

Variation in Cat Traits



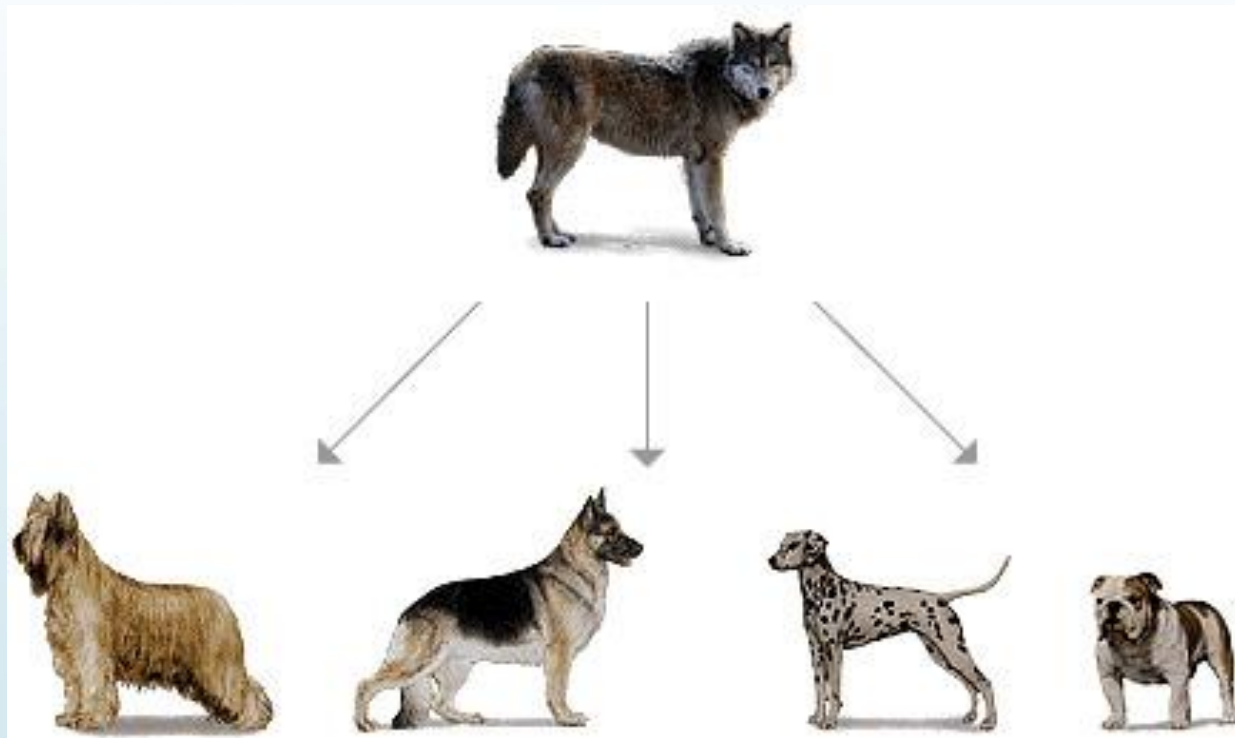
Brainstorm cat traits, such as fur color, length of fur, ear shape, and face shape that are determined by the genes



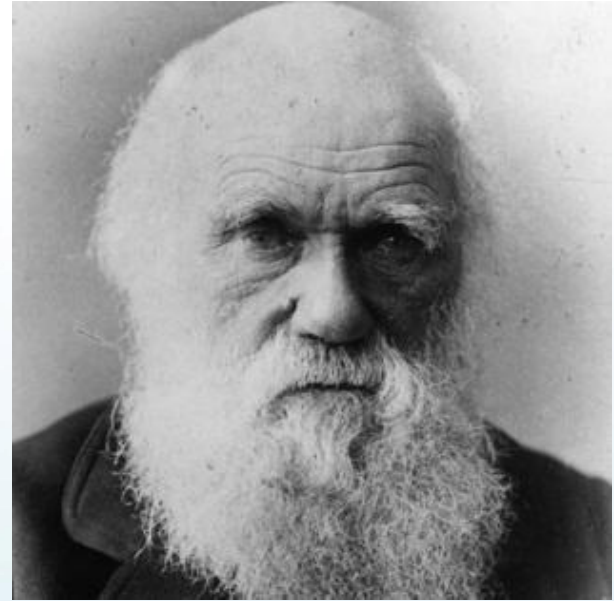
What do you conclude about cat variation?



- **Evolution** is the process by which populations change over time.



