

CIRCUITS DAY 6: LAB: SERIES/PARALLEL BRIGHTNESS

CED 11.4/11.5 · Skills 3.A/2.C · FRQ: ED · bounded investigation

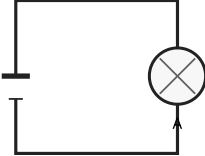
RETRIEVAL — NO DEMO

Brightness is evidence about electrical power. For identical bulbs, predict the ranking before measuring: **single A / series B and C / parallel D and E**.

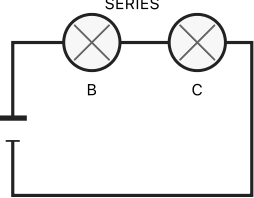
QUESTION AND PREDICTION LEDGER

THREE ARRANGEMENTS ON THE SAME SOURCE

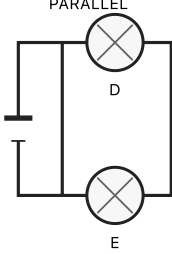
SINGLE



SERIES



PARALLEL



predict, then measure I and V at each bulb

Configuration	Predicted brightness	Reason before measuring
single A		
series B,C		
parallel D,E		

Do not power a circuit until the teacher checks its connections.

NOTES / REASONING

DESIGN AND SAFETY

Supplies: three matching low-voltage bulbs and holders, battery pack or current-limited supply, switch, leads, and two DMMs. Sim fallback: PhET *Circuit Construction Kit: DC*.

- Use the same source setting for all arrangements.
- Measure current through a bulb with the ammeter in series.
- Measure potential difference with the voltmeter across that bulb.
- Switch power off before changing connections; bulbs may become hot.

Procedure: choose the order of configurations, a consistent observation rule, and any repeated measurements. Explain how the comparison remains fair.

MEASUREMENTS AND RECONCILIATION

Configuration/bulb	Observed brightness	I (A)	V (V)	P=IV (W)
single A				
series B				
series C				
parallel D				
parallel E				

Evidence check: compare the two series currents and the two parallel voltages. Are they consistent with the circuit connections?

Power ranking: rank the five bulbs by calculated power, including approximate ties.

ANALYSIS AND CLAIM

1. Compare predicted and observed brightness. Identify one agreement or revision.

2. Explain the series result using measured I , V , and P without saying current is consumed.

3. Explain why each parallel bulb is approximately as bright as the single bulb.

4. State one limitation affecting a brightness or meter comparison.

Required record: prediction ledger, checked circuits, $I/V/P$ table, ranking, and evidence-based claim.