

# Shopping List for Unit #9: Light

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**Don't be afraid of this list!** The materials are broken down by availability and expense. The items in the first list are low-cost materials you already have or can easily add to your next grocery store list. The second list includes mid-priced equipment for more in-depth projects, and the last list of items is appropriate for upper grades. **We'll be re-using the specialty items from this list** (like lenses, lights, lasers, and electrical components) for future projects.

## Light Waves

Water glass and a clean pickle jar  
Cooking oil, such as canola (4 cups – use a cheap brand)  
Two pennies, dollar bill  
Flashlight  
1 teaspoon of milk (soy, cow...) OR white flour  
2 hand held magnifying lenses  
Old CD you can scratch (used in two experiments)  
Paper towel tube  
Feather (any size)  
Index cards  
Crayons  
Bar of Ivory soap (get a pack of 3)  
Sharp pencil  
String (about 3')  
Scissors, tape  
Television with a remote control  
Ziploc bag full of water  
Black plastic trash bag  
Piece of plastic (like a plastic spoon or cup)  
Metal pot or pan (not Teflon coated)  
Clean piece of white paper  
Two pairs of sunglasses (the polarizing kind rated for UV protection work well)

## Light Waves Part 2

Small box with lid (like a shoe box)  
Tracing paper (1 sheet)  
Microwave  
BIG bar of Hershey's chocolate (any type)  
Water in a shallow glass baking dish  
Mirror (like a hand mirror from the bathroom)  
[Long-wave UV lamp](#)  
2 yardsticks (AKA meter stick)  
10-20 popsicle sticks  
Index cards or pieces of cardboard  
[Set of lenses](#) with [extra double-convex lenses](#) (this is the kind in a handheld magnifying glass). Pick one of these to get as an extra, or get all 4:  
[50mm](#), [150mm](#), [300mm](#), [500mm](#))

OR... instead of buying lenses, simply use eyeglasses and magnifiers that you already have around the house.

*Optional:* if you want to make the Newtonian telescope, then pick up a [concave mirror](#) AND a small mirror (like a mosaic mirror from the craft store, or mirror from a compact)

[Diffraction grating](#) (or an old CD)  
Sheet of mylar (5" x 8" or larger) and cardboard OR use three rectangular mirrors approx. 8" x 1"  
Scissors, tape

*Optional:* [red, green, and blue colored light sticks](#) (Make sure the light inside the red stick really glows RED, not the usual green liquid enclosed in a red-colored tube.)

*Optional:* wooden clothespins (about 4)

For the last few items on this list, you can select from either group:

Group A: Three flashlights, three colors of nail polish (red, green, and blue), clear tape (or plastic wrap)  
OR...

Group B: Three 'party bulb' lights (green, blue, and red colored incandescent light bulbs) in clip-on lamps

## Lasers

Red [laser pointer](#)  
Small mirrors ([mosaic mirrors](#) are cheapest)  
3 large paper clips  
3 brass fasteners  
5 index cards  
2 pins  
2 razor blades  
4 clothespins  
Scissors, tape  
White wall (or white paper stuck to the wall)  
PLUS materials from Light Waves 1 & 2

## For Grades 9-12:

### Laser Light Show

Red [laser pointer](#) (RS #63-1064)  
2 [3VDC motors](#) (RS #273-223)  
2 gears\*\* or corks (you'll need a solid way to attach the mirror to the motor shaft tip)  
2 1" round [mirrors](#) (use mosaic mirrors)  
2 [DPDT switches with center off](#) (RS #275-1533)  
20 [alligator clip leads](#) (RS #278-1157) OR insulated wire if you already know how to solder  
2 [AA battery packs](#) with 4 AA's (RS #270-408)  
2 [1K or 5K-ohm potentiometers](#) (RS #271-1714)  
Zip-tie (from the hardware store)  
½ " or ¾ " metal conduit hangers (size to fit your motors from the hardware store)  
3 sets of ¼ " x 2" bolts, nuts, and washers  
1 tupperware container (at least 7" x 5") with lid  
Basic tools (scissors, hot glue gun, drill, wire strippers, pliers, screwdriver)  
\*\*If you have trouble finding these parts (with the \*\* next to them), just send us an email.

## For Grades 9-12:

### Laser Communicator

*This project requires soldering. We'll teach you how to solder, but you need a soldering iron. If you don't have a soldering iron, save this project for another time.*

Red [laser pointer](#)  
[220-ohm resistor](#) (RS #271-1313)  
[8-ohm audio transformer](#) (RS #273-1380)  
[9V battery clip](#) (RS #270-325) & 9V battery  
[CdS cell](#) (RS #276-1657)  
[SPST](#) push-button switch (RS #275-646) or similar  
[Audio plug](#) (RS #274-287) – save the second one in the package for Unit 11  
[Bi-polar LED](#) (RS #276-012)  
2 [AA battery packs](#) with 3 AA's (RS #270-408)  
Crystal earphone (Part: 'EAR1' from - [www.crystalradiosupply.com](http://www.crystalradiosupply.com)) OR get a [Mini Audio Amplifier](#) (RS #277-1008)

*Note: If you're ordering a ceramic earphone, get at least three for later projects in Alternative Energy.*

Tools (scissors, hot glue gun, wire strippers, pliers, soldering iron with stand, solder)