

Science 3-12 Experiments Material List
(Any experiment with and "a" at the end
of the filename is an alternate
experiment.)

Science 3

Sci03u01c01p03d (Breathing Patterns)

- a clock with a second hand

Sci03u01c01p03a (Your Lungs)

- a sponge

Sci03u01c02p06d (Taste Test)

- cocoa
- salt
- teaspoon
- paper towel
- small drinking glass
- large drinking glass half full of water

Sci03u01c03p09d (Taking Your Pulse)

- a clock with a second hand

Sci03u02c01p02d (Root Hairs)

- a magnifying glass
- a small plant

Sci03u02c01p02a (Study a Stem)

- a small jar with water
- food coloring
- magnifying glass

Sci03u02c02p05d (Grow Some Plants)

- two small potted plants or bean seedlings
- a box
- a sunny window

Sci03u02c03p08d (Watch the Seeds Grow)

- a jar with water
- five paper cups
- fifteen (15) lima beans
- potting soil
- wet paper towel

Sci03u02c03p08a1 (Plant a Piece of Potato)

- a white potato (one with eyes on it)
- a pot of soil
- a knife
- water



Sci03u02c03p08a2 (Bean Plant)

- a glass jar
- felt marker
- three lima beans
- a centimeter ruler
- wet paper towel

Sci03u05c01p02d (Be A Chemist)

- a pan of water
- a cup of sand
- a stick

Sci03u05c01p04d (Volume)

- two different sizes of books
- metric ruler (with millimeter markings)
- calculator
- pencil and paper

Sci03u05c01p04a1 (Is Air Matter?)

- two balloons
- wire coat hanger
- door

Sci03u05c01p04a3 (Is Water Matter?)

- small diet scale
- cup
- water

Sci03u05c02p07d (Mass)

- equal arm balance
- cup
- ice cube

Sci03u05c02p07a (Melting Ice Cubes)

- 5 paper cups
- 5 ice cubes
- refrigerator
- cool water
- hot water
- watch or clock

Sci03u06c01p02d (Vibrations)

- drum
- drumstick
- dry cereal

Sci03u06c01p05d (Sound Patterns)

- a partner
- ruler
- water
- large glass
- small stones

Sci03u06c01p07d (Pitch)

- metal box, open on one side
(a strongbox works well)
- three or four rubber bands of different sizes

Sci03u06c01p07a (Loudness)

- coffee can with plastic lid
- dry cereal

Sci03u06c02p10d (Hearing Sounds)

- a clock that ticks
- yardstick
- large piece of paper

Sci03u07c01p02d (The Earth)

- flashlight
- paper towel tube
- globe
- tape

Sci03u07c01p03d (Night)

- lamp

Sci03u07c01p04d (Rotation)

- clay
- two pins
- pencil

Sci03u07c02p07d (Different Times)

- flashlight
- globe
- a partner

Sci03u08c01p04d (Limestone)

- piece of limestone
- pocket knife
- vinegar
- spoon
- eyedropper

Sci03u09c02p07d (Friction)

- wood
- sandpaper
- nail
- a hammer

Sci03u09c02p08d (Oxygen and Fire)

- 3 candles
- 3 candleholders
- 1 quart jar
- 1 pint jar
- matches
- clock or timer

Sci03u09c02p10a (Static Electricity)

- a small flat box
- plastic food wrap
- piece of tissue paper

Sci03u09c01p03d (Water Molecules)

- two clear glasses
- food coloring
- hot water
- eyedropper
- cold water
- clock or timer

Sci03u09c01p04d (Changing a Liquid to a Gas)

- measuring cup
- water
- pot or pan
- pot holder
- clock or timer

Sci03u10c03p10d (How Sound Travels)

- string
- wire
- chair
- coat hanger

Sci03u10c03p11d (Temperature Comparisons)

- 2 small cardboard boxes (same size)
- black paper
- white paper
- 2 thermometers
- glue

Science 4

Sci04u01c02p09d (Celery)

- fresh celery stalk(stem) - leaves on top
- a glass of water
- red ink or red food coloring
- a knife
- a hand-held magnifying glass
- some cloth or netting to put over jars
- some string
- a microscope

Sci04u03c02p13a (Still Water Life)

- one or more kitchen strainers (lengthen the handles by attaching them to long sticks or broom handles)
- a number of wide-mouthed jars -- one-liter, two-liter and four-liter sizes pans
- an aquarium if one is available

Sci04u04c01p02a2 (Gravity)

- a piece of paper
- a book

Sci04u04c02p06d (Hammer and Nail)

- a large nail
- a hammer
- a block of wood

Sci04u04c02p07a (Seesaw)

- one seesaw

Sci04u04c02p09a (Inclined Plane)

- four textbooks, each at least 3 cm thick
- a toy truck or car
- a board about 1 meter long that is wider --than the toy truck
- a spring scale

Sci04u04c02p11a (Screw and Nail)

- one wood screw and one nail—each about 2 1/2 cm long
- two thin pieces of wood less than 1 cm --thick
- two thicker pieces of wood
- one hammer
- one screwdriver

Sci04u04c02p14a (Pulleys)

- a two-kilogram weight
- a spring scale
- a broomstick
- two pulleys
- a light rope about two meters long

Sci04u05c01p03d (Static Electricity)

- string
- two balloons
- piece of woolen cloth
- rubber comb or hard rod

Sci04u05c01p05a1 (Wet Cell)

- Three strips of copper and zinc (15 x 3 cm)
- Four lengths of covered copper wire (50 cm each)
- a galvanometer
- a glass of vinegar
- a juicy lemon
- a sharp knife

Sci04u05c02p10d (Use a Magnet)

- one magnet
- one small piece of paper
- two paper clips
- one penny
- two rubber bands
- one nickel
- five pins
- one tin can
- one piece of chalk
- one small plastic cup
- two bits of wood
- two sewing needles

