

Light: A Lab Manual for Teachers Supply List Supplement

How Fast Do Waves Travel?

Student Materials (per group):

- Toy spring coil
- Stopwatch
- Rope or Toilet Paper
- Tape Measure

Additional Teacher Materials:

- None

Does Light Travel In A Straight Line?

Student Materials (per group):

- Clear plastic cup
- Laser
- Water
- Milk
- Dropper

Additional Teacher Materials:

- None

What Energy Does A Light Bulb Emit?

Student Materials (per group):

- Light bulb in lamp socket
- Thermometer
- Compact Fluorescent Lamp
- Black paper pocket

Additional Teacher Materials:

- None

How Are Lenses Used to See Big and Small Things?

Student Materials (per group):

- Hand Lens
- Print of different sizes
- Index cards or blank sheets of paper

Additional Teacher Materials:

- Telescope and microscope (optional)
- Light bulb (if no window)

What Light Is In A Laser?

Student Materials (per group):

- Laser
- Diffraction Glasses

Additional Teacher Materials:

- Classroom lights

What's In A Color?

Student Materials (per group):

- Diffraction grating
- Red Bulb or LED
- Blue Bulb or LED
- Green Bulb or LED
- White Bulb
- Markers

Additional Teacher Materials:

- Light bulbs/overhead lights

How Do Colors Reflect?

Student Materials (per group):

- Colored Filters

Additional Teacher Materials:

- PowerPoint Presentation or Handouts

How Can Light Be a Fingerprint?

Student Materials (per group):

- Diffraction Gratings

Additional Teacher Materials:

- He, Ne, H₂, O₂, Kr Spectral Tubes
- Spectral Tube Power Supply

How Do You Make Colors?

Student Materials (per group):

- Red LED

Additional Teacher Materials:

- All lights off in room

- Blue LED
- Green LED
- White paper or card
- Crayons or Markers (optional)

How Does Gravity and Light Change Plants?

Student Materials (per group):

- Cardboard box
- Two Plants
- Tray

Additional Teacher Materials:

- Cabinet

How Can Chocolate Bars Be Used to Measure the Speed of Light?

Student Materials (per group):

- Plain chocolate bar
- Ruler
- Calculator
- Paper towels
- Paper plate

Additional Teacher Materials:

- Microwave

How is Light Absorbed and Transmitted?

Student Materials (per group):

- Light source
- Set of color filters
- Lens
- Diffraction grating/CD/DVD disk
- White screen/piece of paper

Additional Teacher Materials:

- Other light sources (if available)

How do Polarizers Change the Light We See?

Student Materials (per group):

- Light source
- 2 thin-film polarizers
- Laser
- White screen (piece of paper)

Additional Teacher Materials:

- None

What is the Wavelength of Light?

Student Materials (per group):

- Diffraction grating
- Light bulb and base
- 2 meter sticks

Additional Teacher Materials:

- Spectral Emission Tube
- Power supply for emission tube

What Energy is Hiding?

Student Materials (per group):

- Flashlight
- 2 Thermometers, non-mercury
- Battery operated toy car
- Battery operated radio
- Electric pencil sharpener
- 1.5 volt C or AA battery
- Pencils
- Radiometer
- Christmas light bulb
- Light bulb and lamp (low wattage)

Additional Teacher Materials:

- Wire cutters
- 6 Index cards for stations
- String of Christmas lights

What is Good and Bad About the Sun?

Student Materials (per group):

Additional Teacher Materials:

- | | |
|---|--|
| <input type="checkbox"/> Pinhole camera made of paper | <input type="checkbox"/> 100 watt light bulb |
| <input type="checkbox"/> 2 White sheets of paper | <input type="checkbox"/> Pin |

What are the Properties of Convex Lenses?

Student Materials (per group):

- Convex lens
- Meter stick
- Card
- Lens Holder
- Light Bulb and Base

Additional Teacher Materials:

- None

How Do You Find the Focal Length of a Concave Lens?

Student Materials (per group):

- Concave lens
- Meter stick
- Card
- Lens Holder
- Light Bulb and Base
- Ruler
- Laser

Additional Teacher Materials:

- None

How Does Light Travel from a Source?

