THE STANDARD

Natural Selection & Traits

Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.

ANCHORING PHENOMENON

Peppered Moths in Industrial England

Before 1850, almost every peppered moth in England was light-colored, dusted to blend with pale lichen on tree bark. By 1895, dark-colored moths made up 98% of the population in some industrial cities. Forty-five years. Same species. The trees had turned black with coal soot, and birds could now spot light moths easily. After clean-air laws in the 1950s, the proportions flipped back. Students will keep circling back to this all week.

> DRIVING QUESTION
>
> *"How does the color of trees in a forest change the color of moths over time?"*

INVESTIGATIVE 1

Bacteria Beating Antibiotics

When penicillin first came into wide use in the 1940s, it cured almost every staph infection. Resistance showed up almost immediately. By 1960, most hospital staph strains were already resistant to penicillin, which is why doctors switched to a new antibiotic called methicillin. Within a year, methicillin-resistant strains (MRSA) appeared. Over the next several decades MRSA spread widely in hospitals, peaking around 2005. Bacteria reproduce every 20 minutes, so the selection clock runs fast. Use this one to sharpen the math lens the anchor is pushing on. Students see the same proportion shift as the moths, just on a faster timeline.

> DRIVING QUESTION
>
> *"Why are antibiotics that worked in our grandparents' time barely working now?"*

INVESTIGATIVE 2

Galapagos Finches in a Drought

In 1977 a drought hit the Galapagos Islands. Small seeds disappeared. Only big, hard seeds were left. Finches with bigger, stronger beaks could crack them; finches with smaller beaks starved. Within one year, the average beak depth in the surviving population was measurably larger. The Grant lab measured this in real time across 30+ years. Use this one to sharpen the proportions-shift-fast lens the anchor exposes more slowly.

> DRIVING QUESTION
>
> *"How does a year of bad weather change the shape of a bird's beak across a whole population?"*