Charles Darwin

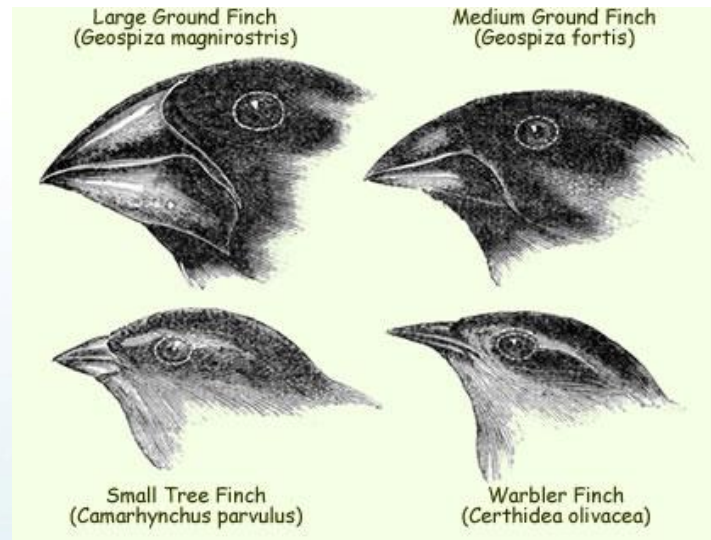


- **Charles Darwin** became a naturalist, a scientist who studies nature, during a voyage on the British ship HMS Beagle.
- Darwin formed the theory of biological evolution using the observations that he had made during an almost five-year journey.



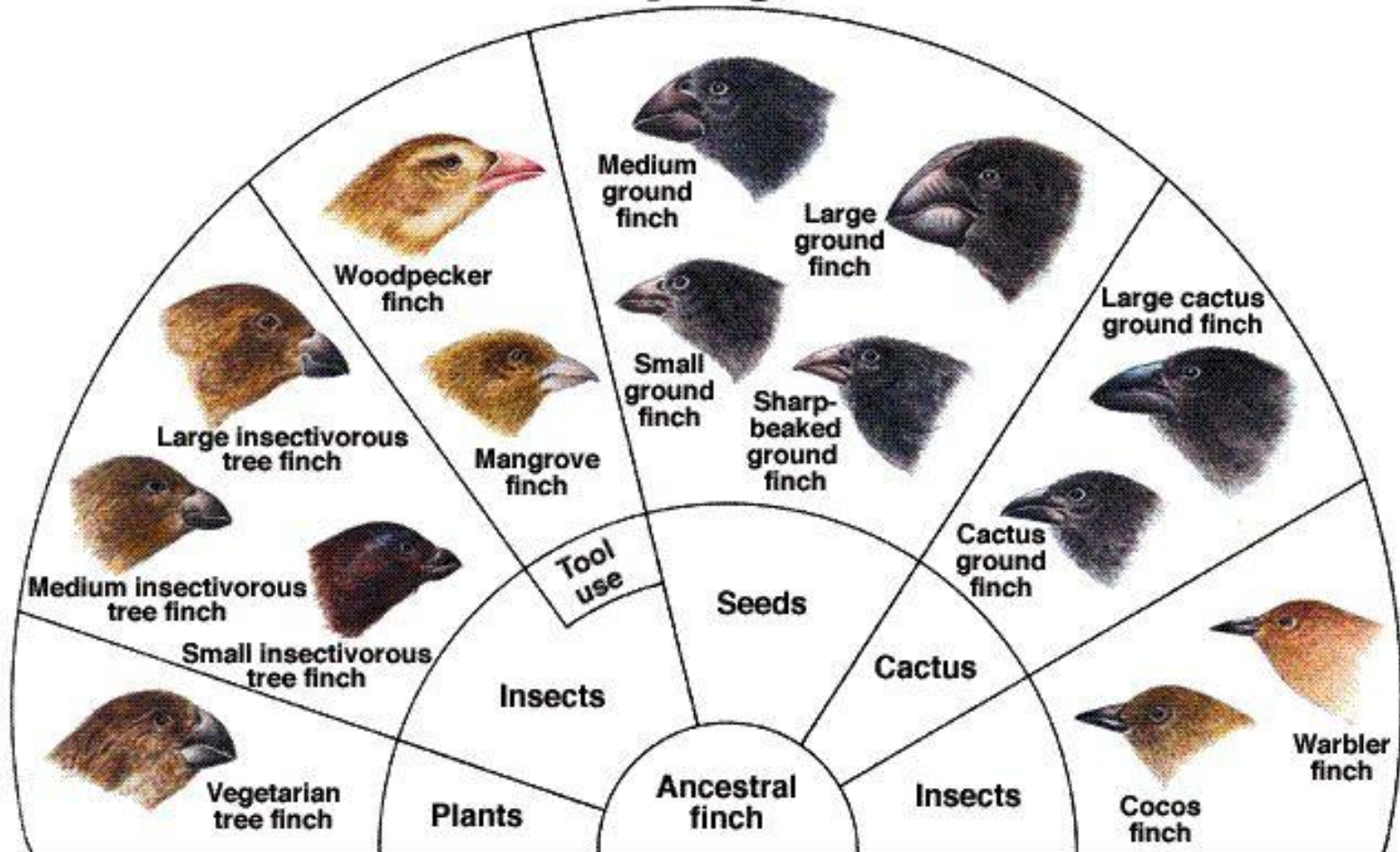
- Darwin collected birds from the Galápagos Islands
- The birds on each island were unique --
- Darwin wondered if the birds had evolved from one species of finch.

