

| | |
|---|----------|
| Introduction | 2 |
| Unit 1: Matter and Its Interactions | |
| Lesson 1: Structure of Matter..... | 2 |
| Lesson 2: Physical Properties of Matter..... | 2 |
| Lesson 3: Mixtures and Solutions | 3 |
| Lesson 4: Chemical Reactions | 3 |
| Lesson 5: Nuclear Fusion | 4 |
| Unit 2: Motions, Forces, & Stability | |
| Lesson 1: Forces & Motions | 4 |
| Lesson 2: Gravity..... | 5 |
| Lesson 3: Magnetic Forces..... | 6 |
| Lesson 4: Electric Forces..... | 6 |
| Lesson 5: Changes in Physical Systems | 7 |
| Unit 3: Energy | |
| Lesson 1: Understanding Energy..... | 7 |
| Lesson 2: Energy in Chemical Process | 8 |
| Lesson 3: Heat and Temperature | 8 |
| Unit 4: Electricity | |
| Lesson 1: Electrical Energy | 9 |
| Lesson 2: Basic Circuits..... | 9 |
| Lesson 3: Static Electricity | 10 |
| Lesson 4: Electromagnetism | 10 |
| Unit 5: Waves | |
| Lesson 1: Characteristics of Waves..... | 11 |
| Lesson 2: Types of Waves..... | 12 |
| Lesson 3: Sound..... | 12 |
| Lesson 4: The Electromagnetic Spectrum | 13 |
| Lesson 5: Light | 13 |
| Lesson 6: Digital Transmission | 14 |

Introduction

Core Physical Science III is one of the three courses in the Core Science III Collection. It is an introductory course that teaches about molecules, atoms, properties and states of matter, mixtures, solutions, chemical reactions, acids, nuclear fusion, forces, laws of motion, gravitational force, magnetic force, electric force, changes in physical systems, states of equilibrium, potential energy and kinetic energy, energy transfer, heat, heat transfer, electrical circuits, electromagnetism, properties of waves, sound waves, electromagnetic waves, light waves, and digital information transfer. The Course has 23 lessons organized in 5 Units and its learning objectives align with Common Core Science objectives for grades 6 to 8. There are 413 audio-supported instruction pages, 69 printable activity sheet pages, 201 defined vocabulary words, and a set of 345 Quiz and Unit Test questions.

Unit 1: Matter and Its Interactions

Lesson 1: Structure of Matter

Common Core Standards

- PS1.A Structure and Properties of Matter

Learning Objectives

- to learn that matter is made of small particles, the smallest of which is an atom
- to learn that atoms can combine to form molecules of substances

Defined Vocabulary Words

- matter, particle theory of matter, atom, proton, neutron, electron, element, Periodic Table of Elements, molecule, compound, organic compounds, inorganic compounds, acid, ion, base, salt

Activity Type

- Write the letter for the matching definition on the line after each word.
- Interactive Activity: Molecule Models

Lesson Components

Total Learning Objects – 35

Instruction Pages - 18

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 2: Physical Properties of Matter

Common Core Standards

- PS1.A Structure and Properties of Matter

Learning Objectives

- to learn about physical properties of matter
- to learn about the physical properties of states of matter

Defined Vocabulary Words

- pure substance, physical properties, mass, weight, volume, density, solubility, magnetism, solid, crystals, liquid, gases

Activity Type

- Describe what is a physical property of matter.
- List at least eight physical properties of matter.
- How do solids, liquids, and gases differ from each other?
- Interactive Activity: Melting Point

Lesson Components

Total Learning Objects – 37

Instruction Pages - 19

Activity Pages - 4

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 3: Mixtures and Solutions

Common Core Standards

- PS1.A Structure and Properties of Matter

Learning Objectives

- to learn about the characteristics of mixtures and solutions
- to learn how to separate the components of a mixture

Defined Vocabulary Words

- pure substances, mixture, solubility, solute, filtration, evaporation, distillation, chromatography

Activity Type

- Draw a line from the word to its definition.
- Interactive Activity: Separating a Mixture

Lesson Components

Total Learning Objects – 35

Instruction Pages - 18

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 4: Chemical Reactions

Common Core Standards

- PS1.B Chemical Reactions

Learning Objectives

- to learn what a chemical reaction is and examples of chemical reactions
- to learn about the concept of acids and bases

