

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

Open **peebedu.com** and navigate to **Plant Response Simulator**. Click the **Start Exploring!** button to begin. Read the introduction popup, which describes two plant responses: Phototropism (growth toward light) and Photoperiodism (flowering based on day length).

## Free Response Questions

### Question 1 — Conceptual Analysis

**Simulation Task:** *Simulation Task: In the Phototropism tab, drag the sun to the far left of the screen and observe the plant's response. Then drag the sun to the far right and watch how the plant changes direction. Pay attention to where the auxin dots accumulate and which side of the stem grows faster.*

**(A)** (1 pt) **Describe** the change in the direction of stem growth that you observed when the sun was dragged from the far left of the screen to the far right.

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**(B)** (1 pt) **Explain** how the unequal distribution of auxin observed in the simulation leads to differential growth that causes the plant stem to bend toward the light source.

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**(C)** (1 pt) **Predict** the direction in which a plant growing in a dense forest would grow if its only light reached it from directly above through a small canopy gap.

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**(D)** (1 pt) **Justify** your prediction.

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## Question 2 — Analyze Model / Visual Representation

**Simulation Task:** *Simulation Task: Switch to the Photoperiodism tab. Set the day length slider to 8 hours and observe which plants flower. Then slowly increase the day length to 16 hours, noting at what point each plant type begins or stops flowering. Record which plants are flowering at 8 hours, 12 hours, and 16 hours.*

**(A)** (1 pt) **Describe** the relationship between day length and flowering across the three plant types.

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**(B)** (1 pt) **Explain** how the ability to detect and respond to changes in day length enables plants to coordinate their flowering with environmental conditions that maximize reproductive success.

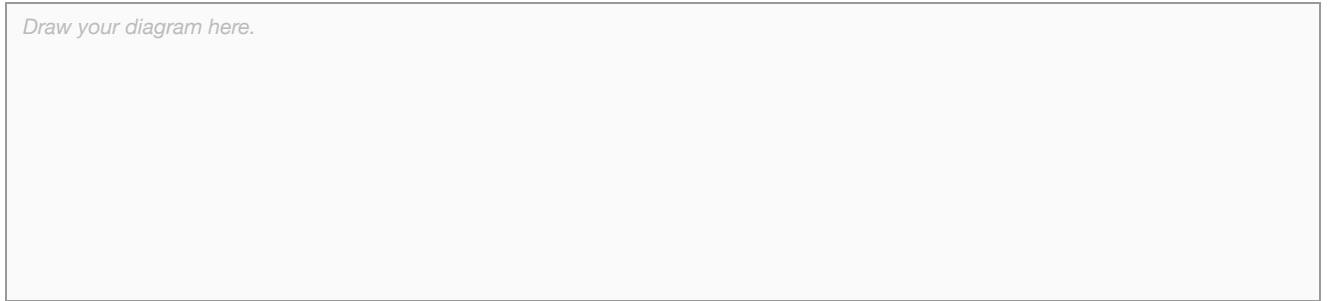
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**(C)** (1 pt) **Represent** the flowering status of all three plant types at two different day lengths. In the box below, draw the short-day plant, the long-day plant, and the day-neutral plant at a day length of 8 hours and again at a day length of 16 hours, labeling each plant as flowering or vegetative. Do NOT draw a concept map.

*Draw your diagram here.*



**(D)** (1 pt) **Explain** why a single short-day plant genotype can produce a flowering phenotype at one time of year and a vegetative phenotype at another.

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8.2.A.2