What did Darwin observe?



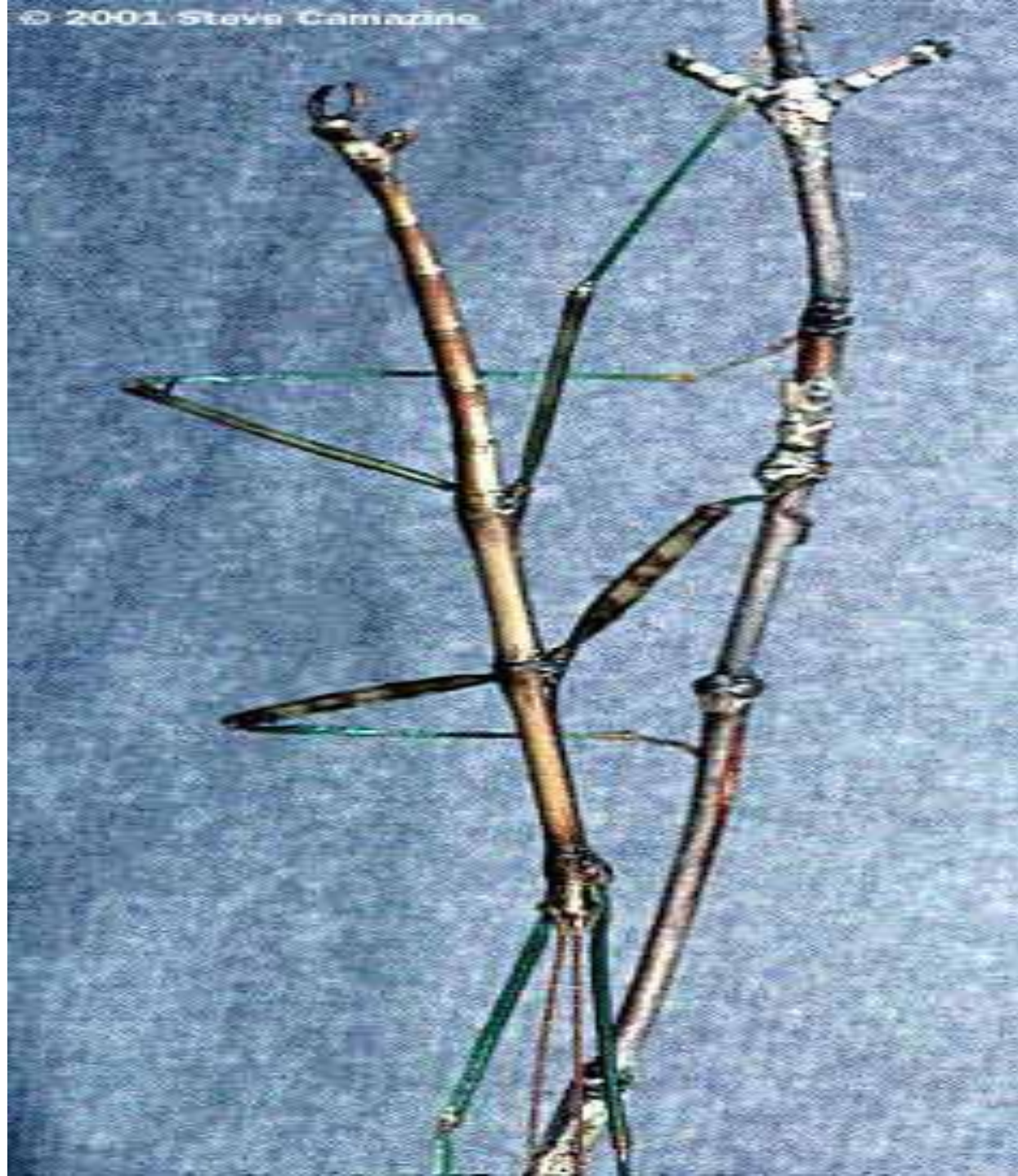
- Darwin observed differences in beak size among finches from different islands.
- Birds with shorter, heavier beaks could eat harder foods than those with thinner beaks could eat.

Darwin's Theory of Finches on the Galápagos Islands



Adaptations and Survival

- Adaptations (e.g. camouflage) help an organism to survive and reproduce
- Can you find the “hidden organisms” in the following slide?

