Subject: Physics

Form/Grade: Form 3

Official Syllabus Topic: Current Electricity

Curriculum: Zambia Competency-Based Curriculum (CBC)

SECTION 1: Topic Overview

The purpose of Current Electricity is to enable learners to understand electric current, potential difference, resistance, series and parallel circuits, Ohm's law, electrical energy, power, domestic wiring, and safety measures, building skills in analyzing and applying circuit principles to practical electrical systems.

SECTION 2: Scenario-Based Learning Examples (EXACTLY FIVE)

Scenario 1:

Context: In Lusaka's high-density compounds like Kanyama, learners observe frequent power surges affecting household appliances during peak evening hours when ZESCO load shedding occurs, noting bulb brightness changes in Zambian urban homes.

Learner Engagement: Groups measure voltages and currents in simple battery-bulb setups using multimeters, compile data from variations, create mental images of resistance effects, evaluate overload risks, and address fuse solutions for safe home wiring.

Competency Developed (Analytical Thinking - Compile data, create mental images and address issues): Learners compile data, create mental images and address issues.

Scenario 2:

Context: During school fundraising events in Kitwe, Copperbelt Province, learners help connect sound systems and lights in parallel for reliable operation, collaborating in teams as in community gatherings common in Zambia's mining towns.

Learner Engagement: Pairs assemble series and parallel bulb circuits with batteries, play with adding/removing components, solve group puzzles on current division while building relationships through shared troubleshooting and successes.

Competency Developed (Collaboration - Play with peers to build relationships): Learners play with peers to build relationships.

Scenario 3:

Context: In rural electrification projects in Eastern Province near Chipata, learners see solar panels charging batteries for village lights, explaining energy calculations for off-grid power common in Zambia's remote farming areas.

Learner Engagement: Use Ohm's law equations and power formulae scientifically to communicate costs of running appliances, draw circuit symbols on charts, present household bill estimates, and seek peer feedback on efficiency improvements.

Competency Developed (Communication - Use mathematical/scientific language in different situations): Learners use mathematical/scientific language in different situations.

Scenario 4:

Context: Learners in Mongu observe fishermen using torch batteries in series for brighter headlamps during night fishing on the Zambezi floodplains, comparing brightness and duration in practical Barotse livelihood activities.

Learner Engagement: Manipulate resistors in circuits to vary totals, arrange components by connection attributes, compare current flows to differentiate series from parallel advantages in battery life.

Competency Developed (Critical Thinking - Compare similarities or differences between objects): Learners compare similarities or differences between objects.

Scenario 5:

Context: In community markets in Ndola, vendors experience shocks from faulty extensions during rainy seasons, identifying improper earthing and overloaded sockets contributing to hazards in Zambian trading environments.

Learner Engagement: After circuit safety demonstrations, identify damaged wire waste, dispose in designated school containers, adhering to practices that prevent electrical fires and maintain clean market surroundings.

Competency Developed (Environmental Sustainability - Adhere to best practices in environmental management): Learners adhere to best practices in environmental management.

SECTION 3: Effective Teaching Approach

Current Electricity should be taught in Form 3 through hands-on circuit building and inquiry-based experiments in Zambian classrooms with limited ICT resources, using batteries, bulbs, wires, switches, and multimeters for series/parallel setups and measurements. Start with learner-

centered discussions on local experiences like load shedding or solar use, encourage collaborative group wiring with differentiated tasks, peer feedback, and reflections linking to Zambian household safety to promote CBC problem-solving and analytical competencies.

SECTION 4: Competency-Based Assessment Ideas

1. Data compilation from resistance variation experiments, evaluating Ohm's law verification (Analytical Thinking - Evaluate solutions).

2. Group assembly of domestic circuits, fostering safe teamwork (Collaboration - Solving puzzle in groups).

3. Presentation calculating power consumption for common Zambian appliances (Communication - Express oneself using different media and symbols).

4. Comparison of circuit types by current and voltage distribution (Critical Thinking - Arrange objects according to attributes).

5. Reflection on earthing practices post-safety demos (Environmental Sustainability - Identify types of waste in local environment).

SECTION 5: Extension and Real-Life Application (Zambia-Focused)

Learners can safely inspect home wiring for overloads, applying series/parallel knowledge to suggest improvements in Zambian households during load shedding. In community projects,

assist in basic solar connections for lighting in rural areas. Participate in school campaigns promoting fuse use and earthing, reducing shock risks in markets. Join clean-ups of discarded electrical waste, preventing hazards in villages. Build simple alarm circuits from local materials, enhancing security in provincial communities.