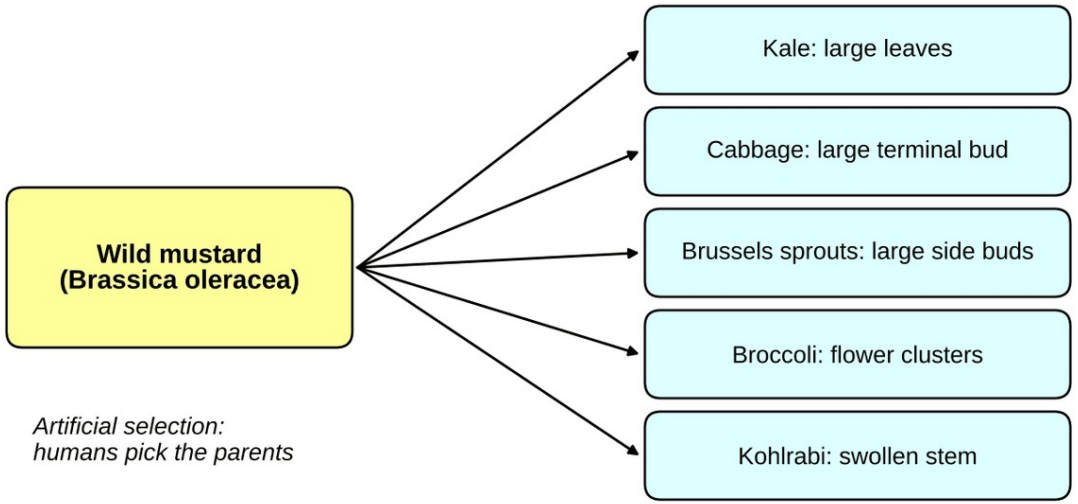
Essential Question

Besides survival, what else can drive selection?

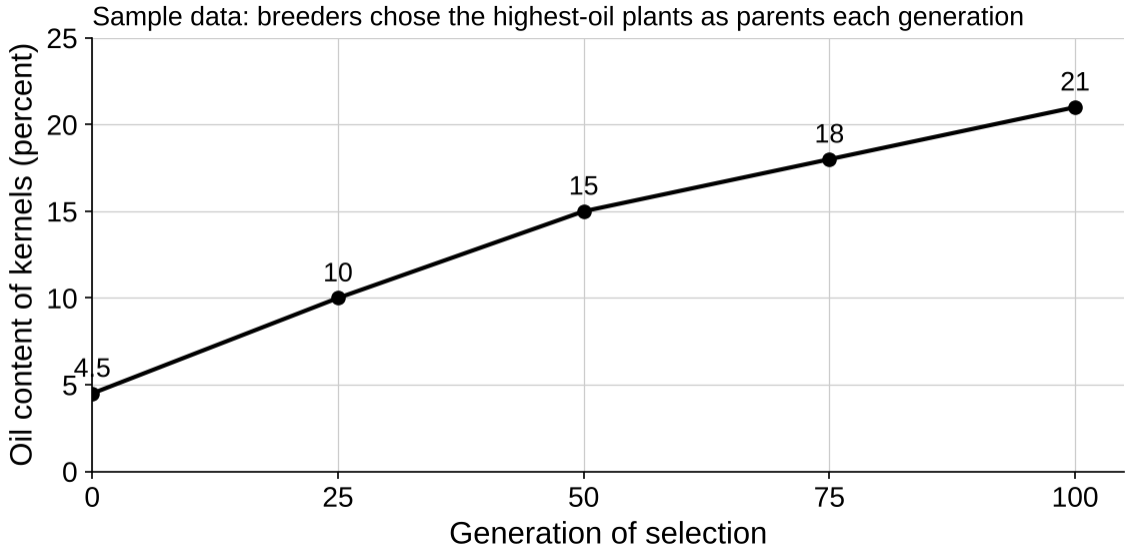
Artificial Selection

- Artificial selection: humans choose which organisms breed
- Used for crops, livestock, and pets
- Works only on inherited variation
- Many forms can come from one species



