



ELECTRIC AFRICA OFFLINE INVESTIGATION

Transformer Lab

S5-S6 | Physics | 60-80 minutes

Use turns ratio to model step-up, step-down and transmission decisions.

BEFORE YOU TEST

Predict

What happens to secondary voltage when the number of secondary turns doubles?

SAFETY RULE

Teacher demonstration only. Never open transformers or use wall-socket electricity.



SIMULATION RECORD

Change one variable

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

- 1 Primary turns
- 2 Secondary turns
- 3 Low-voltage AC input
- 4 Measure: output voltage and ratio

INVESTIGATION TABLE

Trial	Variable value	Prediction	Measurement	Observation
1				
2				
3				
4				



HANDS-ON EXTENSION

Build safely

Teacher demonstration only. Never open transformers or use wall-socket electricity.

Materials

- 1 Certified sealed education transformer
- 2 Low-voltage AC source
- 3 Protected meters
- 4 Teacher supervision

Method

- 1 Teacher confirms the kit is sealed and low voltage.
- 2 Record primary and secondary turns.
- 3 Measure input and output voltage.
- 4 Compare measurements with the turns ratio.



EXPLAIN AND ASSESS

Turn results into evidence

Use the turns ratio to justify a safe power-transmission choice.

Learner explanation

Teacher rubric - score each criterion 0-4

Observation	Accurate, relevant observations	Score: ____ / 4
--------------------	---------------------------------	-----------------

Variable control	One variable changed fairly	Score: ____ / 4
-------------------------	-----------------------------	-----------------

Evidence	Measurements support the claim	Score: ____ / 4
-----------------	--------------------------------	-----------------

Explanation	Scientific reasoning links cause and result	Score: ____ / 4
--------------------	---	-----------------

Certificate threshold: 12/16 plus independent moderation in the school pilot.