Blood Sugar Regulation Simulator Activity: Modeling Glucose Homeostasis

Middle School (NGSS Aligned) Teacher Guide

Overview

This guide supports implementation of the Blood Sugar Regulation Simulator Activity: Modeling Glucose Homeostasis using the 5E instructional model.

Learning Objectives

- Students will model how the body keeps blood sugar levels balanced
- Students will explain how organs work together to control glucose
- Students will predict what happens when the control system doesn't work properly

Standards Alignment

- **MS-LS1-3:** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells
- **MS-LS1-8:** Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories

Prerequisites

- Basic understanding that food provides energy
- Knowledge that organs work together
- Concept of balance

Time Estimate

45-50 minutes

Materials Needed

- Computer/tablet with internet access
- Student Activity Sheet (digital or printed)
- Colored pencils (optional for drawing)

Teaching Tips by Phase

Phase 1: ENGAGE (5-10 minutes)

- Start with the phenomenon or problem presented
- Elicit student predictions and prior knowledge
- Create cognitive dissonance if possible
- Build excitement for investigation

Phase 2: EXPLORE (15-20 minutes)

- Allow students to investigate with minimal guidance
- Circulate and ask probing questions
- Encourage systematic data collection
- Note common discoveries and difficulties

Phase 3: EXPLAIN (10-15 minutes)

- Have students share their findings first
- Build on their observations to introduce concepts
- Address misconceptions directly
- Connect to broader biological principles

Phase 4: ELABORATE (10 minutes)

- Apply knowledge to new scenarios
- Make real-world connections
- Encourage deeper investigation

- Support transfer of learning

Phase 5: EVALUATE (5-10 minutes)

- Use varied assessment strategies
- Focus on conceptual understanding
- Provide immediate feedback
- Plan follow-up based on results

> **Remember:**
>
> The goal is student discovery through guided inquiry. Resist the urge to explain concepts before students have explored them!
