

# Circuit 1A: Blinking an LED

You can find LEDs in just about any source of light, from the bulbs lighting your home to the tiny status lights flashing on your home electronics. Blinking an LED is the classic starting point for learning how to program embedded electronics. It's the "Hello, World!" of microcontrollers. In this circuit, you'll write code that makes an LED blink on and off.



LED



330Ω

RESISTOR



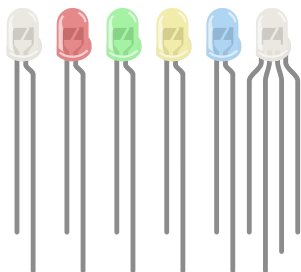
2 JUMPER WIRES

YOU  
NEED

## NEW COMPONENTS

### LIGHT-EMITTING DIODES (LEDs)

are small lights made from a silicon diode. They come in different colors, brightnesses and sizes. LEDs (pronounced el-ee-dees) have a positive (+) leg and a negative (-) leg, and they will only let electricity flow through them in one direction. LEDs can also burn out if too much electricity flows through them, so you should always use a resistor to limit the current when you wire an LED into a circuit.



**RESISTORS** resist the flow of electricity.

You can use them to protect sensitive components like LEDs. The strength of a resistor (measured in ohms) is marked on the body of the resistor using small colored bands. Each color stands for a number, which you can look up using a resistor chart. One can be found at the back of this book.

## NEW CONCEPTS

**POLARITY:** Many electronics components have polarity, meaning electricity can (and should) flow through them in only one direction. Polarized components, like an LED, have a positive and a negative leg and only work when electricity flows through them in one direction. Some components, like resistors, do not have polarity; electricity can flow through them in either direction.



**OHM'S LAW** describes the relationship between the three fundamental elements of electricity: **voltage**, **resistance** and **current**. This relationship can be represented by this equation:

$$V=I \cdot R$$

**V** = Voltage in volts

**I** = Current in amps

**R** = Resistance in ohms (Ω)

This equation is used to calculate what resistor values are suitable to sufficiently limit the current flowing to the LED so that it does not get too hot and burn out.