Syllabus

Physical Science, Semester A

Course Overview

Science is the study of the natural world. It relies on experimentation and evidence to describe the natural events that occur around us. Physical science is the study of matter and energy. In Physical Science A, you'll describe the atomic and molecular structure of substances using models. You will investigate how chemical reactions involve energy and lead to changes in properties of substances. You'll also model different kinds of forces and the effect they have on the motion of objects. You'll solve problems involving work and power and apply these principles to simple machines. Finally, you will see how simple machines make up more complex machines that are important in our lives.

Course Goals

By the end of this course, you will be able to do the following:

- Apply the steps of the scientific method to explain phenomena involving matter and energy.
- Classify matter by its composition and properties.
- Model atomic and molecular structures of substances.
- Explain the relationship between thermal energy and states of matter.
- Describe the Bohr model of an atom.
- Research historical models of the atom developed by scientists.
- Compare properties of reactants and products to determine whether a chemical reaction has occurred.
- Develop a model to show that atoms are conserved in chemical reactions.
- Describe energy changes that occur during a chemical reaction.
- Design, build, test, and modify a device that relies on a transfer of thermal energy.
- Describe the properties and uses of synthetic materials and how they affect society.
- Identify and sketch forces that act on real-world objects.
- Analyze the motion of objects using words, equations, and graphs.
- Explain how the concepts of force and motion are related.
- Analyze input and output forces in simple machines.
- Solve problems involving work and power.
- Design, build, test, and modify a device that uses one or more simple machines.

General Skills

To participate in this course, you should be able to do the following:

- Complete basic operations with word processing software, such as Microsoft Word or Google Docs.
- Perform online research using various search engines and library databases.
- Communicate through email and participate in discussion boards.

For a complete list of general skills that are required for participation in online courses, refer to the Prerequisites section of the Plato Student Orientation document, found at the beginning of this course.

Credit Value

Physical Science A is a 0.5-credit course.

Course Materials

- notebook
- computer with Internet connection and speakers or headphones
- Microsoft Word or equivalent
- Microsoft Power Point or equivalent
- equipment listed in Appendix B

Course Pacing Guide

This course description and pacing guide is intended to help you keep on schedule with your work. Note that your course instructor may modify the schedule to meet the specific needs of your class.

Unit 1: Structure and Properties of Matter

Summary

This unit begins with an introductory lesson where you'll learn about the scientific method and the kinds of phenomena studied in physical science. You will classify matter by its composition and properties, including matter that you find around your home. You'll develop models for the molecular structure of matter and explain how matter changes state with the addition or removal of thermal energy. Finally, you'll describe the model of the atom developed by Niels Bohr and explain how the model of the atom has changed over time based on the work of Bohr and other scientists.

Day	**Activity/***Objective*	Type
1 day: 1	**Syllabus and Plato Student Orientation** *Review the Plato Student Orientation and Course Syllabus at the beginning of this course.*	Course Orientation
4 days: 2–5	**Introduction to Physical Science** *Apply the steps of the scientific method, and identify the kinds of phenomena studied in physical science.*	Lesson
3 days: 6–8	**Examining Matter** *Carry out an investigation to compare properties of common household materials.*	Course Activity
4 days 9–12	**Matter Around Us** *Classify matter by its composition and properties.*	Lesson
2 days: 13–14	**Building Models of Atomic Arrangements** *Develop models of atomic arrangements of substances.*	Course Activity
4 days: 15–18	**Energy and Changes in State** *Explain how the motion of particles of matter changes when thermal energy is added or removed.*	Lesson
2 days: 19–20	**Observing a Change in State** *Carry out an investigation to predict changes in the state of water when thermal energy is added or removed.*	Course Activity
4 days 21–24	**Atoms and Elements** *Describe the Bohr model of the atom and explain how the model of the atom has changed over time.*	Lesson
5 days: 25–29	**Unit Activity and Discussion—Unit 1**	Unit Activity/ Discussion
1 day: 30	**Posttest—Unit 1**	Assessment

Unit 2: Chemical Reactions

Summary

This unit focuses on chemical reactions between substances. You'll learn to determine whether a chemical reaction has occurred by comparing properties of reactants and products. You'll also develop a model to show that atoms are conserved in chemical reactions and describe the energy changes that have taken place. You'll apply ideas on chemical reactions to design, construct, test, and modify a device that releases or absorbs thermal energy. Finally, you'll see how inventors use chemical reactions to create synthetic materials and how the products affect society.

