Parts list

Most of the parts for the experiments in this book are not at your local hardware store; you will have to order them from an electronic supplier. But they are items that are common in the electronics industry and are available from many different companies.

Arrangements are being made for Jameco Electronics (www.jameco.com) to supply a kit of parts for this book. Contact them or check this book's web site, www.eeyounglearners.com, for information.

Try hard to get and use exactly the parts listed here. Otherwise, the experiments will not look like the pictures and may not even work.

The parts list includes a few extras of each of the most commonly used parts.

5 ft Hookup wire, #20 or #22 AWG (0.3 or 0.5 mm^2), solid (preferred) or stranded, insulated, preferably tinned. (Blue if you want to match the pictures in the book.) This size is specially chosen to make it easy to connect wires by hand.

Solid wire is easier to use in most of the experiments, and scraps of it are easier and safer to clean up, since it does not shed fine strands when cut. Stranded wire is more flexible. It is good to learn how to work with both kinds. One experiment, "Signaling with LEDs," uses more wire if available, preferably stranded wire.

1 Wire cutter and stripper for AWG 22 wire (or to match the wire you are using). (Most wire strippers are for a range of sizes; make sure yours includes the right one.) This is a tool of lasting value. See "Using a wire stripper" starting on page 4.

1 Pair of goggles to protect the eyes from flying pieces when cutting or stripping wire, especially if the person doing it does not wear glasses.

10 Wago connectors for 2 wires, type 221-412 (AWG 24 to 12). Do not substitute; these must fit the wire you are actually using. These are more likely to be available at an electrical supply store rather than an electronic parts supplier.

3 Wago connectors for 3 wires, type 221-413 (AWG 24 to 12). Same comment applies. You can also use this item (221-413) in place of 221-412 (above) by leaving one of its three openings unused.

1 Battery box for four AA or AAA cells, with red and black wires, with switch, Jameco 216187 or equivalent. See "Using the battery box" on page 12. A battery box without a switch can be used; in that case you will switch it off by removing one of the batteries.

4 AA cells (or AAA cells if needed to fit your battery box), carbon-zinc or alkaline, not lithium. The cheapest carbon-zinc batteries are best.

5 Resistors, 330 ohms, ¼ or ⅛ watt. (Not 330k, which means 330,000 ohms.)

5 Red LEDs, general-purpose (see Experiment 1 for picture).

2 Green LEDs, general-purpose.

3 SPST (single-pole, on-off) toggle switches with screw terminals. The volt and amp ratings do not matter because we are using low voltage and low current. (See Experiment 10 for picture.)

1 Screwdriver to fit the screw terminals on the switches.

2 Silicon NPN transistors, TO-220 case, type TIP31C or equivalent. (This transistor is chosen because it is not likely to be damaged if you connect it wrong. Other types can be substituted if someone can help you choose an appropriate one, but many other transistors look just like it but are electrically incompatible. See "Working with the transistor" starting on page 62.)

2 3-pin sockets, 0.1-inch (2.5-mm spacing), with wires attached; or sets of 3 jumper wires with pin sockets on one end. (These are to connect to the transistor. See "Working with the transistor.")

1 (Optional) SPST knife switch. See "Using a knife switch" starting on page 48. This is available from educational suppliers and some hardware stores. This type of switch went out of use 100 years ago, except for school projects.