Protein Modification Visualizer Activity

NGSS Middle School Teacher Guide (Grades 6-8)

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Interactive Biology Education

Teacher Guide

Learning Objectives: - Students will practice adding sugar groups to proteins (glycosylation) - Students will practice adding phosphate groups to proteins (phosphorylation) - Students will practice cutting proteins (cleavage) - Students will practice sending proteins to different cell parts

Standards Alignment: - **MS-LS1-2:** Develop and use a model to describe the function of a cell

Prerequisites: - Basic understanding that cells have parts - Basic understanding that proteins are important

Time Estimate: 30 minutes

Materials Needed: - Computer/tablet with internet access - Student Activity Sheet

Differentiation Tips: - Focus on the hands-on practice with the app - Use simple language for the five functions

Teaching Notes:

Phase 1: ENGAGE (5 minutes) - Keep introduction simple and fun - Focus on the hands-on nature of the app - Students should identify the five basic functions

Phase 2: EXPLORE (20 minutes) - Let students experiment with each function - Emphasize the fun, hands-on nature - Use simple language to describe what's happening

Phase 3: WRAP UP (5 minutes) - Simple vocabulary matching - Focus on basic understanding

Answer Key:

First Look: 1. Glycosylation (adding sugar groups) 2. Phosphorylation (adding phosphate groups) 3. Protein cleavage (cutting proteins) 4. Sending proteins to cell membrane 5. Sending proteins to lysosomes

Match the Words: - Glycosylation = Adding **sugar** groups - Phosphorylation = Adding **phosphate** groups
- Cleavage = **cutting** proteins - Cell membrane = **boundary** of the cell - Lysosome = Cell's **recycling** center

Simple Facts:

- Cells change proteins to make them work better
- Sugar groups help proteins stick to things
- Phosphate groups can turn proteins on and off
- Cutting proteins can make them active