Sci04u05c02p11d (Make a Magnet)

- some iron filings
- a large iron nail
- a bar magnet

Sci04u05c02p11a1 (Magnetic Poles)

- one sheet of paper
- iron filings
- bar magnet

Sci04u05c02p11a2 (Testing a Magnet)

- a bar magnet
- a compass
- meter stick
- about 40 cm of heavy string
- a stack of books

Sci04u05c02p11a3 (Generate Electricity)

- a galvanometer
- a mailing tube or the cardboard tube from a roll of paper towels
- a bar Magnet
- a bell wire

Sci04u05c02p11a4 (Electromagnet)

- a large iron nail
- a knife switch
- some bell wire
- small metal objects
- a dry cell

Sci04u07c01p02a (Air and Space)

- a water glass
- a pan full of water

Sci04u07c01p04d (Temperature)

- sheet of black paper
- window
- sunlight shining through the window

Sci04u07c01p06d (Air Pressure)

- drinking glass full of water
- piece of cardboard large enough to cover the glass
- sink or large basin to catch the water after the experiment

Sci04u09c01p02d (Condensation)

- a drinking glass
- some ice cubes
- some flavored beverage
- a clean cloth or tissue

Sci04u09c02p07a (Currents)

- a glass
- two ice cubes
- some hot water
- a paper towel

Sci04u09c03p10d (Shadows)

- a ball (3 to 5 inches)
- a light source
- a disk (3 to 5 inches)

Science 5

Sci05u01c01p02d (The Microscope)

- compound light microscope
- slide
- slide cover
- eye dropper
- water
- newspaper pages
- scissors

Sci05u01c02p06a1 (Beans)

- 3 baby-food jars half full of water
- 3 dried kidney beans
- ruler
- knife



Sci05u01c02p06a2 (Onion Cells)

(Video)

- onion bulb with leaves and roots
- knife
- tweezers
- slide cover
- microscope
- microscope slide
- iodine stain
- toothpick

Sci05u01c02p09a (Pond Water)

(Video)

- microscope
- slide
- slide cover
- dropper
- pond water

Sci05u01c03p15a2 (Stem)

- one glass with water
- one glass without water
- 2 flowers with stem, 2 blades of grass, or 2 stems of *similar* plants

Sci05u01c03p15a3 (Cheek Cells)

(Video)

- microscope
- two Slides
- iodine stain
- toothpick
- eye dropper
- water
- two Slide cover

Sci05u02c01p03d (Flower Dissection)

(Video)

- 2 flowers
- microscope
- two microscope Slides
- two Slide covers
- magnifying glass
- dropper
- straight pins
- paper
- knife

Sci05u02c01p03a2 (Seed Dissection)

(Video)

- lima bean seed
- knife
- corn seed
- baby food jar half full of water
- tweezers

Sci05u02c01p05a1 (Cones)
-male and female pine cones

Sci05u02c02p11a1 (Mold)
(Video)
-slice of bread
-large jar with lid
-magnifying glass
-microscope
-microscope slide
-dropper
-slide cover
-tweezers

Sci05u03c01p05a1 (Mealworm)
(Video)
-baby-food jar with lid
-bran flakes or oatmeal
-potato
-magnifying glass
-mealworm
-knife

Sci05u03c02p12a (Chicken Egg)
-chicken egg
-dropper
-small dish
-tissue paper
-magnifying glass
-food coloring

Sci05u05c02p07a1 (Paper clip)
-2 paper clips

Sci05u05c02p07a2 (Heat Energy)
-yellow construction paper
-a thermometer

Sci05u05c02p09a (Chemical Energy)
(Video)
-1 deciliter of vinegar
-1 spoonful of baking soda
-1 glass jar
-thermometer

Sci05u05c04lp17a2 (Sunlight)
-a baby-food jar filled with water
-a thermometer

Sci05u07c01p02d (Fossils)
(Video)
-modeling clay
-seashell or bone
-a small plastic container (about 10 centimeters across)

Sci05u07c01p02a (Cast Fossils)
-the mold fossil copy from the earlier activity
-molding plaster
-a tin can and stick
-a jar of water

Sci05u08c01p03a (Examine an Orange)
-magnifying glass
-orange

Sci05u08c02p14a (Erosion)
(Video)
-plastic tub or metal pan
-short board
-mixture of soil, sand, large and small pebbles
-glass of water

Sci05u09c01p03d (Volume)
(Video)
-tall, thin jar (Alka-Seltzer® bottle)
-small marble
-large marble
-masking tape
-ruler

Sci05u09c01i05a1 (Water Container)
-4 differently shaped, clear containers
-baby-food jar

Sci05u09c01p05a2 (Types of Changes)
(Video)
-candle in candle holder
-large glass plate or pan
-match

Sci05u09c01p08a1 (Conservation of Matter)
(Video)
-equal-arm balance
-2 baby-food jars with equal mass
-2 baby-food jar lids with equal mass
-ice cube
-dropper

Sci05u09c02p17a (Evaporation)
-liquid measure
-2 identical pans
-funnel

Science 6

Sci06u01c01p02d (Anacharis Photosynthesis)

(Video)

- a few sprigs of Anacharis (Elodea)
- 2 test tubes (6"long)
- 2 clear disposable plastic cups with lids or small glass jars

Sci06u01c01p04d (Seeds)

(Video)

- 4 radish or corn seeds
- metric ruler
- 2 thumbtacks
- water
- hand lens
- 1 plastic bag
- scissors
- microscope
- 1 paper towel
- stapler
- microscope slide

Sci06u01c01p06d (Digestive Enzymes)

(Video)

- soda crackers
- Benedict's solution
- 4 test tubes
- beaker or small sauce pan
- a stove burner or Bunsen burner