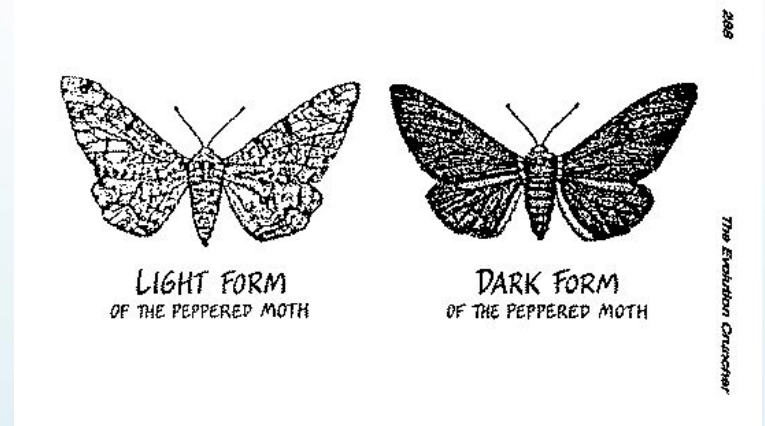






Natural Selection

- **Natural selection** is the process by which organisms that inherit advantageous traits tend to reproduce more successfully.



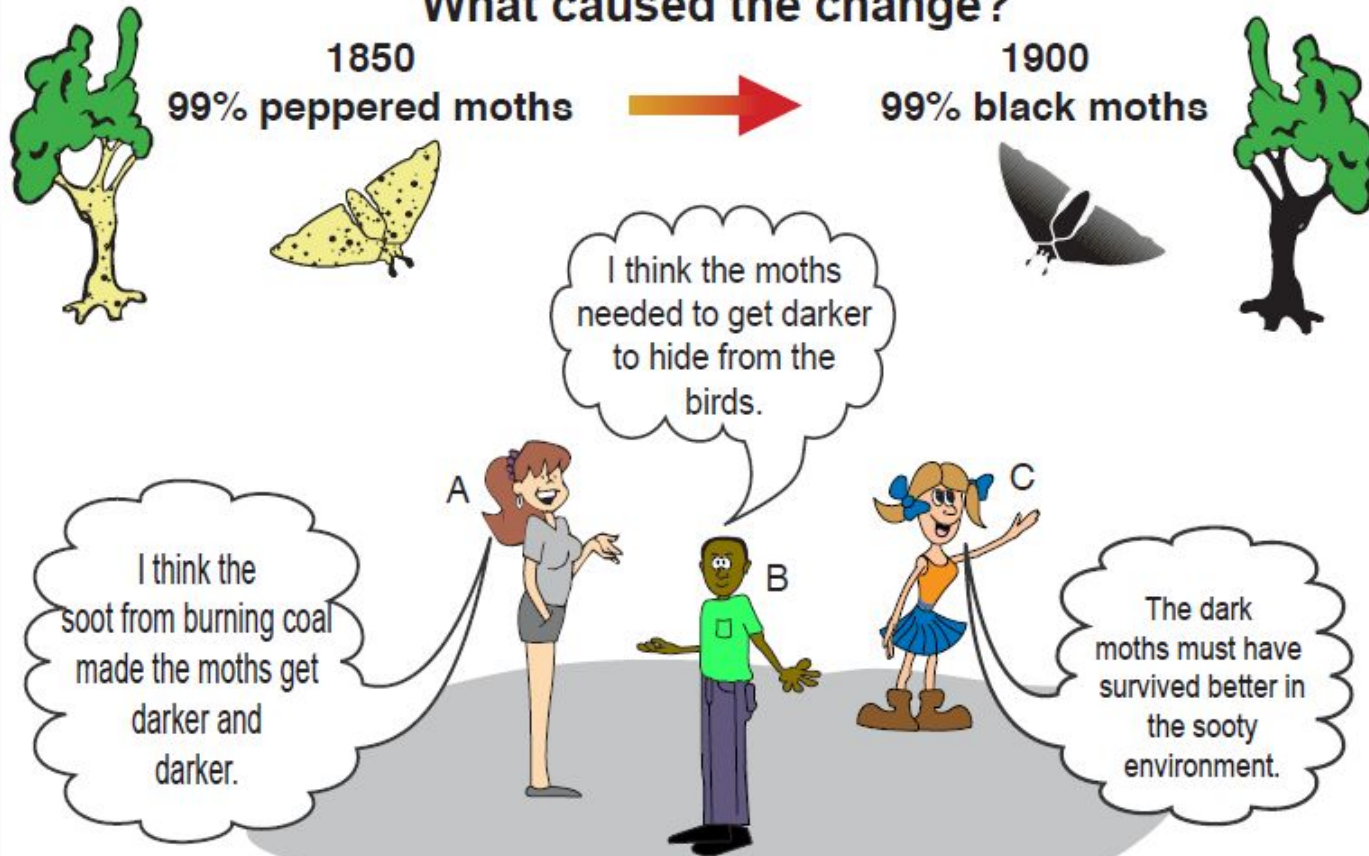
“Survival of the Fittest”