Day	**Activity/***Objective*	Type
2 days: 31–32	**Observing a Chemical Reaction** *Plan and carry out an investigation to compare properties of reactants and products in a chemical reaction.*	Course Activity
4 days: 33–36	**Properties and Chemical Reactions** *Determine whether a chemical reaction has occurred by comparing properties of reactants and products.*	Lesson
4 days: 37–40	**Atoms in Chemical Reactions** *Develop a model that shows that atoms are conserved in chemical reactions.*	Lesson
4 days: 41–44	**Energy Changes in Chemical Reactions** *Describe energy changes that occur during a chemical reaction.*	Lesson
4 days: 45–48	**Building a Device That Uses Energy from Chemical Reactions** *Design, construct, test, and modify a device that uses a chemical reaction to release or absorb thermal energy.*	Course Activity
3 days: 49–51	**Synthetic Materials** *Describe the properties and uses of synthetic materials and how they affect society.*	Lesson
5 days: 52–56	**Unit Activity and Discussion—Unit 2**	Unit Activity/ Discussion
1 day: 57	**Posttest—Unit 2**	Assessment

Unit 3: Forces and Motion

Summary

This unit focuses on the relationship between force and motion. You'll identify and sketch forces that act on objects and predict how the objects will move. You'll analyze the motion of objects using words, equations, and graphs. You will apply the concepts of force and motion to design a car bumper that will reduce the force on riders during a collision. Finally, you will analyze the forces involved in simple machines that make our lives easier, and you'll solve problems involving work and power.

Day	**Activity/***Objective*	Type
2 days: 58–59	**Exploring Forces** *Identify and sketch forces that act on real-world objects.*	Course Activity
4 days: 60–63	**Motion and Motion Graphs** *Analyze the motion of objects using words, equations, and graphs.*	Lesson
4 days: 64–67	**Using Forces to Predict Motion** *Identify forces exerted on an object and predict the object's motion.*	Lesson
4 days: 68–71	**Investigating Forces and Motion** *Plan and carry out an investigation to determine how force and motion are related to each other.*	Course Activity
4 days: 72–75	**Collisions** *Identify force interactions between two objects and predict the motion of the objects.*	Lesson
3 days: 76–78	**Designing a Car Bumper** *Design a car bumper that will reduce the force on riders during a collision.*	Course Activity
4 days: 79–82	**Simple Machines** *Analyze input and output forces in simple machines, and solve problems involving work and power.*	Lesson
5 days: 83–87	**Unit Activity and Discussion—Unit 3**	Unit Activity/ Discussion
1 day: 88	**Posttest—Unit 3**	Assessment

1 day: 89	**Semester Review**	
1 day: 90	**End-of-Semester Test**	Assessment

Appendix A: Safety Notes and Disclaimer

Each Course Activity and Unit Activity that includes a lab/experiment component will highlight key safety guidelines using the safety icon (⚠), which appears directly in the activity. In addition to adhering to those guidelines, you must ensure that you follow these general safety practices:

- Work slowly and safely at all times, and abide by the safety notes and icons.
- Pay attention and be alert at all times. Limit any distractions.
- Keep your hands away from your nose, eyes, mouth, and skin. Wash your hands before and after experiments.
- If you don't understand something, ask a teacher or an adult before proceeding.
- Wear the required protective gear.
- Adult supervision is required for all activities involving an experiment/lab component.
- Do not perform experiments that have not been approved. Follow the procedure.
- Follow good housekeeping practices. Keep your work area clean.
- Abide by all disposal instructions and icons to protect yourself and our planet.
- Report any problems or complications to an adult.

