Stage 1: LED, Resistor, and Pushbutton

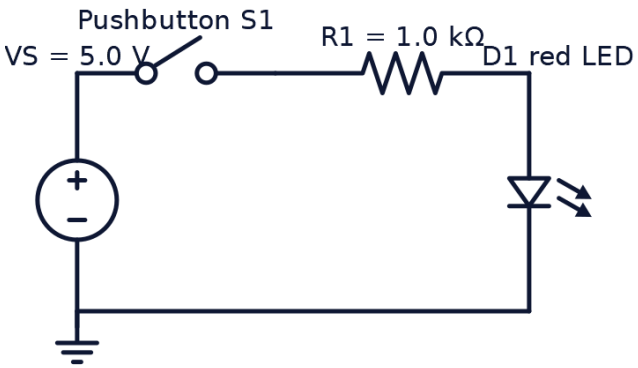
Plan on paper, verify in Tinkercad, then earn READY TO BUILD.

Name: _____ **Student number:** _____

Thursday: plan **Friday: Tinkercad** **Sunday 7 PM: due** **Monday: correct** **Then: hardware**

Physical components are issued only after the matching simulation earns 100%.

1. Read the circuit



Required values

Source: 5.0 V DC

Switch: Normally open pushbutton

Resistor: 1.0 kOhm, 1/4 W

LED: Red; anode toward the resistor

2. Calculate before simulating

1. A red LED is modelled as 2.0 V. Calculate the resistor voltage: VR = VS - VLED

   _____

2. Calculate current: I = VR / R

   _____

3. Calculate resistor power: PR = I^2 R

   _____

4. Write the KVL check using your answers: VS = VR + VLED

   _____

3. Draw your Tinkercad wiring plan

Use red for +5 V, black for ground, and another colour after the pushbutton.

Grob support: Chapter 9 for KVL and Chapter 27 for LED direction, forward voltage, and current limiting.

Tinkercad Readiness Gate

A score of 100% unlocks the matching physical circuit.

Circuit name: _____ **Teacher check date:** _____

Submit

1. Direct Tinkercad share URL
2. One readable screenshot with the simulation running and the button pressed
3. This completed calculation and readiness sheet

100% readiness checklist

Check	Evidence	Marks
☐	Correct filename and working share URL	**5**
☐	One complete series path with a normally open pushbutton	**20**
☐	5.0 V source, 1.0 kOhm resistor, and red LED	**15**
☐	Correct LED polarity	**10**
☐	Clear red, black, and switched-wire convention	**10**
☐	LED off when released and on when pressed	**10**
☐	KVL calculation with units	**10**
☐	Current and resistor-power calculations with units	**10**
☐	Simulated voltage and current evidence	**10**
	TOTAL - must equal 100 before hardware	**/100**

Simulation evidence

Tinkercad URL: _____

VR = _____ V VLED = _____ V

I = _____ **mA** **Screenshot filename:** _____

Correction day

If the score is below 100, stay in Tinkercad during the next lab class. Fix one checklist item at a time, retest, and request another check.

☐ **READY TO BUILD** **Teacher initials:** _____ **Date:** _____

Physical build: teacher-set 5.0 V supply, current limit 20 mA or less, power-off wiring check required.