts and practice their writing and scientific reasoning skills.

This course is built to state standards.

[Lab materials needed for this course](#)

COURSE COMPONENTS AND GRADING RUBRIC

The table gives a breakdown of the weight for each component in the course. Weight represents the percentage of the total score coming from each activity.

Course Components	Count	Weight
Pretest. <i>A pretest is an optional assessment, typically designed for credit recovery. If a student shows mastery of a lesson objective, the student may be automatically exempted from the upcoming activities associated with the mastered objective. Each passing pretest grade is entered into the gradebook.</i>	4	0%

Course Components	Count	Weight
Practice. A practice activity provides instruction similar to that found in a study so that students can practice or review skills necessary to complete their assignment with mastery.	1	5%
Discussion. A discussion activity is an opportunity for students to collaborate with their peers. This activity gives students the opportunity to practice speaking and listening in a clear and logical manner and to receive feedback from peers.	2	5%
Project. A project is a hands-on investigation that extends over several weeks.	4	20%
Lab. A lab is a hands-on investigatory activity that can be completed in a couple of class periods. It can include virtual labs, modeling exercises, and engineering design activities.	2	0%
Mastery Test. A mastery test is a computer-scored lesson-level summative assessment.	16	40%
Posttest. A posttest appears at the end of each unit.	4	20%
End-of-Semester Test. An end-of-semester test (EOS) appears at the end of each course.	1	10%
Total	34	100%

*Teachers may manually adjust these weights if desired, per district grading requirements.

UNIT 1: SCIENCE AND ENGINEERING

Lesson and Duration	Description
Pretest: Science and Engineering 40 minutes	Complete the pretest (optional).
Science and Engineering: Unit Overview 1 minute	Read the unit overview.
LESSON 1 Science: Lesson Overview 5 minutes	Read the lesson objectives.
What is Science?: Study 1 hour	Learn about the nature of science.
What is Science?: Mastery Test 20 minutes	Take a quiz to assess your understanding of the material.

Lesson and Duration	Description
Introduction to Physical Science: Study <i>1 hour</i>	Learn concepts foundational to the study of physical science.
Introduction to Physical Science: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
LESSON 2 Scientific and Engineering Processes: Lesson Overview <i>5 minutes</i>	Read the lesson objectives.
Scientific Investigations: Study <i>1 hour</i>	Learn how to design a scientific investigation.
Scientific Investigations: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Modeling: Study <i>1 hour</i>	Learn about different types of scientific models.
Modeling: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Engineering: Study <i>1 hour</i>	Learn what engineering is and about engineering design practices.
Engineering: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
UNIT 1 WRAP-UP Science and Engineering: Review <i>30 minutes</i>	Review what you have learned in this unit.
Posttest: Science and Engineering <i>30 minutes</i>	Take a computer-scored test to assess what you have learned in this unit.

UNIT 2: ENERGY

Lesson and Duration	Description
Pretest: Energy <i>40 minutes</i>	Complete the pretest (optional).
Energy: Unit Overview <i>1 minute</i>	Read the unit overview.
LESSON 1 What Is Energy?: Lesson Overview <i>5 minutes</i>	Read the lesson objectives.
Types of Energy: Study <i>1 hour</i>	Learn about different types of energy.
Types of Energy: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Conservation of Energy: Study <i>1 hour</i>	Learn about the law of conservation of energy.
Conservation of Energy: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Practice: Conservation of Energy <i>40 minutes</i>	Answer open-response questions to assess your understanding of the material.
Project: Energy Conversions <i>4 hours</i>	Design, build, and refine an energy-conversion device.
LESSON 2 Thermal Energy: Lesson Overview <i>5 minutes</i>	Read the lesson objectives.
Thermal Energy and Matter: Study <i>1 hour</i>	Learn how thermal energy is transferred.
Thermal Energy and Matter: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.