Note: *Edmentum assumes no liability for personal injury, death, property damage, equipment damage, or financial loss resulting from the instruction included in this course.*

Appendix B: Equipment List for Course Activities and Unit Activities

Unit	Activity Name	Task	Equipment List
1	Course Activity: Examining Matter* *Task 4 of this activity may need to be carried out in a school lab.	Task 1: Mixing Substances	• liquid measuring cup • 2 small clear containers (glasses or plastic cups) • 2 drops of food coloring • 1 piece of plain white paper • apron (optional)

		Task 2: Comparing Appearance, Relative Density, and Solubility	• safety goggles
			• small, clear container (glass or plastic cup)
			• liquid measuring cup
			• ¼-teaspoon measuring spoon
			• ¼ teaspoon each of these materials:
			  ○ baking soda
			  ○ baking powder
			  ○ salt
			  ○ sugar
			  ○ white flour
			  ○ white vinegar
			  ○ cooking oil (any kind)
			• paper towels or napkins

Unit	Activity Name	Task	Equipment List
		Task 3: Comparing pH	• 2 tablespoons chopped or shredded red cabbage • 2 small glass or stainless steel bowls • heat source (stove or hot plate) • small pan • oven mitt or hot pad • strainer (if not available, just carefully pour off the red cabbage juice) • apron • white ice cube tray (or a small, clear container that you reuse) • 8.5 × 11-inch piece of paper (for labeling) • rubber gloves • ½-teaspoon measuring spoon • 1-teaspoon measuring spoon (or a regular-size spoon) • ½ teaspoon of each of these materials: white vinegar, water, ammonia (if not available, use ¼ teaspoon of baking soda) • four or more additional household materials for pH testing, such as lemon juice, apple juice, hand soap, citrus cleaner, milk, or dishwasher soap
		Task 4: Measuring Density	• 10 mL graduated cylinder (mL stands for milliliter) • gram scale • water • 6 metal paper clips of the same size and material
1	Course Activity: Building Models of Atomic Arrangements	Task 1: Building an Atomic Model of Salt	• 4 regular-size marshmallows • 4 mini marshmallows (if not available, tear 2 regular-size marshmallows in half) • 12 toothpicks • 1 sheet of 8½-inch × 11-inch paper to build the model on

Unit	Activity Name	Task	Equipment List
		Task 2: Building an Atomic Model of Water	• 4 regular-size marshmallows • 8 mini marshmallows (if not available, tear 4 regular-size marshmallows in half) • 8 toothpicks • 2 sheets of 8½-inch × 11-inch paper to build the model on
		Task 3: Building an Atomic Model of Copper	• 9 regular-size marshmallows • 8 straws, cut in half (small-diameter coffee or hot chocolate straws are best; if using larger straws, flatten both ends when connecting them to the marshmallows) • scissors • 1 sheet of 8½- inch × 11-inch paper to build the model on
1	Course Activity: Observing a Change in State	Task 1: Prepare and Predict	• 1 small sealable plastic bag, approximately 3 in. × 6 in. • 1 teaspoon • 1 empty ice cube tray • tap water
		Task 2: Observe and Explain	• ice made in task 1 • 2 pieces of foil, each 12 inches square
1	Unit Activity: Structure and Properties of Matter	Task 1: Writing a Research Paper	None

Unit	Activity Name	Task	Equipment List
2	Course Activity: Observing a Chemical Reaction	Task 1: Deciding Whether a Reaction Occurs	• safety goggles • ½ teaspoon measuring spoon • 1 teaspoon baking soda • 2 large containers of similar size and shape; must hold at least 2 cups (suggestion: tall glasses, large mugs, or bowls) • pen • sticky notes for labeling • 2 small containers (suggestion: small cups or snack bowls) • ¼ cup measuring cup (equal to 4 tablespoons) • ¼ cup water at room temperature (set out water 1 hour before the activity so it reaches room temperature) • ¼ cup white vinegar at room temperature
		Task 2: Changing Ratios of Reactants	• safety goggles • baking soda • white vinegar at room temperature • set of measuring spoons • 1 cup graduated measuring cup • 3 or more large containers of similar size and shape; must hold at least 2 cups (suggestion: tall glasses, large mugs, or bowls) • tray, rimmed cookie sheet, or large sink to hold containers and contain overflow • paper towels

Unit	Activity Name	Task	Equipment List
2	Course Activity: Building a Device That Uses Energy from Chemical Reactions	Task 1: Carry Out an Endothermic Reaction	• safety goggles • measuring cup for liquids • water • small container (about 1 cup) • thermometer that measures between 0°C and 30°C (32°F and 86°F) • 1-teaspoon measuring spoon (or a regular-size spoon) • 2 teaspoons baking soda • 2 teaspoons citric acid (also called sour salt, available at grocery, health food, or hardware stores) • foam cup • spoon or stirrer
		Task 2: Design, Build, and Test a Prototype of the Cup	• safety goggles • scrap cardboard of different thicknesses, such as cereal boxes, tag board, and shipping boxes • 2 paper towel tubes • 2 toilet paper tubes • scissors • tape • ½-cup and 1-cup measuring cups • 2½ cups shredded paper