Sci06u01c02p09d (Root Observation)

(Video)

- 4 radish or corn seeds
- metric ruler
- 2 thumb tacks
- water
- hand lens
- 1 plastic bag
- scissors
- microscope
- 1 paper towel
- stapler
- microscope slide

Sci06u01c02p11d (Celery)

(Video)

- celery stalk with leaves
- food coloring (red or blue)
- dropper
- microscope
- microscope slide
- water
- tall baby-food jar or glass
- sharp knife
- metric ruler



Sci06u01c02p13a (Growing Roots)

- water
- stem cutting of growing plants
- tall baby-food jar

Sci06u02c01p03d (Digesting Proteins)

(Video)

- stove or alcohol burner
- 1 Rennet tablet or 1/2 g renin
- Pyrex beaker (about 250 ml)
- water
- test tube and clamp
- 10 ml whole milk

Sci06u02c01p05d (Digesting Fats)

(Video)

- two test tubes with stoppers or two tall thin bottles (vials) with lids
- 20 drops of cooking oil
- 4 drops of liquid soap
- water

Sci06u02c01p06d (Absorbing Food)

(Video)

- water
- honey
- starch
- masking tape
- glucose test strips
- iodine solution
- dialysis membrane or semi-permeable membrane (2 squares, 5 cm x 5 cm)
- 2 dental rubber bands or other small rubber bands
- 2 small baby-food jars/beakers/cups
- 2 small bottles or test tubes that will fit easily inside the baby-food jars

Sci06u02c02p09d (Pulse Rate)

- watch or clock
- partner

Sci06u02c02p13d (Carbon Dioxide)

(Video)

- clear limewater
- hand air pump
- 2 soda straws
- 2 baby-food jars

Sci06u03c01p06d (Trial and Error)
-piece of card stock or heavy paper (10 cm x 10 cm)
-scissors
-three volunteers

Sci06u04c01p04a (Embryo Formation)
-lima beans soaked overnight in water
-magnifying glass

Sci06u04c02p09a (Mendel's Discovery)
-20 dried garden pea seeds

Sci06u04c02p11d (Taste Test)
(Video)
-a small trash bag
-PTC taste paper strips
-gum, candy, or small snack

Sci06u04c03p15a (Albinism)
-flat of soil or pots of soil
-seeds of corn, sorghum

Sci06u04c03p15a (Solid, Liquid, and Gas)
(Video)
-a balloon
-a small block of wood (or a rock)
-a clean, square, dish
-water
-a glass

Sci06u05c01p06d (Make a Compound)
(Video)
-a copper penny
-iodine solution
-a cotton swab
-a small pan for heating the penny
-a Bunsen burner or stove

Sci06u05c01p06a (Limewater)
(Video)
-a clear plastic disposable glass or a test tube
-1 teaspoon of lime (available at a garden shop)
-quart jar
-water
-coffee filter
-a soda straw
-glass

Sci06u05c03p16d (Acid or Base?)

(Video)

-Phenolphthalein solution
- ¼ cup of vinegar
- ¼ teaspoon of baking soda mixed in 1 tablespoon of water
- ¼ teaspoon of household ammonia mixed in 1 tablespoon of water
-2 clear plastic glasses
-a plastic spoon
-about 1 tablespoon of additional baking soda
-eye dropper

Sci06u06c01p05d (The Greenhouse)

-shoe boxes (2)
-sheet of clear plastic
-Thermometers (2)
-Watch with a second hand or a stopwatch

Sci06u07c01p04d (Work)

-spring scale (with a hook)
-heavy box filled with something to make
it weigh about 3 lbs.
-yard stick or ruler
-heavy cord or rope

Sci06u07c01p07d (Calculating Horsepower)

-a watch with a second hand or a stopwatch
-access to a flight of stairs

Sci06u07c02p10d (Inertia)

-1 quart jar
-1 square piece of cardboard large enough to cover the top of the jar
-1 marble
-enough sand or dirt to fill about 2 inches in the bottom of the jar

Sci06u07c02p12d (Newton's Laws)

-beach ball
-volleyball
-rubber kickball
-chalk
-measuring tape or yard stick
-outdoor area (park, backyard)
-paper
-pencil or pen

Sci06u08c01p02a (Earth's Shape)
-dark room, preferably at night
-round balloon
-small flashlight
-round, flat disk (DVD or CD)

Sci06u08c02p08d (Shadows)
-large piece of brown wrapping paper or newspaper (about 4 feet by 8 feet); can be taped together
-black crayon
-masking tape

Sci06u08c03p12a (Making an Eclipse)
-large ball about the size of a basketball
-small ball about the size of a tennis ball
-strong light of about 100 watts or more
-dark room

Science 7

Sci07u02c02p08d (Chromatography)
-clear plastic cup
-5 to 6 coffee filters
-scissors
-wooden craft stick
-tape
-water
-5 or 6 washable markers

Sci07u02c03p13d (Chemical Reactions)
-6 antacid tablets
-measuring cup
-6 clear plastic cups
-timer or watch with a second hand
-water
-thermometer
-graph paper
-5 or 6 washable markers

Sci07u03c01p03d (Heat Transfer)
-hot water
-cold water
-metal fork
-plastic fork
-stick of cold butter
-large glass
-watch or clock with a second hand
-yellow and blue food coloring
-playing card
-four empty, identical plastic bottles (sports drink bottles work well)
-access to a sink

Sci07u03c02p08d (Electric Motor)
-5 small disk or rectangular magnets
-2 large paperclips
-plastic cup
-2 ft. insulated 20-gauge copper wire
-masking tape
-1.5 volt D battery
-2 electrical lead wires with alligator clips at both ends
-wire stripper
-black marker
-small block of wood
-4 nails
-hammer

