**Impulse and Momentum**

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**Subject:** Physics **Week**: Jan 06th – Jan 10th 2025

**Grade:** Lower six (Grade12) **Time:** 4 hours 40 minutes

**Number of sessions**:

1. 40 minutes

3- 80 minutes

**Link to Vision 2030**

**Goal 1:** Jamaicans are empowered to achieve their fullest potential (Vision 2030). This lesson seeks to achieve this goal by enhancing third-form students' problem-solving and critical-thinking skills.

**Essential Benchmark (General Objectives):**

1. Understand the concept of impulse and momentum.
2. Apply the principles of impulse and momentum to solve real-world problems.

**Lesson Objective(s)**

*Students should be able to:*

1. Correctly explain the relationship between impulse and momentum.
2. Solve problems using the impulse and momentum equations.
3. Correctly design an experiment to determine the impulse and momentum of an object.

**Key Skills:**

Communication, collaboration, critical thinking, analytical reasoning, and problem-solving.

**Key Vocabulary:**

* Impulse
* Momentum
* Force
* Mass
* Velocity
* Collision
* Conservation of momentum

**Materials:**

* Sponge,
* Markers,
* Centimetre ruler,
* Graph paper,
* Calculator,
* Stopwatch,
* Textbook (Physics: For Cape Examination)
* Small ball

**Prior Learning:**

Students should be able to identify the different types of momentum.

**Procedure**

**Engage**

Students will participate in two class activities. The first is a class demonstration that simulates the motion of a skydiver, during which the students will describe their observations during the demonstration. Second, students will engage in a class discussion about what will happen to a car if it experiences balance forces (a force causing the car to move in one direction and a frictional force acting in the other direction).

Students will identify similarities between the two types of motion.

**Explore**

Students will participate in a brief experiment in which they drop small objects into three cylinders filled with different liquids (water, oil, and dishwashing liquid). They will then conduct a further experiment to calculate the terminal speed of an object falling into a liquid.

For Fast learners:

Students will be asked to predict the position at which terminal velocity will occur in the liquid and explain their decision.

**Explain**

The teacher will use a whiteboard to define terminal velocity and explain that it is the constant speed reached when the net force on the object is zero. The teacher will introduce Stokes' Law and how it calculates viscous drag.

The teacher will use Stoke’s mathematical model to solve problems.

**Elaborate**

Students will discuss how terminal velocity affects the falling speed of seeds as farms look to increase production.

**Evaluate**

Students answer quick-fire questions

Students will solve questions using Stoke’s mathematical model.

**Reflection:**

Students will write what they found challenging. What areas of the concepts are they confident about?

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**Link to CAPE Syllabus**

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