Subject: Physics

Form/Grade: Form 1

Official Syllabus Topic: Mechanics I

Curriculum: Zambia Competency-Based Curriculum (CBC)

SECTION 1: Topic Overview

The purpose of Mechanics I is to enable learners to apply principles of forces, motion, and energy in describing physical phenomena, developing foundational skills in analyzing everyday mechanical processes through observation, measurement, and simple calculations.

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

Scenario 1:

Context: In the bustling markets of Lusaka like Soweto Market, learners observe vendors pushing heavily loaded carts over uneven ground, noting how extra effort is needed on slopes compared to flat areas, relating to forces in Zambia's urban trade environments.

Learner Engagement: Groups measure distances and time cart movements using tapes and stopwatches, compile data on speeds, create mental diagrams of force directions, and evaluate how reducing friction with wheels addresses pushing issues for efficient market operations.

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 traditional fishing in the Kafue River near Kafue Town, learners watch fishermen pulling nets against water currents, collaborating to haul catches while building teamwork akin to community fishing practices in Zambian rivers.

Learner Engagement: Pairs role-play net pulling with ropes, solving group puzzles on balanced forces by adjusting pull strengths, expressing relationships through play-acting scenarios that mimic real river resistance and successful hauls.

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

Scenario 3:

Context: In rural schools in Chipata, Eastern Province, learners examine bicycle mechanics used for transporting maize from fields, focusing on how gears and chains transmit motion in daily Zambian farming transport.

Learner Engagement: Use diagrams and symbols to communicate energy transfers from pedaling to wheel rotation, expressing scientific explanations in group discussions and asking peers for feedback on clarity of motion descriptions.

Competency Developed (Communication - Ask for feedback): Learners ask for feedback.

Scenario 4:

Context: Learners in Mongu during the Kuomboka ceremony preparation observe lozi craftsmen balancing canoes on the Zambezi floodplains, classifying stability factors in watercraft essential for ceremonial and daily navigation in Western Zambia.

Learner Engagement: Manipulate model canoes in water basins to test balance, arranging weights by attributes like position and mass, comparing stability differences to explore good versus unstable designs in floodplain conditions.

Competency Developed (Critical Thinking - Differentiate good from bad): Learners differentiate good from bad.

Scenario 5:

Context: In community gardens in Ndola, learners see farmers using levers like hoes to lift soil, identifying energy conservation in tools that make digging easier in Copperbelt's fertile but hard grounds.

Learner Engagement: After lever experiments, identify experiment waste like broken sticks, dispose in designated school pits, linking proper management to clean local environments for sustainable gardening.

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

SECTION 3: Effective Teaching Approach

Mechanics I should be taught in Form 1 through hands-on experiments and inquiry-based activities in Zambian classrooms with limited ICT resources, using local items like strings, stones, carts, and water for demonstrations of forces and motion. Initiate with learner-centered discussions on familiar scenarios such as pushing loads or riding bicycles, followed by collaborative group tasks with differentiated roles for varied abilities, peer teaching, and reflective feedback on real-life applications to foster CBC competencies in problem-solving and curiosity.

SECTION 4: Competency-Based Assessment Ideas

1. Data compilation from timing object rolls down school slopes, evaluating force effects (Analytical Thinking - Identify patterns).

2. Group puzzle-solving on balancing see-saws with unequal weights, promoting relationships (Collaboration - Solving puzzle in groups).

3. Symbolic presentation explaining energy in traditional pounding with mortars (Communication - Use mathematical/scientific language in different situations).

4. Object classification by motion attributes in playground games (Critical Thinking - Match different things according attributes).

5. Waste identification and disposal plan post-experiments (Environmental Sustainability - Identify types of waste in local environment).

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

Learners can safely measure speeds of bicycles on community paths, applying motion principles to suggest safer riding in villages. At home, use levers for gardening tools, conserving energy in family plots. Join school groups to build simple carts from recycled materials, testing loads for market transport efficiency. Participate in clean-ups after mechanics activities, maintaining

school grounds. Observe and discuss forces in traditional dances or games, linking to balanced movements in cultural events across Zambian provinces.