Sci07u03c02p10d (Energy Efficiency)
-100-watt incandescent light bulb
-23-26-watt compact fluorescent light bulb (CFL)
-lamp
-two plastic sandwich bag
-four ice cubes
-clock or watch
-measuring cup

Sci07u03c03p14d (Air Resistance)
-plastic garbage bag
-scissors
-ruler
-yardstick
-12 pieces of string (each 20 inches in length)
-three plastic sandwich bags
-three raw eggs
-cardboard box

Sci07u07c01p02d (Local Ecosystem)
-outdoor area like a field or garden
-string
-magnifying glass
-thermometer
-popsicle sticks
-paper
-small gardening tools

Sci07u07c03p16d (Biodegradability)

- shovel or trowel
- compost bin (can be purchased from a local garden or hardware store)
- dirt
- twigs and branches
- grass clippings or leaves
- food garbage (such as banana peels and apple cores)
- plastic cup
- newspaper
- aluminum foil
- tissues
- paper towels
- tin can

Sci07u09c01p03d (Solar System Model)

- large backyard or field
- measuring tape
- construction paper
- metric ruler
- pencil
- scissors
- tape
- nine bamboo skewers or sharpened pencils

Sci07u09c02p10d (Planet Comparison)

- protractor
- plain paper
- colored pencils or markers
- ruler
- pencil
- graph paper

Sci07u10c02p08d (Natural Selection)

- construction paper in four different colors
- scissors
- blanket with a colorful pattern (a sheet or comforter will also work)
- plastic cup
- plain paper
- pencil or pen

Science 8

Sci08u03c01p02d (Determining Volume)

- graduated cylinder
- water
- assorted small rocks (be sure they will fit easily into the graduated cylinder)
- A rectangular solid that can be measured, such as a brick or box
- Meter stick or ruler

Sci08u03c02p05d (Mass of Gas)

- Two balloons of the same size
- Meter stick
- String
- Paper clips

Sci08u04c03p12d (Specific Gravity)

(Video)

- balance
- set of metric masses
- strong thread
- various rocks
- beaker

Sci08u04c03p13d (Gravity)

- magnet
- long string, approximately 1 meter
- several washers or other material that would be attracted by a magnet
- meter stick or ruler
- balance
- blank piece of card stock or paper to place behind the washers and string

General Science 9

Sci09u02c01p02d (Determining Volume)

- graduated cylinder
- water
- assorted small rocks (Be sure they will fit easily into the graduated cylinder.)
- a rectangular solid that can be measured, such as a brick or box
- meter stick or ruler

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(Video)

- balance
- set of metric masses
- strong thread
- various rocks
- beaker

Sci09u03c03p13d (Gravity)

- magnet
- long string, approximately 1 meter
- several washers or other material that would be attracted by a magnet
- meter stick or ruler
- balance
- blank piece of card stock or paper to place behind the washers and string

Earth Science

Escu02c02p07d (The Clock of Eons)

- computer-based graphics program or
- poster board
- colored pencils or markers

Escu02c02p09d (Before, During and After Mass Extinction)

- internet access
- colored pens or pencils
- large paper folded into 3 equal sections

Escu02c02p11d (Greenhouse Effect)

- 2 clear, 2-liter bottles
- 2 thermometers that can measure room temperatures (at least 60-100 degrees F)
- molding clay
- 2 seltzer tablets
- table-top lamp to use as a source of heat
- 1 cup of water

Escu05c01p02d (Crystal Systems)

- paper
- printer
- scissors
- tape or glue

Escu07c01p04d (Soil Formation)

- 1 ½ cups potting soil
- 1/2 cup sand
- 2 wide-mouthed juice bottles with lids
- masking tape
- pen
- spoon
- water



Escu07c02p08d (Ice Erosion)

- 10 lbs. sand
- square of window screen or kitchen strainer
- 2 plastic trays, about 8 X 24 inches
- water
- freezer
- ruler
- bucket
- measuring cup

Escu08c01p02d (Water Purification)

- 1 cup of dirt
- 4 cups of water
- small glass
- large glass bowl
- clear plastic wrap
- small, round rock
- sunshine

Escu08c01p05d (Water Conservation)

- poster board (optional)
- colored pencils or markers (optional)

Escu08c02p08d (Porosity and Permeability)

(Video)

- water
- graduated cylinder
- 6 clear, plastic cups
- Permanent marker
- Metric ruler
- Large, medium, and small pebbles (about 1 cup each)
- Gravel, sand, and dirt (about 1 cup each)
- funnel
- 3 coffee filters
- ring stand
- stopwatch or watch with a second hand

Escu08c03p13d (Freshwater VS. Saltwater)

- 4 tablespoons salt
- water
- 2 clear glasses
- measuring cup
- tablespoon
- 2 eggs
- 2 plastic cups
- spoon
- marker
- freezer
- stove
- small pot
- stopwatch or watch with a second hand
- 2 pie plates or shallow pans about the same size
- paper

Escu09c01p04d (Layers of the Atmosphere)

- crayons, markers, or colored pencils
- poster board

Escu09c02p08d (Solar Energy)

- crayons, markers, or colored pencils
- poster board

Escu09c02p08a (Temperature)

- sheet of black paper
- sheet of white paper
- window
- sunlight shining through the window

Escu09c02p10a (Barometers)

- coffee can or glass jar
- large balloon
- rubber band (big enough to fit around the top of the coffee can or jar)
- toothpick
- glue
- straw
- index card

Escu09c03p13d (Greenhouse Effect)

- 2 shoe boxes or any other boxes that are similar in size
- sheet of clear plastic (plastic wrap) *or* a pane of glass
- 2 thermometers for measuring air temperatures
- Watch *or* stop watch
- Paper and pen to record temperature results
- 2 lamps (only needed if it's a cloudy day)



Escu10c01p04a (Clouds and Rain)

- 2-liter plastic soda bottle
- matches (adult supervision required)
- hot tap water
- black paper

