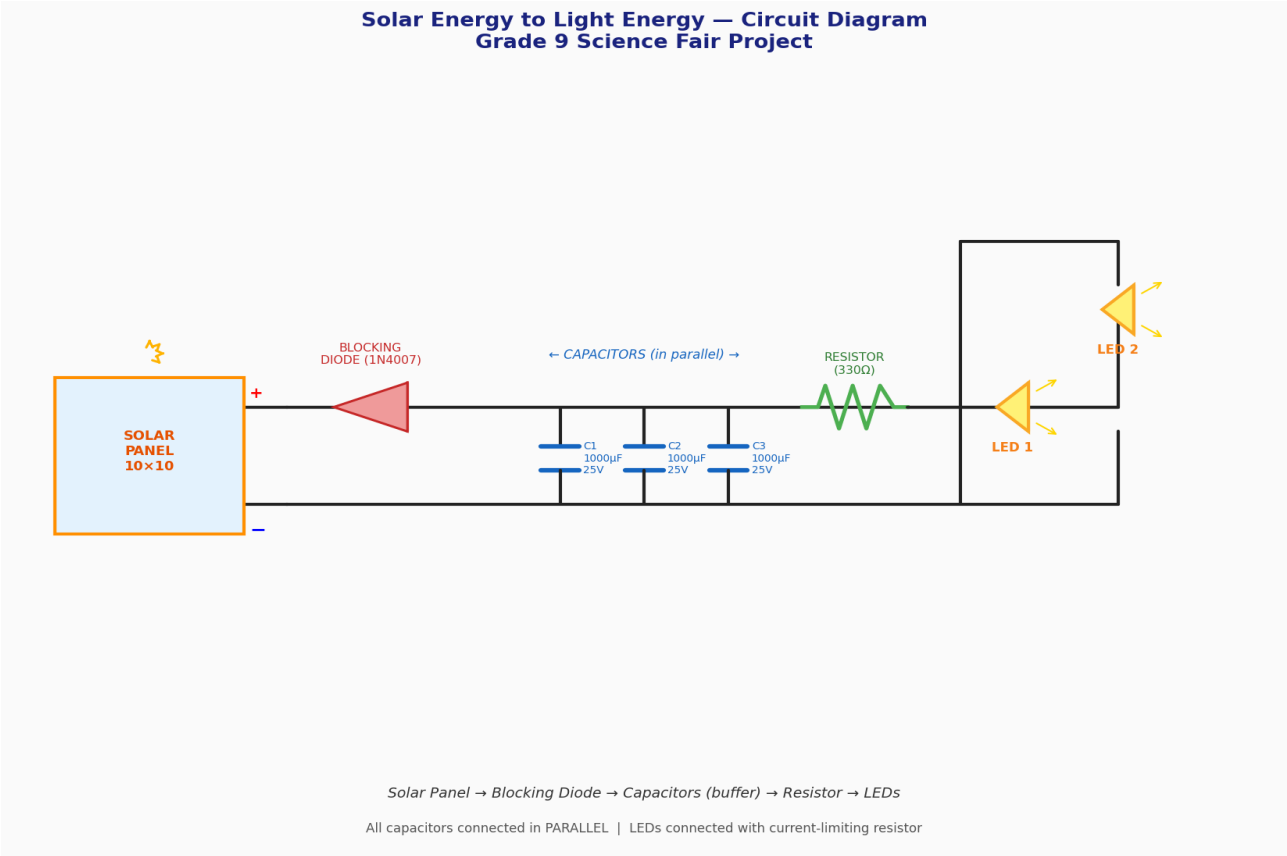
Solar Energy to Light Energy

Grade 9 Science Fair — Circuit Guide



Components List

Qty	Component	Spec	Purpose
1	Solar Panel	10×10 cm	Main power source
1	Blocking Diode	1N4007	Prevents reverse current from capacitors back to panel
3–10	Capacitors	1000 µF, 25V electrolytic	Connected in PARALLEL to store and smooth energy
1–2	Resistor	330 Ω (or 470 Ω)	Limits current to protect the LEDs
2–4	LED Bulbs	Standard 5mm LEDs	Output light when current flows
—	Connecting Wires	Jumper wires / copper wire	To connect all components
1	Breadboard	Optional	Makes wiring easier without soldering

Step-by-Step Connection Instructions

Step 1 – Capacitors (Parallel): Connect all capacitors in parallel. Join all (+) positive legs together on one wire/rail and all (–) negative legs together on another rail. This increases total storage capacity.

Step 2 – Blocking Diode: Connect the ANODE (A) of the 1N4007 diode to the positive (+) output wire of the solar panel. The CATHODE (K) — the side with the silver/white band — connects to the positive rail of the capacitors.

Step 3 – Solar Panel Negative: Connect the (–) terminal of the solar panel directly to the negative (–) rail of the capacitors.

Step 4 – Resistor: Connect one leg of the 330Ω resistor to the positive (+) rail (after the diode/capacitors). Connect the other leg to the (+) anode of the first LED.

Step 5 – LEDs: Connect the LED anode (+, longer leg) to the resistor. Connect the LED cathode (–, shorter leg) to the negative (–) rail. For multiple LEDs, connect them in parallel (all + together, all – together).

Step 6 – Test: Take the circuit into sunlight. The solar panel generates voltage → capacitors get charged → current flows through resistor → LEDs glow!

Important Safety Notes

■ Always observe capacitor POLARITY — the negative leg is the shorter one and usually marked with a stripe.
■ Make sure the diode is connected in the correct direction (band/stripe faces the capacitor side).
■ Do not exceed the 25V rating of the capacitors — a small 10×10 solar panel is well within this limit.
■ Use a multimeter to check panel output voltage before connecting (usually 3–6V for a 10×10 panel).