Lesson and Duration	Description
Lab: Transfer of Thermal Energy <i>3 hours</i>	Conduct a scientific investigation to explore the transfer of thermal energy.
Transfer of Thermal Energy: Mastery Test <i>25 minutes</i>	Take a quiz to assess your understanding of the material.
Prepare to Discuss: Transfer of Thermal Energy <i>5 minutes</i>	Prepare for a discussion.
Discuss: Transfer of Thermal Energy <i>20 minutes</i>	Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error. Evaluate lab procedures and results in a discussion with your peers.
LESSON 3 Doing Science: Lesson Overview <i>5 minutes</i>	Read the lesson objectives.
Project: Modeling the Energy of a System <i>4 hours</i>	Model the energy of a system.
UNIT 2 WRAP-UP Energy: Review <i>30 minutes</i>	Review what you have learned in this unit.
Posttest: Energy <i>30 minutes</i>	Take a computer-scored test to assess what you have learned in this unit.

UNIT 3: FORCES

Lesson and Duration	Description
Pretest: Forces <i>40 minutes</i>	Complete the pretest (optional).
Forces: Unit Overview <i>1 minute</i>	Read the unit overview.

Lesson and Duration	Description
LESSON 1	
Force and Motion: Lesson Overview <i>5 minutes</i>	Read the lesson objectives.
Newton's Laws of Motion: Study <i>1 hour</i>	Learn about Newton's laws of motion.
Newton's Laws of Motion: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Noncontact Forces: Study <i>1 hour</i>	Learn about noncontact forces, also known as the fundamental forces.
Noncontact Forces: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Project: Electric Fields <i>4 hours</i>	Develop a model of two objects interacting through electric fields.
LESSON 2	
Momentum and Collisions: Lesson Overview <i>5 minutes</i>	Read the lesson objectives.
Momentum: Study <i>1 hour</i>	Learn about momentum.
Momentum: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Project: Collisions <i>4 hours</i>	Design a device that minimizes the forces transferred during a collision.
UNIT 3 WRAP-UP	
Forces: Review <i>30 minutes</i>	Review what you have learned in this unit.
Posttest: Forces <i>30 minutes</i>	Take a computer-scored test to assess what you have learned in this unit.

UNIT 4: ELECTROMAGNETS

Lesson and Duration	Description
Pretest: Electromagnets <i>40 minutes</i>	Complete the pretest (optional).
Electromagnets: Unit Overview <i>1 minute</i>	Read the unit overview.
LESSON 1 Electricity and Magnetism: Lesson Overview <i>5 minutes</i>	Read the lesson objectives.
Electricity: Study <i>1 hour</i>	Learn about electricity.
Electricity: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Magnetism: Study <i>1 hour</i>	Learn about magnetism.
Magnetism: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
LESSON 2 Electromagnetism: Lesson Overview <i>5 minutes</i>	Read the lesson objectives.
Electromagnetism, Part 1: Study <i>1 hour</i>	Learn about electromagnetism.
Electromagnetism, Part 1: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Lab: Electromagnetism, Part 2 <i>3 hours</i>	Conduct a scientific investigation into the phenomenon of electromagnetism.
Electromagnetism, Part 2: Mastery Test <i>25 minutes</i>	Take a quiz to assess your understanding of the material.

Lesson and Duration	Description
Prepare to Discuss: Electromagnetism <i>5 minutes</i>	Prepare for a discussion.
Discuss: Electromagnetism <i>20 minutes</i>	Analyze data by using data tables, calculating the range and average of a set of measurements, and identifying sources of error. Evaluate lab procedures and results in a discussion with your peers.
UNIT 4 WRAP-UP Electromagnets: Review <i>30 minutes</i>	Review what you have learned in this unit.
Posttest: Electromagnets <i>30 minutes</i>	Take a computer-scored test to assess what you have learned in this unit.

SEMESTER WRAP-UP

Lesson and Duration	Description
Semester Review: Review <i>30 minutes</i>	Review what you have learned in this semester.
End-of-Semester Test: Semester Exam <i>40 minutes</i>	Take a computer-scored exam to demonstrate your mastery of concepts and skills covered in this semester.