



ELECTRIC AFRICA OFFLINE INVESTIGATION

Series and Parallel Circuits

S1-S4 | Physics | 60-75 minutes

Compare current paths, equivalent resistance, lamp brightness and reliability in series and parallel arrangements.

BEFORE YOU TEST

Predict

Which arrangement keeps one lamp on when the other lamp is removed? Explain before testing.

SAFETY RULE

Use only 1.5-3 V battery holders. Never use a wall socket.



SIMULATION RECORD

Change one variable

Keep all other settings constant. Record a prediction, measurement and observation for each trial.

- 1 Arrangement: series or parallel
- 2 Number of lamps: one or two
- 3 Supply voltage: keep constant
- 4 Measure: branch current and brightness

INVESTIGATION TABLE

Trial	Variable value	Prediction	Measurement	Observation
1				
2				
3				
4				

HANDS-ON EXTENSION

Build safely

Use only 1.5-3 V battery holders. Never use a wall socket.

Materials

- 1 Two low-voltage bulbs
- 2 Two 1.5 V cells in a holder
- 3 Insulated leads
- 4 Switch
- 5 Results sheet

Method

- 1 Build the series circuit with power disconnected.
- 2 Connect power for five seconds and record brightness.
- 3 Disconnect, rebuild in parallel and repeat.
- 4 Remove one lamp from each arrangement and compare.



EXPLAIN AND ASSESS

Turn results into evidence

Use equivalent resistance and branch voltage to explain the measured differences.

Learner explanation

Teacher rubric - score each criterion 0-4

Observation	Accurate, relevant observations	Score: ____ / 4
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Variable control	One variable changed fairly	Score: ____ / 4
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Evidence	Measurements support the claim	Score: ____ / 4
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Explanation	Scientific reasoning links cause and result	Score: ____ / 4
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Certificate threshold: 12/16 plus independent moderation in the school pilot.