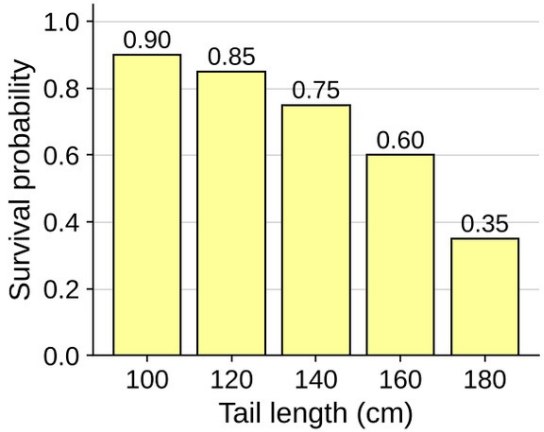
Artificial Selection Over Generations

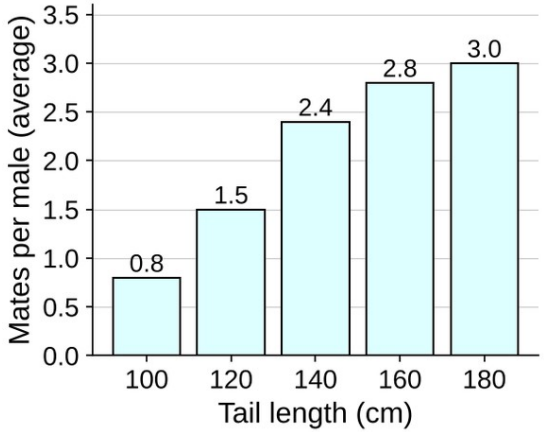
- Breeders choose the highest-oil plants each generation
- Oil content rose from 4.5% to 21%
- Selection works on existing variation
- The rate of change can slow down



Sexual Selection

- Sexual selection: traits that help get mates
- Males compete, or females choose
- Examples: peacock tails and deer antlers
- A trait may lower survival but raise mating





Sample data for a model species.

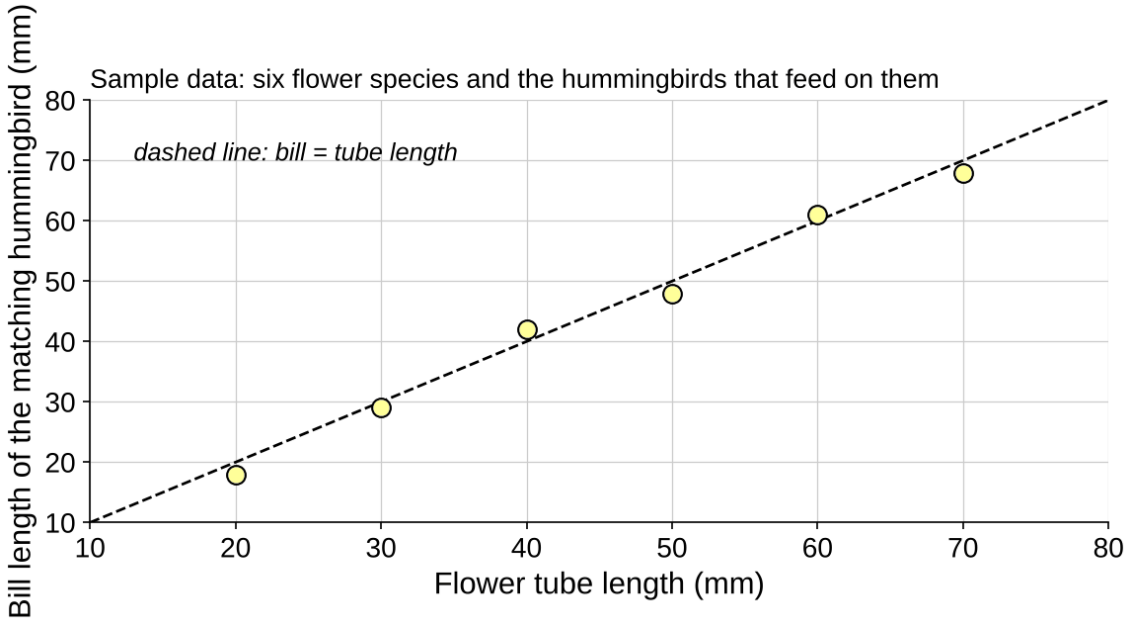
Natural, Artificial, and Sexual Selection

- All three change which traits become common
- They differ in what does the selecting
- All need inherited variation

Type	What selects?	Trait favored	Example
Natural	The environment	Traits that improve survival and reproduction	Camouflaged beetles survive predators
Artificial	Humans	Traits that humans want	Broccoli bred from wild mustard
Sexual	Mates or rivals	Traits that help get mates	Peacock tails, deer antlers