Unit	Activity Name	Task	Equipment List
		Task 3: Design, Build, and Test a Prototype of the Cold Pack	• safety goggles • 1 toilet paper tube or a small rectangular box (depends on cold pack compartment shape from Task 2) • scrap cardboard of different thicknesses, such as cereal boxes, tag board, and shipping boxes • scrap paper • scissors • glue • tape • thread or string • paper clips • plastic produce bag or similar • ½-cup measuring cup • 1-teaspoon measuring spoon • 4 teaspoons baking soda • water
2	Unit Activity: Chemical Reactions	Task 1: Planning and Creating a Presentation	None
3	Course Activity: Exploring Forces	Task 1: Contact Forces	• safety goggles • cleared space on a smooth, durable table that is at least 3 feet in length • 12-inch ruler • ball made of a hard material, such as a baseball, tennis ball, pool ball, lacrosse ball, whiffle ball, or ping-pong ball • large, heavy book or box to use as a barrier • piece of plastic or wood with a broad flat surface, such as a three-ring binder or a cutting board • area rug, carpet, or piece of fabric with nap

Unit	Activity Name	Task	Equipment List
		Task 2: More Contact Forces	• safety goggles • 2 sheets of paper that are the same size • small rubber band • 1-foot piece of string or rope
		Task 3: Forces Exerted Over a Distance	• safety goggles • 4 or more identical clothes hangers • any kind of tape • 2 bar magnets with labeled or colored ends • 2 balloons • 2 (2-foot) pieces of thread or string • wool or fur to charge balloon (can use wool yarn, a sweater, or even your hair to create the charge) • 2-foot piece of plastic wrap
3	Course Activity: Investigating Forces and Motion	Task 1: Set Up the Experiment	• goggles • square piece of cardboard, about 8 inches per side • ruler • hole punch or scissors • 36 inches of string or strong thread • large paperclip to use as a hook • 1 nonbreakable object to be placed on top of the cardboard (e.g., plastic or metal kitchen utensils such as spatulas and large spoons) • 2 nonbreakable objects to hang on the paperclip hook (e.g., small or large kitchen utensils with holes in the handles such as ½- and 1-cup measuring cups) • a table at least 24 inches wide • 1 square meter of floor space next to the table, covered with a rug, mat, or carpet

Unit	Activity Name	Task	Equipment List
		Task 2: Plan and Observe	• goggles • the experimental setup from Task 1 • one more nonbreakable object to place on top of the cardboard (e.g., another kitchen utensil) • table at least 24 inches wide • 1 square meter of floor space next to the table, covered with a rug, mat, or carpet
		Task 3: Analyze and Extend	None
		Task 4: Calculate Velocity and Acceleration	None
3	Course Activity: Designing a Car Bumper	Task 1: Set It Up	• goggles • a ruler at least 12 inches long • scissors • tape • glue • a 6-inch × 7-inch piece of heavy cardboard • a small box, about 5 inches × 7 inches on one side and 2.5 inches deep (e.g., 1-pound pasta box or similar) • a board or a piece of stiff cardboard, at least 30 inches long, for the ramp • 6 8-inch disposable straws • a ball (golf, tennis, lacrosse, or similar) • uncarpeted floor space, about 2 feet × 6 feet • an 8- to 12-inch high support for the ramp (e.g., a heavy box, a stool, or a stack of books)

Unit	Activity Name	Task	Equipment List
		Task 2: Design, Build, and Test Bumper Prototypes	• goggles • a ruler at least 12 inches long • scissors • tape • glue • balloons • thick and thin pieces of scrap cardboard • setup from task 1
3	Unit Activity: Forces and Motion	Task 1: Analyze a Tool	• goggles • any tool that uses one or more simple machines
		Task 2: Design, Build, and Test a Prototype of a Tool	• materials you find around the house • repurposed toys and other objects

Syllabus

Physical Science, Semester B

Course Overview

Science is the study of the natural world. It relies on experimentation and evidence to describe the natural events that occur around us. Physical science is the study of matter and energy. In Physical Science B, you'll investigate gravitational, electric, and magnetic force fields and identify factors that determine their strength. You'll apply concepts of electricity and magnetism to explain how motors, generators, and electromagnets work. You will discuss energy transformations in objects and systems, including how heat flows between objects that are at different temperatures. You will model how sound and light travel as waves and how they interact with different forms of matter. Finally, you'll explore how electromagnetic waves help us communicate with one another and collect information about the universe.