Defined Vocabulary Words

- chemical properties, acidity, hydrogen ions, acid, basicity, hydroxide ion, base, pH, litmus paper, combustibility, reactivity, chemical reaction

Activity Type

- Circle if the description is referring to an acid or a base.
- Answer the questions below.
- Interactive Activity: Making Rust

Lesson Components

Total Learning Objects – 36

Instruction Pages - 18

Activity Pages - 4

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 5: Nuclear Fusion

Common Core Standards

- PS1.C Nuclear Processes

Learning Objectives

- to understand the concept of nuclear fusion

Defined Vocabulary Words

- atom, proton, neutron, nucleus, electron, nuclear fusion, conservation of matter

Activity Type

- Draw pictures to depict the steps that occur during nuclear fusion. Explain what you drew in each step.
- Interactive Activity: Investigate ITER

Lesson Components

Total Learning Objects – 28

Instruction Pages - 11

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Unit 2: Motions, Forces, & Stability

Lesson 1: Forces & Motions

Common Core Standards

- PS2.A Forces and Motions

Learning Objectives

- to learn what a force is and how forces cause motion
- to learn about Newton's three laws of motion

Defined Vocabulary Words

- Newton, force, magnitude, speed, velocity, acceleration, accelerating, decelerating, momentum, at rest, inertia

Activity Type

- Write the letter for the matching definition on the line after each word.
- Interactive Activity: Marbles in Motion

Lesson Components

Total Learning Objects – 36

Instruction Pages - 19

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 2: Gravity

Common Core Standards

- PS2.B Types of Interactions

Learning Objectives

- to learn about the nature of gravity and how it affects objects
- to learn how tides are caused by gravity

Defined Vocabulary Words

- gravitational force, gravity, weight, tides, high tide, low tide, spring tides, neap tides

Activity Type

- Draw a picture showing how the sun, moon, and Earth are positioned to create the highest tides on Earth. What are these tides called?
- Draw a picture showing how the sun, moon, and Earth are positioned to create the lowest tides on Earth. What are these tides called?
- Interactive Activity: Falling Balls - this activity is trying to answer “How does the mass of an object affect how quickly it will fall from a 2-story building?”

Lesson Components

Total Learning Objects – 34

Instruction Pages – 17

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 3: Magnetic Forces

Common Core Standards

- PS2.B Types of Interactions

Learning Objectives

- to learn about the nature of magnets
- to learn what magnetic force is and how it affects objects

Defined Vocabulary Words

- magnetic force, magnet, magnetic field, alloy, non-magnetic, permanent magnets, magnetically hard, magnetically soft, poles, repel, attract

Activity Type

- Answer questions about magnets.
- Interactive Activity: Magnetic Maze

Lesson Components

Total Learning Objects – 36

Instruction Pages – 18

Activity Pages - 4

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 4: Electric Forces

Common Core Standards

- PS2.B Types of Interactions

Learning Objectives

- to learn about the nature of electrically charged atoms
- to learn what electric force is and how it affects objects

Defined Vocabulary Words

- electric force, electromagnetism, atom, proton, neutron, electron, repel, attract, electric field, Line of Force

Activity Type

- Draw the lines of force for two positively charged objects.
- Draw the lines of force for two objects that have different electric charges.
- What determines the strength of an electric field?
- Interactive Activity: Othello - board game

Lesson Components

Total Learning Objects – 35

Instruction Pages - 17

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 5: Changes in Physical Systems

Common Core Standards

- PS2.C Stability and Instability in Physical Systems

Learning Objectives

- to learn about the changes that can occur in physical systems
- to learn about equilibrium, or stable states, and unstable states in physical systems

Defined Vocabulary Words

- physical system, stable system, equilibrium, unstable system, inertia, static system

Activity Type

- Draw a picture of the concepts. Then explain what you drew and how it explains the concept.
- Interactive Activity: Creating Stability

Lesson Components

Total Learning Objects – 32

Instruction Pages - 15

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Unit 3: Energy**Lesson 1: Understanding Energy**

Common Core Standards

- PS3.A Definitions of Energy
- PS3.C Relationship between Energy and Forces

Learning Objectives

- to learn about the concepts of potential and kinetic energy
- to understand that energy can be transferred but is never lost