Student Materials (per group):

- Ring Stand
- Foam-core Boards
- Light bulb
- Meter stick

Additional Teacher Materials:

- Sharpie Marker
- Scissors or box cutter

How Do We Know Photosynthesis is Occurring?

Student Materials (per group):

- 3 Sprigs of Elodea (waterweed)
- 3-250 ml Beakers or similar sized jars
- Distilled Water
- Pinch of Baking Soda
- 1 Light bulb (100 watts)

Additional Teacher Materials:

- Sharp knife

What is the Electromagnetic Spectrum?

Student Materials (per group):

- Color copy of the EM Spectrum

Additional Teacher Materials:

- None

How Does Light Reflect Off Mirrors?

Student Materials (per group):

- Plane Mirror
- Laser
- White Sheet of Paper
- Milk
- Dropper

Additional Teacher Materials:

- None

How Can We See More Stars in the Sky?

Student Materials (per group):

- Hand lens, plastic
- Star Picture

Additional Teacher Materials:

- Meter stick or tape measure (optional)

What are the Properties of Concave Mirrors?

Student Materials (per group):

- Convex mirror

Additional Teacher Materials:

- None

- Concave Mirror
- Cardboard Screen
- Light Source
- Plane Mirror
- Holders
- Metric Ruler
- 2 meter sticks

How Do You Measure the Index of Refraction in Water?

Student Materials (per group):

- Semicircular Dish
- Water
- Glass plate
- Graph Paper
- Ruler
- Cardboard
- Pin

Additional Teacher Materials:

- None

How Do You Measure the Index of Refraction in Glass?

Student Materials (per group):

- Semicircular Dish
- Water
- Glass plate
- Graph Paper
- Ruler
- Cardboard
- Pin

Additional Teacher Materials:

- None

What is the Diameter of the Sun?

Student Materials (per group):

- Aluminum foil
- Meter Stick
- Ruler
- Pin or small nail
- Paper

Additional Teacher Materials:

- None

How Do I Use Ray Diagrams to Predict How an Image Will Look?

Student Materials (per group):

- Ray Diagrams Worksheet
- Ruler

Additional Teacher Materials:

- None

How Do Bubbles Show Colors?

Student Materials (per group):

- Bubble solution
- Wand

Additional Teacher Materials:

- None

Is Light a Wave Or a Particle?

Student Materials (per group):

- White Construction Paper
- Black Construction Paper
- Bendable Gooseneck Desk Lamp
- Triangular Prism

Additional Teacher Materials:

- Light Sensitive Paper

Demo: Standing Waves

Student Materials (per group):

Additional Teacher Materials:

None

Slinky

2 Volunteers

Demo: Photoelectric Effect and Fluorescence

Student Materials (per group):

None

Additional Teacher Materials:

Glow in the Dark Card or Stars

Red LED

Blue LED

Green LED

Demo: Water Fiber Optics

Student Materials (per group):

None

Additional Teacher Materials:

2 Liter Bottle

Water

20 Penny Nail

Heat Source

Laser or Flashlight

Plastic Box

Tongs

Stand

Demo: Laser Eye Checks

Student Materials (per group):

None

Additional Teacher Materials:

Laser

Lens

2 Ring Stands

2 Clamps

Demo: Polarization and Stresses

Student Materials (per group):

None

Additional Teacher Materials:

2 Polarizing Filters

Clear Plastic Items

Demo: Plasma Ball Lighting

Student Materials (per group):

None

Additional Teacher Materials:

Plasma Ball

Compact Fluorescent Light Bulb

2 Quarters

Demo: Ultraviolet Lighting

Student Materials (per group):

None

Additional Teacher Materials:

UV Light

Mr. Clean Cleaning Solution

Tonic Water with Quinine

Calcite

Other fluorescent materials

Demo: Compare the Beams

Student Materials (per group):

None

Additional Teacher Materials:

Red Laser

White LED Flashlight

Diffraction Gratings

1 Ring Stand

2 clamps

Demo: Colors in the Shadows

Student Materials (per group): None**Additional Teacher Materials:**

- 3 Light Bulb Sockets with Bases
- Red, Blue, Green Compact Fluorescent Bulbs
- Large Index Card

Demo: Pirate Eyepatches**Student Materials (per group):** None**Additional Teacher Materials:**

- Eyepatches
- Objects such as Balls, Books, or Pencils