- Evolutionary fitness isn't a measure of physical fitness but of reproductive fitness.
- **Fitness**- Relative ability to survive and produce offspring in an environment

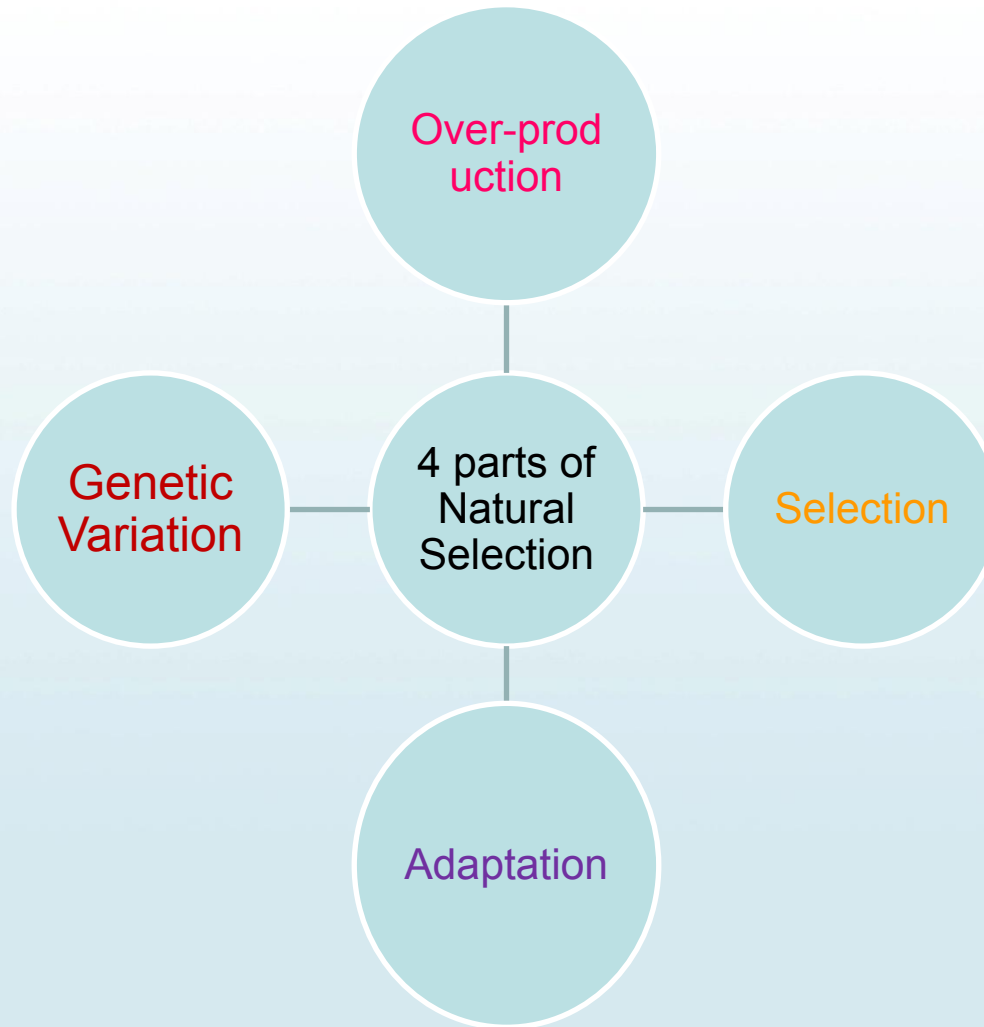


Natural Selection

During the industrial revolution in Great Britain (1850-1900), the moth population changed. What caused the change?



