ELECTRONIC PROJECT KIT

Sound & Sense

Stack batteries, store charge, and turn light and knobs into sound.

39 IN ONE

OHMSVILLE.COM/MANUALS/LEVEL-3

Contents

THE FIVE YOU ARE GRADED ON

- № 11 · Twice the push — ohmsville.com/bench#a=exp-11
- № 12 · Capacitor battery — ohmsville.com/bench#a=exp-12
- № 13 · Metronome — ohmsville.com/bench#a=exp-13
- № 14 · Two-tone — ohmsville.com/bench#a=exp-14
- № 15 · Light theremin — ohmsville.com/bench#a=exp-15

Sound & Sense

Stack batteries, store charge, and turn light and knobs into sound.

The kit can feel the room now. A cell that reads sunlight, plates that read a finger, a bead that reads heat, and a lamp with a filament that gets hot enough to glow and hot enough to give up. These builds are the sensors used as sensors, rather than demonstrated one at a time on the graded page.

Burn out a lamp

WHAT YOU SHOULD SEE

Eighteen volts on a nine-volt lamp. It is beautiful for four milliseconds.

PARTS

two 9 V batteries, lamp from the drawer

THE SHOP TEACHER'S NOTE

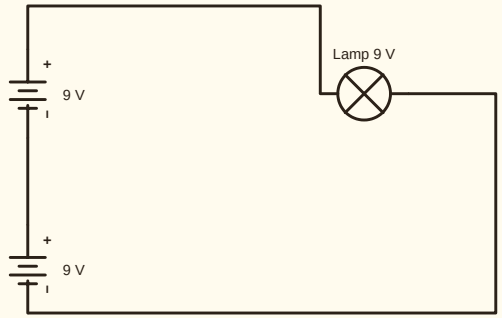
Two batteries in a row (Level 3) push twice the volts through a filament rated for half of them. It survives past 3 000 K before it gives up — the same stack that already teaches doubling voltage teaches what too much of it does.

WIRING

1. 1 → 49
2. 48 → 46
3. 47 → 2

Open it on the bench: ohmsville.com/bench#a=burn-out-a-lamp

SCHEMATIC



Sun to light

WHAT YOU SHOULD SEE

Slide the light to sun and the LED lights. Slide back to a room and it dies — and it is not the LED's fault.

PARTS

solar cell from the drawer, red LED

THE SHOP TEACHER'S NOTE

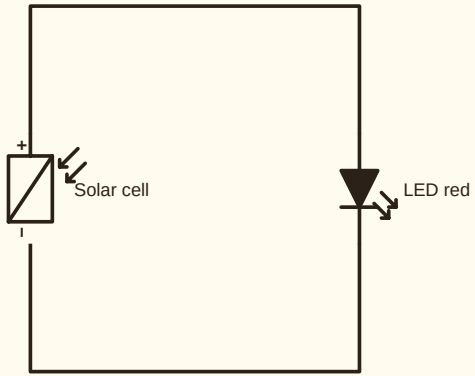
A four-cell panel makes about 2 V and tens of milliamps in full sun, and about a tenth of a milliamp in an ordinary room. Straight onto the red LED, no resistor needed: the panel is its own current limit.

WIRING

1. 46 → 28
2. 29 → 47

Open it on the bench: ohmsville.com/bench#a=sun-to-light

SCHEMATIC



Solar night-light

WHAT YOU SHOULD SEE

While there is light the panel holds Q1 on and the LED stays dark. Let the room go dim — past dusk, about 60 lux — and the LED comes on.

PARTS

solar cell from the drawer, 10 kΩ, 100 kΩ, 330 Ω, Q1, Q2, red LED

THE SHOP TEACHER'S NOTE

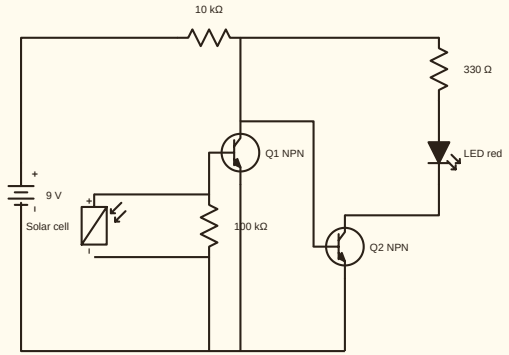
The panel is a sensor here, not a source: its few tenths of a volt across the 100 kΩ bleed hold Q1's base up in any ordinary room, Q1 holds Q2 off, and the LED is dark. Let the panel's output fall toward zero and Q1 lets go, Q2 takes over, and the LED lights — the same divider-plus-transistor idea as the CdS night light (experiment 5), with a source instead of a resistor doing the sensing.

WIRING

1. 46 → 33
2. 47 → 2
3. 33 → 15
4. 16 → 2
5. 1 → 11
6. 12 → 32
7. 34 → 2
8. 32 → 36
9. 37 → 2
10. 1 → 5
11. 6 → 28
12. 29 → 35

Open it on the bench: ohmsville.com/bench#a=solar-night-light

SCHEMATIC



A thermometer with no numbers on it

WHAT YOU SHOULD SEE

Hover spring 11 and drag the heat slider: 2.06 V at freezing, exactly half the battery at 25 °C, 6.62 V on a hot day.

PARTS

thermistor from the drawer, 10 kΩ resistor

THE SHOP TEACHER'S NOTE

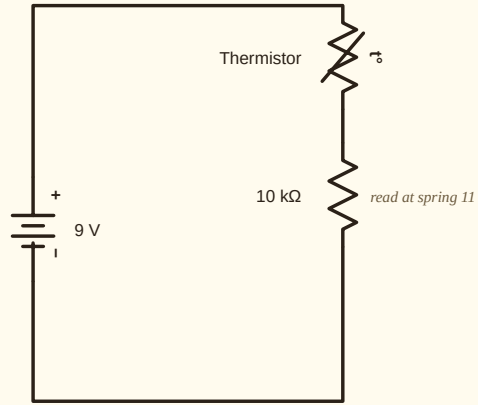
A 10 kΩ NTC bead paired with an ordinary 10 kΩ resistor: at exactly 25 °C the bead is also 10 kΩ, so the divider splits the battery in half. Colder, the bead's resistance climbs and the junction reads lower; hotter, it falls and the junction reads higher. A sensor turns a physical quantity into ohms, and a divider turns ohms into volts.

WIRING

1. 1 → 46
2. 47 → 11
3. 12 → 2

Open it on the bench: ohmsville.com/bench#a=thermometer

SCHEMATIC



Colophon

Generated from the modules the bench runs on: every circuit in this booklet is the circuit the simulator solves, and every word beside it is the word the manual panel prints.

Built 2026-09-15 from commit 953a47e.