Artificial Selection

Can extreme selection change expression of a quantitative trait in a population in one generation?

Name: _____ Date: _____ Class/period: _____

Dataset ID: _____

https://biologylabbench.com/lab01

How to use this guide

Check off each numbered step as you work in the online simulation. Follow your teacher's assigned sections and repeat counts. This guide explains the workflow; enter your measurements and responses in the lab or your assigned worksheet.

Use Data for tables and editable calculations, Graph for plots, and Scene for the simulation. Some controls are under More options. Write predictions before running an experiment and scroll below the simulation for response boxes.

Overview

- ☐ 1. Read the driving question and your teacher's assignment. Note which sections, optional extensions, and number of trials your teacher wants you to complete.
- ☐ 2. Sign in with your name and class period. Copy your Dataset ID onto this guide. Keep using the same dataset for the investigation; classmates may have different numbers.

Background

- ☐ 1. Read the background explanations, diagrams, and vocabulary. Review the reference formulas you will need and identify the variables you will measure.

Pre-lab

- ☐ 1. Complete the pre-lab questions and any practice activities. Use Check answer, read the feedback, and revise your reasoning before starting the investigation.

Grow & score

- ☐ 1. Select a seedling. Count the trichomes on the right margin and use Record my count. Hand-count at least five plants before using Auto-count the rest, unless your teacher gives other instructions.
- ☐ 2. Open Data to review the scores and Graph to inspect the histogram. Record the generation 1 mean, spread, and distribution shape; answer the questions below the simulation.

Select & pollinate

- ☐ 1. Write your prediction before selecting parents. Choose the selection direction and fraction, then use Mark selected plants. Generation 1 must be scored first.
- ☐ 2. Compare the selected-parent mean with the generation 1 mean. Press Pollinate and wait for completion, then Harvest seed and plant generation 2. Explain your selection in the response box.

Generation 2

- ☐ 1. Press Score generation 2. Compare the generations using Graph and Data; record the means and spread.
- ☐ 2. Calculate the selection differential S, response R, and heritability estimate h^2 using the formulas on the page. Enter your calculations and use Check my numbers. If assigned, use Select again to investigate additional generations.

Design

- ☐ 1. Write a testable question, hypothesis, variables, and controls before running the experiment. Choose the trait, selection direction, and number of generations.
- ☐ 2. Run experiment and compare the resulting generations in Graph and Data. Record the settings and results; explain the pattern and use the available statistics to support your conclusion.

Analyze

- [ ] 1. Answer every assigned analysis question using your own recorded data. Include numbers, units, and comparisons from the appropriate Data and Graph panels.
- [ ] 2. Complete the requested calculations or statistical comparisons. Show your method and explain what the result means biologically. Write the claim, evidence, and reasoning response if shown.

Reflect

- [ ] 1. Compare your original predictions with your results. Explain any disagreement, limitations of the simulation, and one way to improve the investigation.
- [ ] 2. Complete the assigned reflection/evaluation questions and AP-style response if shown. Use your own data where requested. Rate your confidence if you wish; ask your teacher about any unfinished or unclear work.

Submit

- [ ] 1. Review the completion checklist and Preview my report. Check your name, period, Dataset ID, calculations, units, graphs, and written responses.
- [ ] 2. Download .docx or use Save as PDF as directed by your teacher. Open the downloaded file and check that it contains your work, then upload or hand it in where your teacher specifies. Downloading alone does not submit it.
- [ ] 3. Save a progress file using Move your work to another computer if you need a backup or will change devices. Keep recordings separately if assigned; a report cannot restore editable progress.

Teacher instructions / notes