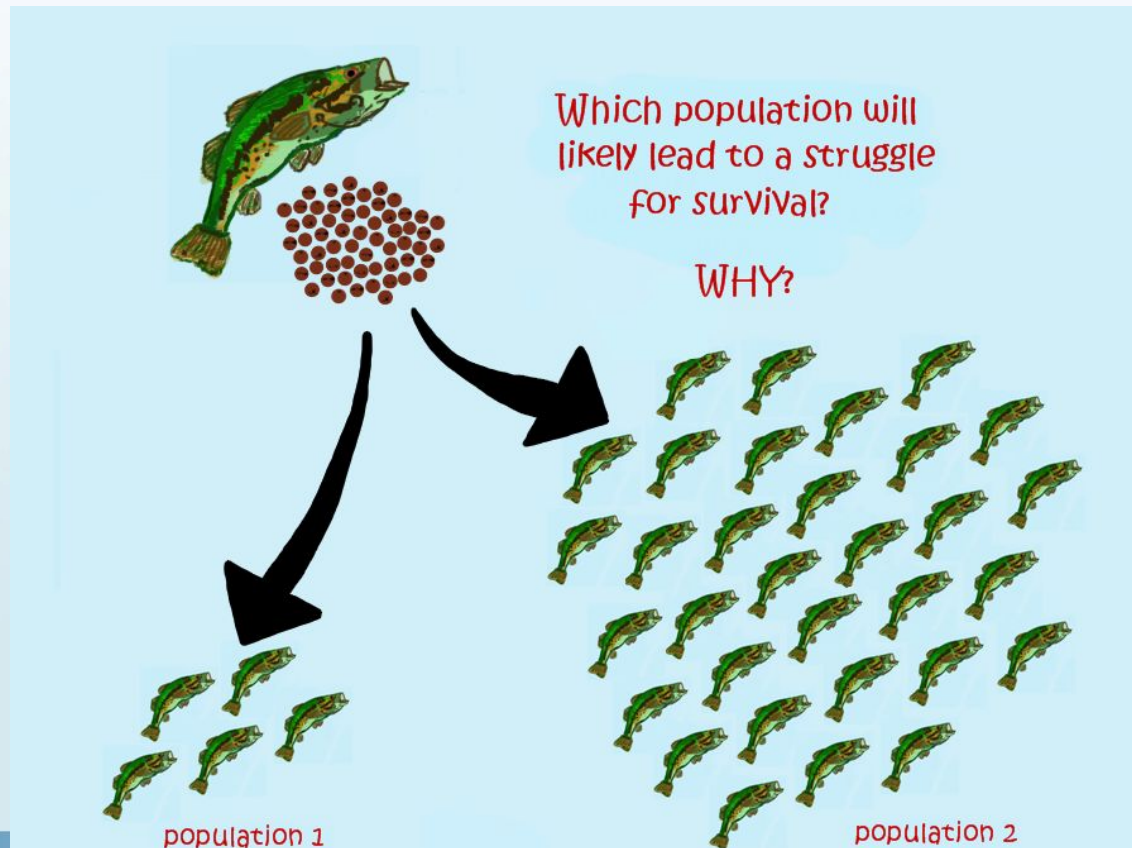
Four elements that contribute to natural selection?



Overproduction of young

More young are born than do survive

- Only – some survive to reproduce.

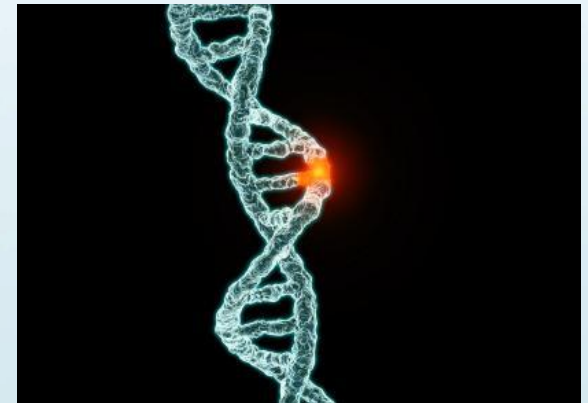


Over-prod
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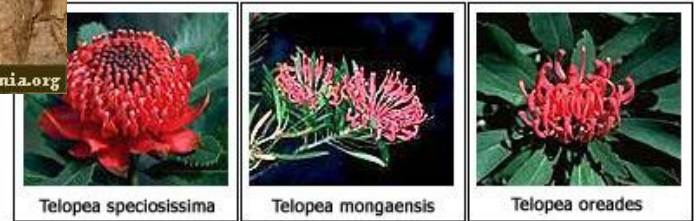
Genetic variation

Genetic
Variation

- Variations **in genetic material** can be passed on from parent to offspring.
- An important **source of variation** is a **mutation**, or change in genetic material.