Course Goals

By the end of this course, you will be able to do the following:

- Construct arguments that support the law of universal gravitation.
- Identify factors that determine the strength of forces created by electric charge and by magnets.
- Describe how current flows through series and parallel electric circuits.
- Differentiate between electromagnets, generators, and motors.
- Identify different forms of energy and discuss how energy flows through systems.
- Explain how the position of an object in a force field relates to its potential energy.
- Compute the kinetic energy of moving objects.
- Define the law of conservation of energy.
- Analyze models that show how heat flows between objects at different temperatures.
- Design, build, and test a device that involves transfer of thermal energy.
- Classify waves based on their characteristics and use mathematics to model them.
- Interpret models of interactions of light and matter.
- Assess how light from objects in space provides information about their temperature, composition, and distance.
- Compare and contrast the use of digital and analog signals in communication.

General Skills

To participate in this course, you should be able to do the following:

- Complete basic operations with word processing software, such as Microsoft Word or Google Docs.
- Perform online research using various search engines and library databases.
- Communicate through email and participate in discussion boards.

For a complete list of general skills that are required for participation in online courses, refer to the Prerequisites section of the Plato Student Orientation document, found at the beginning of this course.

Credit Value

Physical Science B is a 0.5-credit course.

Course Materials

- notebook
- computer with Internet connection and speakers or headphones
- Microsoft Word or equivalent
- Microsoft Power Point or equivalent
- equipment listed in Appendix B

Course Pacing Guide

This course description and pacing guide is intended to help you keep on schedule with your work. Note that your course instructor may modify the schedule to meet the specific needs of your class.

Unit 1: Force Fields

Summary

This unit focuses on gravitational, electric, and magnetic force fields. In this unit, you will use evidence to explain the force of gravity around you and understand how the strength (force) of gravity depends on an object's mass. You'll also identify factors that determine the strength of forces created by electric charge and by magnets. You'll model series and parallel circuits and explain how a current flows through them. You'll apply your understanding of electricity and magnetism to classify devices as electromagnets, generators, and motors. You'll describe the cause of Earth's magnetic field and explain how it protects our atmosphere from charged particles. Finally, in a real-world application, you'll calculate how much electricity you use in your home and propose ways to conserve electricity.

Day	**Activity/***Objective*	Type
1 day: 1	**Syllabus and Plato Student Orientation** *Review the Plato Student Orientation and Course Syllabus at the beginning of this course.*	Course Orientation
4 days: 2–5	**Gravity** *Use evidence to construct arguments supporting the claim that gravity is attractive and that its strength depends on the mass of objects.*	Lesson
4 days: 6–9	**Electricity and Magnetism** *Identify factors that determine the strength of forces created by electric charge and by magnets.*	Lesson
3 days: 10–12	**Finding Evidence of Force Fields** *Carry out an investigation to report evidence of force fields acting between objects.*	Course Activity
4 days: 13–16	**Electric Circuits** *Identify series and parallel circuits, and explain how current flows through them.*	Lesson
3 days: 17–19	**Conserving Electricity at Home** *Calculate how much electricity you use in your home and propose ways to save electricity.*	Course Activity
5 days: 20–24	**Electromagnets, Generators, and Motors** *Differentiate between electromagnets, generators, and motors, and describe how they work.*	Lesson
5 days: 25–29	**Unit Activity and Discussion—Unit 1**	Unit Activity/ Discussion
1 day: 30	**Posttest—Unit 1**	Assessment

Unit 2: Energy

Summary

This unit focuses on forms of energy and energy transformations. In this unit, you'll construct energy flow diagrams to describe the movement of energy through one or more systems. You'll explain how the position of an object in a force field relates to its potential energy. You'll also discuss how speed and mass affect the kinetic energy of an object. You'll investigate how heat flows between objects at different temperatures and how that process relates to thermal energy. Finally, you will apply heat transfer ideas as you design, construct, test, and modify a device that minimizes or maximizes thermal energy transfer.