Escu10c02p11d (Research Your Climate)

- poster board
- markers or crayons
- paper
- pen or pencil

Escu10c03p15d (Predict The Weather)

- paper
- pen or pencil

Escu11c02p09d (Life Histories of Stars)

- computer graphics program
- OR
- poster board
- colored pencils or markers

Integrated Physics and Chemistry

Ipcu01c01p03d (Making Observations)

- bowl of peanuts in their shells
- various measuring tools (metric rulers, string, etc.)
- paper and pencil

Ipcu01c02p08d (Determining Volume)

- metric ruler
- small block of wood
- string
- water
- small rock
- graduated cylinder

Ipcu01c02p10d (Determining Density)

- a penny, a nickel, and a quarter
- metric ruler
- metric balance
- scissors

Ipcu01c02p10a (Density Column)

- Karo syrup or molasses
- cooking oil
- red solution
- blue solution
- piece of paraffin
- raisin
- peanut or cashew
- paperclip
- small plastic cups
- eye droppers
- laboratory balance
- 50-mL graduated cylinder (or larger)

Ipcu02c01p02d (Atomic Structure)

- large box (at least 40 to 50 cm along all sides)
- small block of wood (around 6 to 8 cm along all sides)
- 100 marbles or pellets (airsoft pellets work well)
- ruler

Ipcu02c02p08d (Identifying an Unknown)

- metric balance
- graduated cylinder
- ruler
- small paper cup containing one or more metal pieces (Your teacher will supply you with this.)

Ipcu02c03p13d (Separating a Mixture)

- mixture containing salt, iron filings, sand, gravel, and raisins
- screens
- funnel
- filter paper (see diagram below for directions on use)
- beakers
- ring stand and ring
- magnet

Ipcu03c01p03d (Graphing Changes of State)

- coarsely crushed ice (about 8 ice cubes or enough to half fill a 500-mL beaker)
- string or wire
- Bunsen burner or hot plate (stove on low setting may be used)
- Pyrex beaker (use a small metal pan if a stove is used)
- Celsius thermometer
- ring stand with ring & supports (see diagram)
- time piece with second hand
- digital camera (optional)

Ipcu03c01p06d (Cabbage Indicator)

- sliced red cabbage
- stainless steel cooking container
- food strainer
- collection beaker
- coffee filter
- white vinegar
- baking soda (or ammonia)
- distilled water (for control)
- two pieces of notebook paper
- several small, clear plastic cups (3-oz [90-mL] bathroom cups work well for this purpose)
- at least 6 household liquids for testing (suggestions: clear soda-pop, clear shampoos or liquid soap solutions, clear or light-colored fruit or vegetable juices, rain from a recent storm, water with soil fertilizer dissolved in it, etc.)

Ipcu03c02p10d (Chemical Changes)

- small utility candle and holder
- matches
- metric balance
- 3 small sheets of paper
- watch glass
- 3 test tubes
- table salt (NaCl)
- calcium chloride (CaCl₂)
- baking soda (NaHCO₃)
- magnesium ribbon
- 1M hydrochloric acid (muriatic acid)

Ipcu03c03p16d (Half-Life)

- 100 small candy pieces with printing or design on one side only (M&M™, Reese's pieces™, etc.)
- resalable plastic bag or clean plastic box with lid
- sheet of wax paper, approximately 30 cm x 30 cm
- plastic knife
- plastic cup
- graph paper

Ipcu04c01p02d (Comparing Hardness and Density of Solids)

- at least six of the following solid samples (some are crystals, others amorphous): aluminum, amber, calcite, chalcopyrite, dolomite, feldspar (orthoclase or anorthite), fluorite, galena, gypsum, hematite, ice, iron, magnetite, mica (muscovite or biotite), pyrite, quartz, ulexite
- your own fingers (fingernails to be precise!)
- copper penny (pre-1981)
- dissection knife (from a biology dissection kit)
- steel nail or file
- metric balance
- graduated cylinder
- overflow can (optional, may be necessary for some samples)
- graph paper

Ipcu04c02p07d (Viscosity)

- egg carton
- scissors or nail
- several straws
- cardboard (for ramp)
- tape
- stopwatch or watch with second hand
- 1-inch block, a book, or other support ramp (see images below)
- several test liquids (e.g., water, ketchup, honey, olive oil, molasses, syrup, heavy cream, vegetable oil)
- microwave
- beaker or measuring cup

Ipcu04c03p14d (Pressure in Gases)

- a car and licensed driver
- the car manual (for information)
- air pressure gauge
- 16 sheets of paper or thin cardboard
- tape

Ipcu05c01p05d (Motion Graphs)

- battery-powered toy car
- non-powered toy car
- meter stick
- stopwatches (one for each timer) or second hand on clock
- long board (at least 2 meters) for ramp
- books to prop up ramp

Ipcu05c02p11d (Propulsion)

- balloon
- empty soda pop can
- sharp nail
- hammer
- fishing line or strong thread
- bowl of water

Ipcu07c01p05d (Conservation of Energy)

- cardboard tube (from gift wrap or paper towels)
- box (cut from lightweight cardboard, such as a gift box, using the pattern below)
- four marbles of different masses
- meter stick
- tape
- scissors
- book
- metric balance

Ipcu07c02p12d (Inclined Planes)

- smooth board
- smooth block or other object to drag up the plane (approximately 200 to 500 grams)
- spring scale (calibrated in newtons)
- string
- books or blocks to support the inclined plane
- meter stick

Ipcu08c01p04d (Insulators)

- large Styrofoam cup
- small Styrofoam cup
- flat piece of Styrofoam
- thermometer
- hot water
- heat source for heating water
- at least two insulating materials (shredded newspaper, sheets of newspaper, bits of cloth, small Styrofoam peanuts, bubble wrap, feathers, aluminum foil, saw dust, etc.)
- clock with second hand

