

PEEBEDU Environmental Effects on Phenotype Lab

Unit 5: Heredity

Name: _____ Period: _____ Date: _____

Open **peebedu.com** and navigate to **Environmental Effects on Phenotype Lab**. Read the introduction popup, which explains how environmental conditions influence gene expression and can lead to **phenotypic plasticity**. Then click **Begin Experiments** to enter the lab.

Free Response Questions

Question 1 — Conceptual Analysis

Simulation Task: *In Experiment 1, tap each planter to plant a genetically identical hydrangea seed, then click **Grow All Plants**. Observe how flower color changes across the pH gradient from 4.0 (Very Acidic) to 8.5 (Very Alkaline). Record the flower colors at pH 4.0, pH 6.5, and pH 8.5.*

(A) (1 pt) **Describe** the relationship between soil pH and flower color observed across the genetically identical hydrangea plants grown in the pH gradient.

(B) (1 pt) **Explain** why genetically identical hydrangea plants produce blue flowers at pH 4.0 and pink flowers at pH 8.5.

(C) (1 pt) **Predict** the flower color of a genetically identical hydrangea seed grown in soil with a pH of 9.5.

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

Question 2 — Analyze Model / Visual Representation

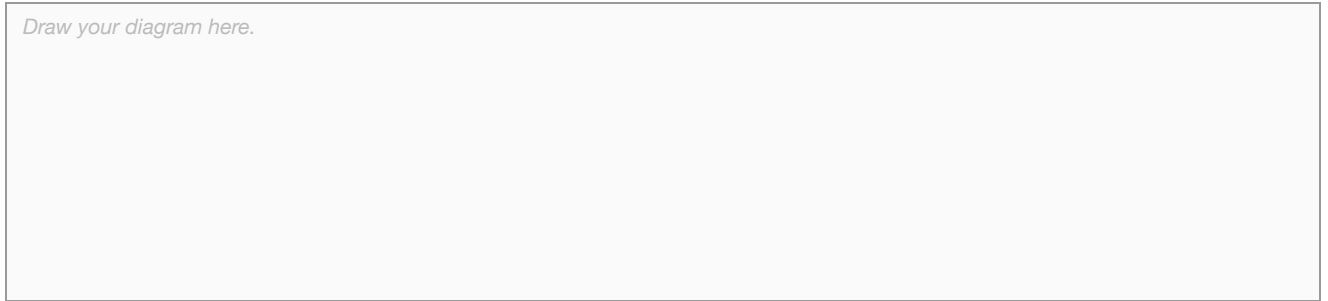
Simulation Task: *In Experiment 2, set the genotype to ZZ and run trials at three different incubation temperatures: 26°C, 30°C, and 34°C. Record the sex ratio of offspring at each temperature.*

(A) (1 pt) **Describe** the relationship between incubation temperature and the sex ratio of offspring produced from eggs with the same ZZ genotype.

(B) (1 pt) **Explain** why eggs with identical ZZ genotypes develop into males at one incubation temperature but into females at a different incubation temperature.

(C) (1 pt) **Represent** how eggs with a ZZ sex-chromosome genotype produce different sex phenotypes at 26°C and at 34°C by drawing a labeled diagram.

Draw your diagram here.



(D) (1 pt) **Explain** how an increase in incubation temperature could alter the activity of an enzyme in a developing lizard egg.

5.5.A.1, 5.4.A.2, 3.2.A.1