Name: _____ **Date:** _____

Section: _____

Plant Response Activity

Investigating Plant Light Responses: Survival Through Sensing

Background: _____

Plants cannot move to find optimal conditions, so they've evolved sophisticated mechanisms to sense and respond to light. These responses are critical for photosynthesis optimization and reproductive timing.

Phase 1: ENGAGE (10 minutes)

Getting Started: Open peebedu.com and navigate to Plant Response Simulator

Initial Exploration: Click the Phototropism tab and observe the plant setup Note the light source, plant stem, and auxin molecules Drag the light source to different positions

Pre-Assessment Questions: Define the fitness advantage of phototropism:

Predict: If light comes from the left, which side of the stem will have more auxin? _____

Hypothesis: How might day length affect flowering time in temperate plants? _____

Phase 2: EXPLORE (30 minutes)

Investigation 1: Phototropism Mechanics

Systematically test light positions and measure plant responses.

Data Collection Table 1: Light Position vs. Stem Bending Auxin Distribution ———————— 90 Lower right Night Length (h) ———————— 16 14 12 10 8 6 4 Plant Phototropism

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Application Question:

Space agriculture challenge:

- Design LED array for Mars greenhouse: _____

- Energy optimization: _____

Model Evaluation:

Simulation strengths:

- _____

Missing complexities:

- _____

- Darwin's phototropism experiments
- Garner and Allard photoperiodism discovery
- Current research on photoreceptors
- Agricultural light management guides