Variation Within a Species

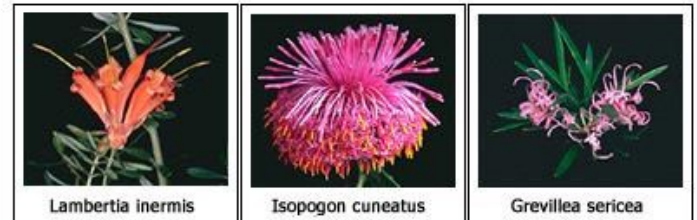


Telopea speciosissima

Telopea mongaensis

Telopea oreades

Genus *Telopea*



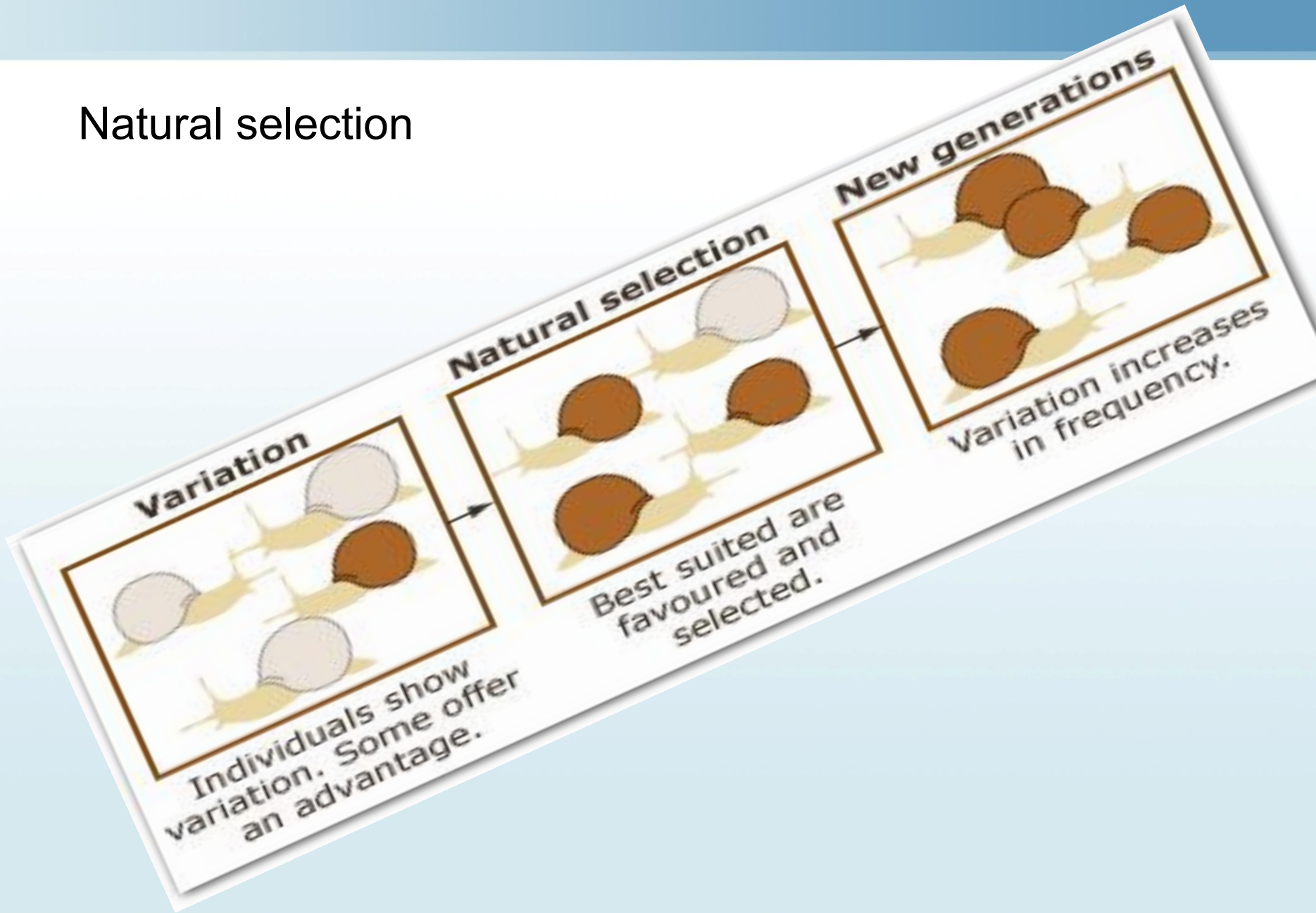
Lambertia inermis

Isopogon cuneatus

Grevillea sericea

Family Proteaceae

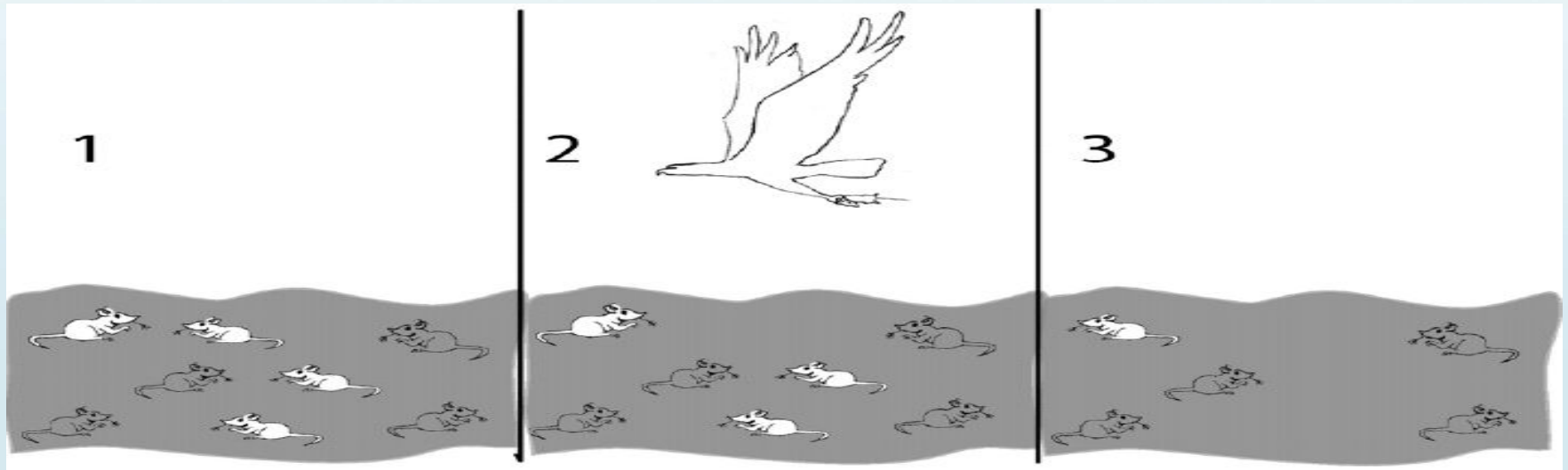
Natural selection



Natural Selection

– Survival of the fittest

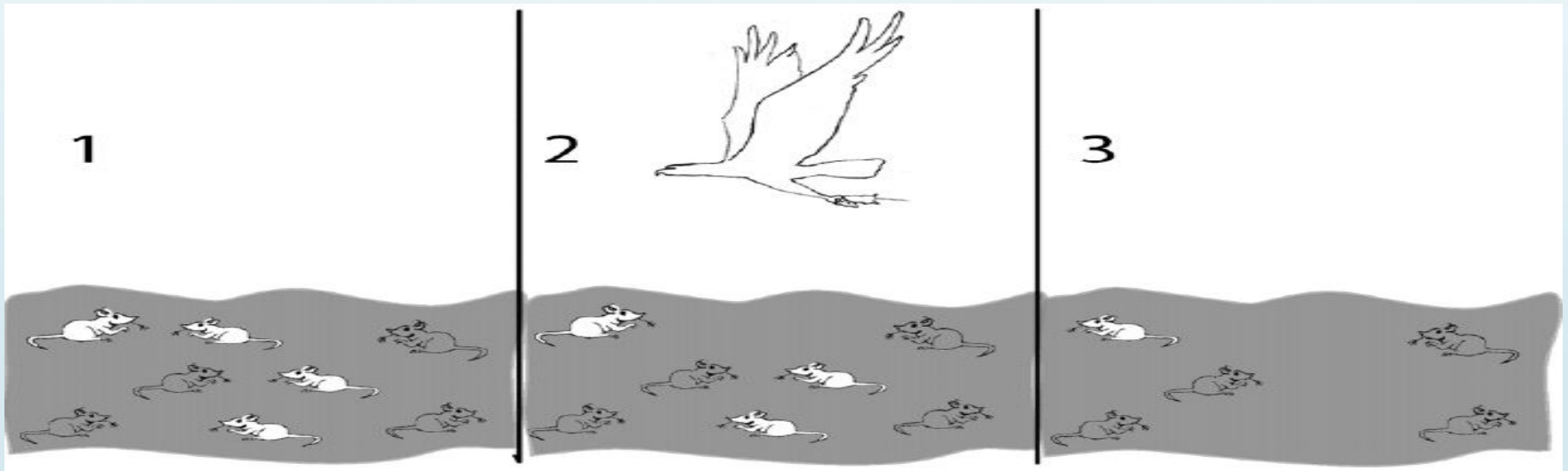