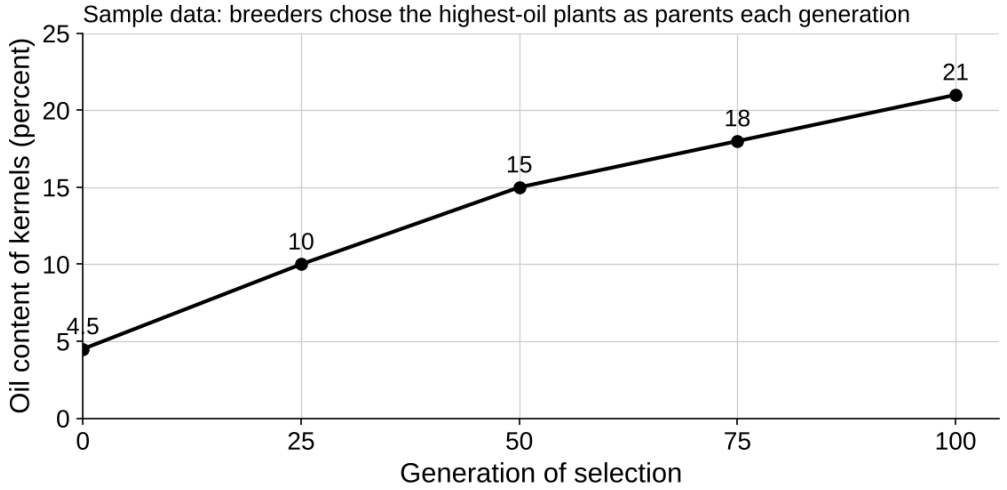
Coevolution

- Coevolution: two species change each other over time
- Flowers and their pollinators
- Predators and their prey
- Each species is a selective pressure on the other



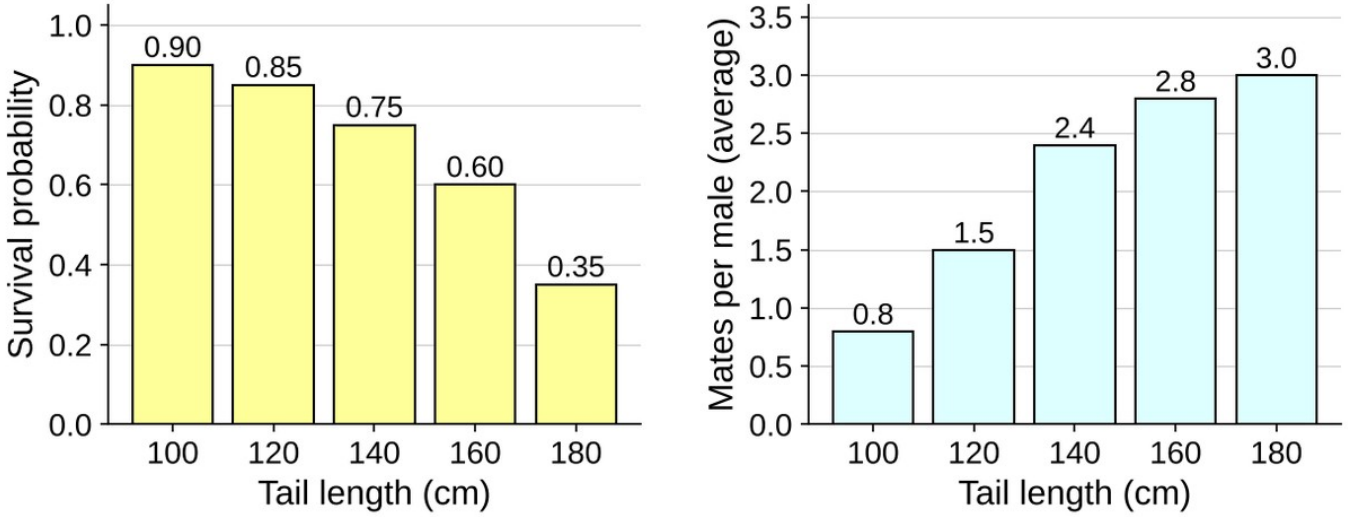
Example: Breeding Corn for Oil

Use the graph of corn oil content. (a) How many times greater was the oil content at generation 100 than at generation 0? (b) Find the average increase in oil content per generation from generation 0 to 50, and from 50 to 100. (c) Explain why the rate slowed down.



Example: The Peacock's Tail

Reproductive success = survival probability × average number of mates. Use the graphs to find the reproductive success for each tail length. Which tail length is favored by selection? Explain the trade-off.



Sample data for a model species.

Example: Which Kind of Selection?

Name each example as natural selection, artificial selection, sexual selection, or coevolution. (a) A farmer saves seeds only from the tomato plants that resisted a disease. (b) Female frogs mate more often with males that have deeper calls. (c) Cheetahs that run faster catch more prey and have more cubs. (d) Flowers with deeper tubes and hummingbirds with longer bills each favor the other's traits.

Example	Type of selection
(a) Tomato seeds	
(b) Frog calls	
(c) Fast cheetahs	
(d) Flowers and hummingbirds	

Artificial and Sexual Selection

Big Ideas

- Artificial selection: humans choose the parents
- Sexual selection favors traits that help get mates
- Fitness depends on survival and on reproduction
- Coevolution: interacting species select each other