Day	**Activity/***Objective*	Type
3 days: 31–33	**Describing the Movement of Energy** *For an event that involves energy, describe what the energy did, where it came from, and where it went.*	Course Activity
4 days: 34–37	**Forms of Energy** *Identify examples of different forms of energy.*	Lesson
3 days: 38–40	**Investigating Gravity and Potential Energy** *Design an investigation that explores the relationship between position and gravitational potential energy.*	Course Activity
4 days: 41–44	**Potential Energy** *Explain how the position of an object in a force field is related to the amount of its potential energy.*	Lesson
4 days: 45–48	**Kinetic Energy** *Explain how the speed and mass of a moving object are related to the object's kinetic energy.*	Lesson
4 days: 49–52	**Energy Transfer and Transformation** *Explain that when the kinetic energy of an object changes, energy is transferred to or from the object.*	Lesson
5 days: 53–57	**Investigating Temperature Changes in Materials** *Plan and carry out an investigation to identify factors that affect an object's change in temperature.*	Course Activity

4 days: 58–61	**Thermal Energy and Heat** *Analyze models that illustrate how heat flows between objects at different temperatures.*	Lesson
5 days: 62–66	**Unit Activity and Discussion—Unit 2**	Unit Activity/ Discussion
1 day: 67	**Posttest—Unit 2**	Assessment

Unit 3: Waves

Summary

This unit focuses on the characteristics and applications of waves. In this unit, you'll learn the parts of a wave and how to represent waves mathematically. You'll explain how visible light, one type of electromagnetic wave, interacts with matter and develop a model to describe what you see. You will assess how light from objects in space gives information about their temperature, composition, and distance. Finally, you'll study a real-world application of waves as you compare and contrast the use of digital and analog signals in communication.

Day	**Activity/***Objective*	Type
4 days: 68–71	**Exploring Waves** *Classify waves based on their characteristics, and use mathematics to model them.*	Lesson
3 days: 72–74	**Describing How Light Interacts with Matter** *Observe interactions of light and matter and develop a model that describes your observations.*	Course Activity
4 days: 75–78	**Interactions of Light with Matter** *Use models to describe interactions of light and matter.*	Lesson
4 days: 79–82	**Light and Information About the Universe** *Assess how light from objects in space provides information about their temperature, composition, and distance.*	Lesson
5 days: 83–87	**Unit Activity and Discussion—Unit 3**	Unit Activity/ Discussion
1 day: 88	**Posttest—Unit 3**	Assessment

1 day: 89	**Semester Review**	
1 day: 90	**End-of-Semester Test**	Assessment

Appendix A: Safety Notes and Disclaimer

Each Course Activity and Unit Activity that includes a lab/experiment component will highlight key safety guidelines using the safety icon (⚠), which appears directly in the activity. In addition to adhering to those guidelines, you must ensure that you follow these general safety practices:

- Work slowly and safely at all times, and abide by the safety notes and icons.
- Pay attention and be alert at all times. Limit any distractions.
- Keep your hands away from your nose, eyes, mouth, and skin. Wash your hands before and after experiments.
- If you don't understand something, ask a teacher or an adult before proceeding.
- Wear the required protective gear.
- Adult supervision is required for all activities involving an experiment/lab component.
- Do not perform experiments that have not been approved. Follow the procedure.
- Follow good housekeeping practices. Keep your work area clean.
- Abide by all disposal instructions and icons to protect yourself and our planet.
- Report any problems or complications to an adult.