Defined Vocabulary Words

- chemical potential energy, elastic potential energy, electrical potential energy, energy, gravitational energy, kinetic energy, magnetic energy, physical system, potential energy, radiation, thermal heat

Activity Type

- Write the letter for the matching definition on the line after each word.
- Interactive Activity: Rubber Band Boat

Lesson Components

Total Learning Objects – 38

Instruction Pages - 20

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 2: Energy in Chemical Processes

Common Core Standards

- PS3.D Energy in Chemical Processes and Everyday Life

Learning Objectives

- to learn how chemical potential energy is stored within the bonds of molecules
- to learn about the conversion of chemical potential energy into kinetic energy
- to learn the difference between renewable and nonrenewable energy sources

Defined Vocabulary Words

- chemical potential energy, energy, fossil fuels, friction, kinetic energy, nonrenewable energy, photosynthesis, potential energy, renewable energy

Activity Type

- Draw a series of pictures and describe how energy from the sun can be converted into chemical potential energy and ultimately into electricity. Draw as many pictures as you need to show the various steps.
- Interactive Activity: The Energy of Nuts - compare the amount of energy stored in different varieties of nuts.

Lesson Components

Total Learning Objects – 38

Instruction Pages - 20

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 3: Heat and Temperature

Common Core Standards

- PS3.B Conservation of Energy and Energy Transfer

Learning Objectives

- to learn about the concepts of heat and temperature
- to learn about Celsius, Fahrenheit, and Kelvin temperature scales
- to learn the mechanisms that transfer heat from one place to another

Defined Vocabulary Words

- absolute zero, Celsius, centigrade, conduction, convection, Fahrenheit, heat, Kelvin, phase change, radiation, temperature, thermal

Activity Type

- Name the three ways heat can be transferred. Explain each mechanism, using as much detail as possible. Then draw an example of each.
- Interactive Activity: Make Your Own Thermometer

Lesson Components

Total Learning Objects – 40

Instruction Pages – 22

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Unit 4: Electricity

Lesson 1: Electrical Energy

Common Core Standards

- PS3.A Definitions of Energy

Learning Objectives

- to learn about the nature of electrical energy
- to learn about conductors and insulators
- to learn how generators and motors work

Defined Vocabulary Words

- alternating current, amperes, battery, conductor, current, direct current, electric motor, electrical energy, electrical field, electrical potential energy, electricity, generator, insulator, ohms, resistance, semiconductor, volt, voltage

Activity Type

- Crossword puzzle
- Interactive Activity: Simple Rheostat

Lesson Components

Total Learning Objects – 41

Instruction Pages - 23

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 2: Basic Circuits

Common Core Standards

- PS3.A Definitions of Energy
- PS3.D Energy in Chemical Processes and Everyday Life

Learning Objectives

- to learn about batteries and how they work
- to learn about various kinds of circuits, including simple, closed, open, series, and parallel circuits

Defined Vocabulary Words

- anode, battery, cathode, circuit, closed circuit, conductor, electricity, open circuit, parallel circuit, series circuit, simple circuit, volt, voltage

Activity Type

- Answer the questions. Include a drawing if it will help with your explanation.
- Interactive Activity: Electronic Quiz

Lesson Components

Total Learning Objects – 38

Instruction Pages - 20

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 3: Static Electricity

Common Core Standards

- PS3.A Definitions of Energy
- PS3.D Energy in Chemical Processes and Everyday Life

Learning Objectives

- to learn about the nature of static electricity
- to learn how static electricity can be measured
- to learn how lightning is formed

Defined Vocabulary Words

- atom, current, electron, electroscope, lightning, neutron, potential energy, proton, resistance, static electricity

Activity Type

- Answer the questions.
- Interactive Activity: Balloon Magic - experiment with static electricity using some common household objects.

Lesson Components

Total Learning Objects – 39

Instruction Pages - 21

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 4: Electromagnetism

Common Core Standards

- PS3.A Definitions of Energy
- PS3.D Energy in Chemical Processes and Everyday Life

Learning Objectives

- to learn about the nature of magnets
- to learn about electromagnets, how they are created, and how the Earth is an example of an electromagnet

Defined Vocabulary Words

- attract, compass, electromagnet, electromagnetism, galvanometer, lodestone, magnet, magnetic field, magnetite, magnetism, pole, repel

Activity Type

- Answer the questions.
- Interactive Activity: Name That Pole - create an electromagnet.

