Chi-Square Activity: Statistical Analysis in Biology

Middle School (NGSS Aligned) Teacher Guide

Overview

This guide supports implementation of the Chi-Square Activity: Statistical Analysis in Biology using the 5E instructional model.

Learning Objectives

- Students will recognize patterns in genetic data
- Students will understand how scientists test predictions
- Students will interpret whether data matches expectations

Standards Alignment

- **MS-LS3-2:** Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information
- **SEP:** Analyzing and Interpreting Data
- **DCI:** LS3.B: Variation of Traits
- **CCC:** Patterns

Prerequisites

- Basic genetics (dominant/recessive traits)
- Simple ratios
- Making predictions

Time Estimate

45 minutes

Materials Needed

- Computer with internet access
- Student Activity Sheet

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!

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