Note: *Edmentum assumes no liability for personal injury, death, property damage, equipment damage, or financial loss resulting from the instruction included in this course.*

Appendix B: Equipment List for Course Activities and Unit Activities

Unit	Activity Name	Task	Equipment List
1	Course Activity: Finding Evidence of Force Fields	Task 1: Gravitational Force Fields	• safety goggles • root vegetable, such as a large carrot or potato • two metal forks • an edge or thin wall to freely balance the vegetable on, such as a cardboard box with its flaps taped down
		Task 2: Electric Force Fields	• about 127 cm (50 inches) clear sticky tape • tabletop or desktop [optional: to protect the tabletop, use clean scrap wood or smooth cardboard 25 cm (10 inches) square]
		Task 3: Magnetic Force Fields	• 1 compass (available wherever science lab supplies, educational science materials, or party supplies are sold) • 1 bar magnet (must be strong enough to move the compass) • 2 pieces of white paper, partially overlapped and taped together to make an 11-inch square • pen or pencil
1	Course Activity: Conserving Electricity at Home	Task 1: Power Usage	• a small electric appliance that you can unplug to observe the appliance tag
		Task 2: Electrical Costs	None
		Task 3: Energy-Saving Tips	None
1	Unit Activity: Force Fields	Task 1: Planning and Creating a Presentation	None

Unit	Activity Name	Task	Equipment List
2	Course Activity: Describing the Movement of Energy	Task 1: Pendulum	• goggles • golf ball (or similar size ball) • plastic sandwich bag • tape • hole punch or scissors • 1 foot of string • metal lid or pan
		Task 2: Toy Car Launcher	• goggles • half-gallon paper milk carton (or sturdy box of similar size and weight) • scissors • hole punch (or use tip of scissors) • rubber band • paper clips • toy car (or a small ball)
		Task 3: Heat Spiral	• goggles • card stock or a thin piece of cardboard, about 8 inches square • scissors • pencil • hole punch (or use tip of scissors) • 15 inches of thread or thin string • meterstick or yardstick (or stick of similar length) • medium size pot of water • heat source (stove or hot plate)
2	Course Activity: Investigating Gravity and Potential Energy	Task 1: Planning	• goggles • golf ball or any other small, bouncy ball • 1 square meter of floor space next to a table or desk

Unit	Activity Name	Task	Equipment List
		Task 2: Hypothesis and Data Collection	• goggles • golf ball or any other small, bouncy ball • meterstick or yardstick • tape • 1 square meter of floor space next to a table or desk • mat, small rug, or stool to sit on while observing the bouncing ball
		Task 3: Analyze and Extend	data table from task 2
2	Course Activity: Investigating Temperature Changes in Materials* *Task 2 of this activity may need to be carried out in a school lab.	Task 1: Planning	None
		Task 2: Conducting the Experiment	• goggles • heat mitts • 2 trays of ice cubes • water • 50 g of free-flowing dry sand (about enough to fill one-fourth of a small glass) • mass scale that measures up to 500 g • 3 thermometers that measure between 0°C and 80°C (32°F to 176°F) • heat source (stove or hot plate) • medium-sized pot • 2 large, flat-bottom tubs with covers (or use plastic wrap or foil to cover) • 3 containers for cold water and sand (100 mL beakers, glasses, or mugs) • 3 containers for hot water (200 mL beakers, 250 mL beakers, or mugs) • 3 mixing containers (300 mL beakers or large mugs)
2	Unit Activity: Energy	Task 1: Thermal Conductivity Factors	None

Unit	Activity Name	Task	Equipment List
		Task 2: Design, Build, and Test a Conductor or Insulator	• safety goggles • thermometer that measures between 0°C and 30°C (32°F to 86°F) • ½- and 1-cup measuring cups (1 cup is the same as 16 tablespoons; a tablespoon is about the size of a soup spoon) • foam cup • ceramic cup • paper cup • stainless steel cup • cotton wool • aluminum foil • cardboard • scissors • tape • plastic bags • egg carton • container that can hold up to 4 cups (1 quart) • water • 1 tray of ice cubes
3	Course Activity: Describing How Light Interacts with Matter	Task 1: Light Reflection and Absorption	• room that can be made completely dark • three pieces of construction paper: one red, one blue, and one green • masking tape • flashlight
		Task 2: Light Transmission	• room that can be made completely dark • piece of white paper • masking tape • flashlight • 4-inch square piece of clear plastic wrap (or a square cut from the side of a food storage bag) • 4-inch square piece of waxed paper (or a square of sheer fabric)

Unit	Activity Name	Task	Equipment List
		Task 3: Light Refraction	• clear drinking glass or resealable plastic bag • water • pencil • small container or bowl that is opaque (not transparent) • penny • masking tape
3	Unit Activity: Waves	Task 1: Writing a Research Paper	None