Lesson Components

Total Learning Objects – 38

Instruction Pages - 21

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Unit 5: Waves

Lesson 1: Characteristics of Waves

Common Core Standards

- PS4.A Wave Properties

Learning Objectives

- to learn about the basic features and properties of waves
- to learn how waves transfer energy
- to learn what happens when waves cross

Defined Vocabulary Words

- amplitude, crest, frequency, in-phase, out-of-phase, peak, pitch, trough, wave, wavelength

Activity Type

- Draw the following concepts: high vs low frequency; loud/bright vs soft/dim; a wave with the following labeled: crest, trough, wavelength, amplitude
- Interactive Activity: Bathtub Waves

Lesson Components

Total Learning Objects – 33

Instruction Pages – 15

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 2: Types of Waves

Common Core Standards

- PS4.A Wave Properties

Learning Objectives

- to learn about the classification and properties of waves

Defined Vocabulary Words

- compression, compression wave, electromagnetic wave, longitudinal wave, mechanical wave, , surface wave, transverse wave

Activity Type

- Place the following words in the correct place in the diagram.
- Interactive Activity: Slinky Waves

Lesson Components

Total Learning Objects – 36

Instruction Pages - 18

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 3: Sound

Common Core Standards

- PS4.A Wave Properties

Learning Objectives

- to learn about the characteristics of sound waves
- to learn how sound waves travel

Defined Vocabulary Words

- absorption, acoustic insulation, amplitude, compression, compression wave, decibels, echolocation, frequency, hertz, in-phase, longitudinal wave, mechanical wave, natural frequency, pitch, reflection, resonance, SONAR, volume

Activity Type

- Write the letter of the definition for each word in the box.
- Interactive Activity: Natural Frequency - explore how the natural frequency of an object can be affected by different physical features.

Lesson Components

Total Learning Objects – 40

Instruction Pages – 22

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 4: The Electromagnetic Spectrum

Common Core Standards

- PS4.B Electromagnetic Radiation

Learning Objectives

- to learn about the Electromagnetic (EM) Spectrum
- to learn the characteristics of the different electromagnetic waves in the EM Spectrum

Defined Vocabulary Words

- electromagnetic spectrum, electromagnetic wave, gamma waves, infrared wave, microwave, radio wave, ROY-G-BIV, ultraviolet, visible light, white light, x-ray

Activity Type

- Write the kind of electromagnetic wave on the line beside the correct description.
- Interactive Activity: UV Blocking Bottles - experiment testing which bottle seems to be the most effective in blocking UV rays.

Lesson Components

Total Learning Objects – 37

Instruction Pages - 19

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 5: Light

Common Core Standards

- PS4.B Electromagnetic Radiation

Learning Objectives

- to learn about the characteristics of light waves
- to learn about the reflection, absorption, transmission, and refraction of light waves

Defined Vocabulary Words

- absorb, angle of incidence, angle of reflection, electromagnetic wave, incident ray, light wave, longitudinal wave, normal line, opaque, prism, ray, reflect, reflected ray, refract, ROY-G-BIV, translucent, transmit, transparent, transverse wave

Activity Type

- Crossword Puzzle
- Interactive Activity: Mirror Rainbow - use the property of light bending in such a way to create a rainbow of colors without a prism.

Lesson Components

Total Learning Objects – 40

Instruction Pages – 22

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test

Lesson 6: Digital Transmission

Common Core Standards

- PS4.C Information Technologies and Instrumentation

Learning Objectives

- to learn what digital information is and how it is transmitted
- to learn how our knowledge about waves can be used to design methods of digital transmission

Defined Vocabulary Words

- analog, digital, digital information, digitized, Morse Code, SONAR

Activity Type

- Answer the questions.
- Interactive Activity: Molecule Models

Lesson Components

Total Learning Objects – 33

Instruction Pages - 17

Activity Pages - 3

Quiz Questions – 10 total questions; 5 randomly selected to populate quiz

Test Questions – 50 total questions; 10 total per Lesson of which 3 are randomly selected to populate test