Ipcu08c02p07d (Heat and Expansion)

- beaker or pan for heating water
- medium test tube
- one-holed stopper to fit test tube
- glass tube to fit through stopper
- grease pencil
- food coloring
- hot plate for heating water
- large round balloon
- marker
- tape measure
- freezer

Ipcu09c01p03d (Electrostatic Investigations)

- clear adhesive tape
- plastic straw

Ipcu09c02p10d (Diverting a Magnetic Field)

- strong disk magnet
- plastic drinking straw
- tape
- double-stick tape or glue
- paperclips
- cardboard from cereal or cake mix box
- test materials such as pennies, aluminum foil, an iron or steel nail, cardboard, crayons, a table knife, or a popsicle stick
- compass
- paper

Ipcu10c01p04d (Changing the Speed of a Wave)

- 2 sturdy rubber bands, large enough to stretch around the plastic box
- plastic box
- paperclips

Ipcu10c02p09d (Using Vibrations to Produce Sound)

- a tuning fork
- plastic bowl (for water)
- 3 test tubes (or 3 identical glass bottles with narrow mouths)

Ipcu10c03p16d (Law of Reflection)

- laser pointer
- small rectangular or square plane mirror
- block of wood to support mirror
- sharp pencil
- protractor
- unlined paper

Ipcu11c01p02d (Carbon Dioxide and Water Acidity)

- three 12-inch balloons
- manila folder
- scissors
- twist tie
- bicycle tire air pump
- CO₂ cartridge bicycle tire pump
- one-hole stopper with glass tube inserted
- 00-ml graduated cylinder
- pH paper, acid range

Ipcu11c01p04d (Water Acidity and the Environment)

- sand paper
- vinegar
- fresh water
- small jar with lid
- several small paper or plastic cups or small beakers
- a raw egg
- a piece of coral
- a penny (use sand paper to remove any surface build-up)
- an iron or steel nail (use sand paper to remove any surface build-up)
- chips of marble, concrete, brick
- various rock samples (slate, limestone, quartz)
- piece of chalk
- small glass bead or other piece of glass
- small plastic bead or other piece of plastic

Ipcu11c02p09d (Kepler's Second Law)

- centimeter graph paper
- scissors
- poster board
- triple beam balance
- centimeter rule
- tape

Biology

Chmu09c03p10d (Static Electricity)

(Video)

- inflated balloons (2)
- piece of material (nylon, wool, or fur)
- thread
- nylon stocking
- string
- piece of white paper

Biou02c02p06a (Temperature Control)

- two flat aluminum cake pans (disposable)
- thermometer
- a liter measure
- sand
- aluminum foil

Biou02c02p08d (Water Properties)

(Video)

- calcium hydroxide
- phenolphthalein
- filter paper
- pyrex beakers (2)
- chalk
- heat source

Biou02c02p09a (Indicators)

- litmus paper
- vinegar
- bicarbonate of soda
- fruit juice
- tomato juice
- other varied household liquids
- soup

Biou02c04p15a (Starch)

- powdered starch
- Dextrostik
- beakers or tumblers
- iodine
- several fruits and vegetables
- sugar (Karo syrup)

Biou02c05p20a (Digestion)

- jars with lids (2)
- crackers
- diluted hydrochloric acid
- cornstarch
- ground beef (raw)
- Dextrostik strips
- iodine



Biou03c01p03d (Using a Microscope)

(Video)

- one compound microscope
- dropper
- one slide
- one slide cover
- water
- one short piece of brightly colored thread (about 2 mm long)

Biou03c02p06d (A Protozoan Culture)

(Video)

- four jars of pond water (labeled 1, 2, 3, and 4)
- one teaspoon of chopped hay (lespedeza, alfalfa, or timothy)
- 1/4 teaspoon of polished rice
- 1/16 teaspoon of egg yolk
- one teaspoon of rich black garden soil
- 4 well slides with a depression that holds a drop of water or an ordinary slide with a circle drawn around an area about the size of a dime. (The circle can be drawn with Vaseline using a toothpick. This circle of Vaseline will help to keep the drop of water confined to the area.)
- a tiny amount of cotton
- microscope
- dropper
- 4 cover slides

Biou03c02p07a (The Amoeba)

(Video)

- microscope
- a prepared slide of amoeba

Biou03c02p09a (The Euglena)

(Video)

- Microscope
- a prepared slide of euglena (or a slide of mixed protozoans containing euglena)

Biou03c03p13a (Algae)

(Video)

- six or eight mayonnaise jars--pints or quarts (Use jars that can be thrown away upon completion of the exercise)
- two small plastic bags for collecting bark with algae
- a dipper tied to a long pole is very useful in collecting from ponds and lakes
- one plain slide
- one well slide (depression slide or a plain slide and Vaseline for making a well)
- a cover slip
- cultures you collected
- an eye dropper for adding water
- microscope

Biou03c04p18d (Fungi)

(Video)

- molds on jelly, fruits, and bread
- baker's yeast
- sugar
- Bleu, Roquefort, (keep refrigerated)
- Camembert cheese (keep refrigerated)
- plastic disposable tumbler
- stirring spoon
- needle
- pair of tweezers
- two clean microscopic slides
- hand lens or strong magnifying glass
- microscope
- two cover slips
- a yeast stain: methylene blue safranine, or similar stain

Biou03c04p21a (Algae Observations)

- a prepared slide of nostoc (cyanobacteria)
- a prepared slide of spirogyra (green algae)
- microscope

Biou04c01p02d (Cheek Cells)

(Video)

- microscope
- medicine dropper
- water
- methylene blue stain
- slide
- slide cover
- toothpick

Biou04c01p03a (The Onion Cell)

