INVESTIGATING REFLEX ACTIONS

OBJECTIVE: TO EXPLORE HOW THE NERVOUS SYSTEM COORDINATES REFLEX ACTIONS AND UNDERSTAND THE ROLE OF DIFFERENT TYPES OF NEURONS.

Sub-topic(s): A.1.1.1—The nervous system senses both internal and external conditions to coordinate the responses of the body's physiological systems effectively.

Materials Needed:

- Rulers
- Stopwatches
- Reflex hammer

PROCEDURE:

1. **Introduction**: Learn about reflex actions and how sensory neurons, interneurons, and motor neurons work together.
2. **Experiment**:
   - Perform the ruler drop test to measure reaction time. Partner A drops a ruler without warning, and Partner B catches it as quickly as possible.
   - Record the distance the ruler fell before being caught.
   - Calculate the reaction time using the formula: Reaction Time (s) = $\sqrt{(2 \times \text{Distance (cm)} / 980)}$.
   - Repeat the experiment three times and calculate the average reaction time.
   - Use a reflex hammer to test knee-jerk reflex and observe the response.
3. **Analysis**: Discuss how the reflex actions involve the nervous system and compare the reaction times between different students.

GUIDING QUESTIONS:

- How do sensory neurons, interneurons, and motor neurons work together to produce a reflex action?
- What differences did you observe in reaction times between different individuals? What factors might contribute to these differences?
- How does the knee-jerk reflex help in maintaining posture and balance?

HL OPTION

Include an analysis of how different types of stimuli (visual vs. auditory) affect reaction time.