

Name: _____ () Class: _____ Date: _____

Topic: Natural Selection & the Peppered Moth

Pre-Activity (15 minutes)

1) Natural Selection — Core Concepts

i) What is natural selection?

ii) What are five conditions necessary for natural selection?

2) Human Activity & Industrial Melanism

During the Industrial Revolution, coal soot blackened tree bark across England, effectively flipping the selection pressure overnight on an evolutionary timescale.

If you were a bird hunting moths, which would you eat more of — and why?"

Video: Peppered Moths, BBC News

<https://www.youtube.com/watch?v=ndD7XtLraFw>

Activity Section (30 minutes)

In pairs, work through the six guided activities in the simulation

(<https://edtechsims.com/natural-selection-of-peppered-moths/>)

Spend roughly 5 minutes on each question:

1. **Baseline Hunt** — Run 3 manual generations in the light birch environment and record your observations. Which moth type was harder to spot?

2. **Industrial Revolution Shift** — Switch to the industrial (dark bark) environment. Compare auto-simulated outcomes across both environments. Which is the dominant form for each environment?

3. **You vs. Natural Selection** — For one environment, run the ten generations manually by hunting the moths through clicking. Then, run the auto-simulation. Is there any hunting bias against the computer's probability-driven selection? What does this mean about consistent vs. inconsistent predator behaviour?

4. **Reading the Graph** — Analyse the population frequency graphs for both environments. Identifying start/end percentages and the steepness of the selection curves.

5. **Mutation and Variation** — At the end of a light birch forest environment activity, does the less-favoured form disappear completely? Why or why not?

Close this activity section by completing the **Check Your Understanding** quiz in the simulation.

Post-Activity (15 minutes)

Learn more than just industrial melanism! In pairs, research on other well-documented examples of natural selection in action:

- **Antibiotic resistance in bacteria** — rapid selection under extreme pressure, directly parallel to the moth simulation
- **Beak variation in Darwin's finches** — directional selection driven by food availability
- **Sickle cell anaemia in malaria-endemic regions** — balancing selection where the heterozygote has a survival advantage
- **Guppy colouration in Trinidad** — predation pressure selecting for drab vs. bright colouration depending on predator presence

Identify the *selection pressure*, the *variation being selected*, and the *predicted outcome over generations* — mirroring the same analytical framework you applied to the simulation.

Wrap-Up & Exit Ticket (5 min)

"Using the peppered moth as a model, explain how a change in the environment can lead to a change in allele frequency in a population over multiple generations."