- microscope
- single-edged razor blade or exacto-knife
- slide
- slide cover
- dropper
- iodine stain
- forceps
- paper towel
- water
- onion

Biou04c02p07d (Osmosis)

- beaker
- ring stand
- sucrose (table sugar)
- thistle tube
- semi-permeable membrane (sausage skin)
- clamp

Biou04c03p12a (Tissues)

(Video)

- microscope
- prepared slides of tissues

Biou05c02p06d (Seeds)

(Video)

- four different types of seeds (at least one grass such as corn and one bean such as a pinto bean)--at least four seeds of each kind
- magnifying glass (hand lens)
- styrofoam cups (4)
- razor blade, single edge
- soil mixture: 2/3 potting soil, 1/3 sand
- water

Biou05c03p11a (Terrarium)

- large glass or Plexiglas container
- aquarium charcoal
- washed gravel, sand and/or rock
- potting soil
- a few assorted plants

Biou06c02p10a (Muscles Types)

- microscope
- raw chicken leg
- blunt probe
- scissors
- latex gloves
- prepared slides (can be secured from a local hospital, medical clinic, or doctor's office) of smooth muscle, skeletal muscle, and cardiac muscle

Biou07c01p03d (Probability)

- coins (2)
- box (a cardboard shoebox is good)

Biou07c03p12d (Molecular Genetics)

- 2 Petri dishes or flat covered containers
- radish seeds (60)
- sand-peat mixture
- medicine dropper
- box to cover Petri dish

Biou08c01p04d (Mitosis)**(Video)**

- microscope
- prepared slide of onion (*Allium*) root stained to show chromosomes
- prepared slide of roundworm stained to show chromosomes

Biou08c02p07a (Fragmentation)

- small glass jar or culture jar
- a razor blade, a scalpel, or a very sharp knife
- a dissection microscope or a good hand lens
- eight or ten individual *Planaria* or flatworms
- a small piece of fresh liver about 2 cm on a side placed in fresh water which is just the depth of the height of the liver
- blunt ended tweezers or forceps

Biou08c02p09a (Bulb Structure)

- a hand lens or dissection microscope
- a razor blade or knife
- a fresh onion or other plant bulb

Biou08c02p11a (Cuttings)

- one glass jar of 16-ounce, or larger, size
- two or more flower pots of 4-inch, or larger, diameter
- rich loamy soil or potting mix
- toothpicks
- a sweet potato

Biou08c03p15a (Sexual Reproduction)**(Video)**

- a compound microscope
- one or more prepared slides of egg cells from an animal
- one or more prepared slides of animal sperm, preferably from the same species as the slides of the egg cell

Biou08c04p18d (Tissue Structure)**(Video)**

- microscope
- prepared slides of muscle tissue
- prepared slide of internal organ(s), such as the kidney, liver or heart
- prepared slides of erythrocytes, or leukocytes (from blood)
- cheek cells (from you)
- medicine dropper
- methylene blue stain
- toothpick
- clean glass slide
- cover slip

Biou08c05p23a (Ferns and Pines)

- hand lens or dissection microscope
- forceps
- microscope
- medicine dropper
- fern leaves with sori
- clean glass slides
- pine cone (green and unopened would be best)
- cover slip

Biou08c05p24a (Flowers)

- microscope
- razor blade or sharp knife
- hand lens or dissection microscope
- medicine dropper
- microscope
- clean glass slides
- teasing needle
- cover slips
- several kinds of fresh flowers

Biou08c05p24a (Habitats)

- gallon jar (or other large, glass container)

Biou09c02p09a (Quadrats)

- string or twine
- large nails
- meter stick

Chemistry

Chmu01c02p08a (Masses)

(Video)

- centigram balance
- various small objects

Chmu02c02p04d (Observation of a Phase Change)

(Video)

- test tubes with 12-15g PDCB (moth crystals)
- three Pyrex beakers the same size, 150 mL range
- 250ml Pyrex beakers (2)
- beaker stand
- thermometers (2)
- water
- heat source
- three dye tablets or egg-coloring tablets
- iodine crystals (optional)

Chmu02c02p05a (Sand and Salt)

- pure white sand
- $\frac{1}{2}$ sand and $\frac{1}{2}$ salt mixture
- pure salt
- filter funnel
- filter paper or heavy paper hand towel

Chmu02c03p10d (Using the Tyndall Effect to Identify Colloids)

- clear glass with smooth sides (3)
- laser pointer or flashlight
- red Jell-O[®]
- red food coloring
- sugar
- water



Chmu03c03p08d (Finding Absolute Zero Experimentally)

(Video)

- 250ml Erlenmeyer flask
- wire gauze
- short piece of plastic tube
- rubber stop, 1-hole to fit flask
- water
- beaker to fit flask
- ice
- burner or hot plate
- ring stand
- ring
- thermometer

If a gas jet burner is used:

- ring
- wire gauze

Chmu04c01p03a (Chemical Properties of Some Metals)

- tin can lid with 4 indentations
- support stand and ring
- Bunsen burner or propane burner
- samples of iron, copper, magnesium, and lead

Chmu05c03p09d (Demonstrating Polar Properties)

- acetate (overhead transparency material) strip
- tissue paper
- vinyl strip
- woolen cloth
- slow, steady stream of water from a faucet

Chmu06c01p02d (Observing Chemical Change)
(Video)

- 0.01 M NaCl (sodium chloride) solution, table salt = 0.58g/L of solution
- 0.01 M K_2CrO_4 (potassium chromate) solution, = 1.94 g/L of solution; solid can be purchased at drug, hobby, or photo supply store
- 0.01 M $AgNO_3$ (silver nitrate) solution, 1.7 g/L of solution or diluted solution; solution can be purchased at local drug or photo supply store
- several small test tubes
- several eye droppers, one for each solution
- goggles

Chmu06c01p03a (Chemical Reactions)
(Video)

- 0.01 M acidified iron (II) sulfate, $FeSO_4$ - 1.52 g/liter of solution and 1 mL concentrated HCl; solid $FeSO_4$ can be purchased at drug or hobby store.
- WEAR GOGGLES WHEN HANDLING CONCENTRATED HCl AND WORK IN A WELL VENTILATED AREA.**
- 0.01 M of potassium permanganate, $KMnO_4$ – 1.58 g/liter of solution; solid $KMnO_4$ can be purchased at drug, hobby, or chemical supply store
- 0.01 M NaCl solution – 0.58 g/liter of solution; table salt
- 0.01 M ammonium nitrate, NH_4NO_3 – 0.80 g/liter of solution; solid ammonium nitrate can be purchased at drug or fertilizer store
- several test tubes or baby-food jars
- several medicine (eye) droppers
- graduated cylinders or marked disposable pipettes
- Goggles

Chmu06c01p04a (Ammonium Nitrate)

- solid sodium hydroxide, NaOH – lye, can be purchased in grocery stores
- solid ammonium nitrate, NH_4NO_3 , can be purchased from a drug or fertilizer store
- concentrated hydrochloric acid, HCl
- phenolphthalein solution (or other indicator) – can be purchased from a hobby shop
- thermometers to fit test tubes
- forceps (tweezers)
- water
- test tubes with stoppers
- graduated cylinders or marked disposable peppetts

Chmu06c02p09d (Affect of Solution Concentration on Reaction Rate)

- 0.1 M HCl-see previous experiment
- chalk crumbs or dust
- clean test tubes (5)
- metric balance
- weighing paper

Chmu07c02p08d (Solubility Trends)

- (Video)**
- rock salt (water softener crystals)
 - glycerin
 - water
 - baby food jars with lids (2)
 - rubbing Alcohol (isopropyl alcohol)
 - stirring rod
 - test tubes

Chmu07c03p12a (Acid Strength)

- (Video)**
- distilled water
 - goggles
 - 0.1 M HCl (hydrochloric acid)(8.3 ml per 1 L of solution)
 - 0.001 M HCl (1 ml 0.1 M HCl per 100 ml of solution)
 - chips of marble, limestone, or chalk
 - pipette (glass with suction bulb or disposable)
 - test tubes (4)

Chmu08c01p03a (Volatility)

- acetone- available in the paint department of stores
- isopropyl alcohol-90% rubbing alcohol available at drug stores
- mineral oil
- water
- test tubes or other equal sized glass containers (4)
- grease marker or masking tape
- ruler
- goggles

Chmu09c03p10d (Preparation of a Polymer)

- small beakers (3)
- stirring rod
- polyvinyl alcohol
- borax
- food coloring (optional)

Physics

Phyu01c01p02d (Soda Straw Balance)

(Video)

- screw
- paper straw
- 2 microscope slides
- needle
- ruler
- razor blade or scissors
- small wood block
- tongue depressor
- clothespin
- paper

Phyu01c02p05a (Oleic Acid)

- 100 mL graduated cylinder
- 50 mL graduated cylinder
- 2 eye droppers
- large tray (or ripple tank)
- oleic acid
- talcum powder
- alcohol
- meter stick

Phyu02c03p07d (Circular Motion)

(Video)

- glass or plastic tube (the barrel of a ballpoint pen can be used for this part)
- String
- 2 stoppers
- alligator clip
- 10 washers
- paper clip
- stop watch



Phyu02c04p10a (Explosion)

- 2 carts (one with a spring)
- 2 clamps
- assorted standard masses
- table, 1 1/2 m. long
- 2 boards
- meter stick

Phyu02c05p13a2 (Kepler's Law)

- sharp pencil
- small ruler

Phyu03c02p06d (Simple Machines)

(Video)

- meter stick
- string
- weights

Phyu03c03p10a (Latent Heat)

- aluminum colorimeter (or an aluminum tumbler and a Styrofoam cup)
- analytical balance
- Celsius thermometer
- paper towel
- crushed ice
- cardboard lid

Phyu04c01p02d (Wave Speeds)

- Slinky[®]
- stop watch or sweep second hand
- meter stick

Phyu04c01p02a (Pulses)

- Slinky[®]

Phyu04c02p05d (Waves)

(Video)

- ripple tank with dampers
- high intensity light source
- white paper
- protractor
- paraffin blocks
- electrical wave generator
- thick wooden dowel

Phyu04c02p05a (Bending Waves)

- ripple tank
- light source
- white paper
- wave generator
- washers
- paraffin blocks
- glass plate

Phyu04c03p08a (Doppler Effect)

- ripple tank
- wave generator
- light source
- white paper

Phyu05c01p03d (Light Angles)

(Video)

- small purse-sized rectangular or square mirror
- protractor
- ball bearing
- pencil
- flashlight
- sheet of paper
- ruler

Phyu05c01p03a (Water Refraction)

- semicircular plastic dish
- protractor
- sheet of graph paper
- corrugated cardboard
- ruler
- straight pins (15)

Phyu05c02p06d (Convergence)

(Video)

- ripple tank
- rubber hose
- wooden dowel
- light source

Phyu05c03p10a (Light Observation)

- red filter
- blue filter
- liquid graphite
- 2 glass slides
- stand
- razor blade
- lamp
- meter stick

Phyu06c01p03a (Static Electricity)

- glass wand
- hard rubber wand
- silk cloth
- pith ball
- silk thread
- wool cloth (or cat's fur)
- stand

Phyu08c01p02a (Magnetic Fields)

- 2 bar magnets
- iron fillings
- 3 sheets of stiff cardboard

Phyu08c02p06a: (Magnetic Fields)

- copper wire, about (1m) long
- small porcelain socket and bulb
- drycell
- compass
- wire cutter or 8-inch scissors