- Individuals with a positive trait (darker coloured fish below) are more likely to:
- live longer,
- Reproduce more
- that characteristic increases in the population



Natural Selection

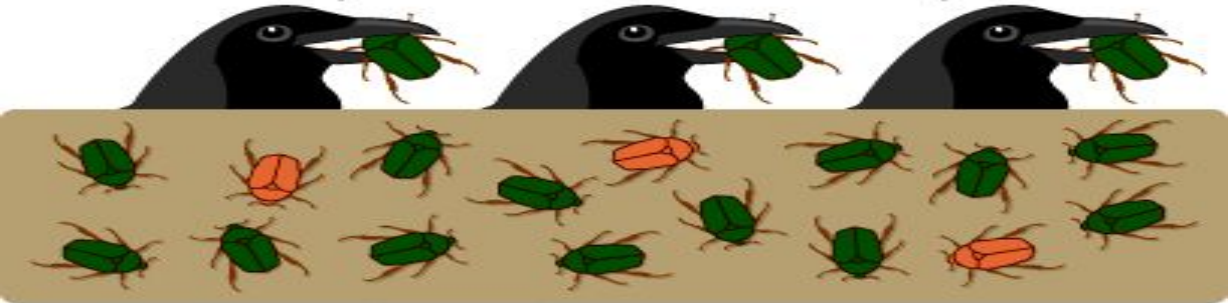
Natural Selection

- Individuals with a negative trait (light coloured fish below) are more likely to:
- live shorter
- Reproduce less
- that characteristic decreases in the population

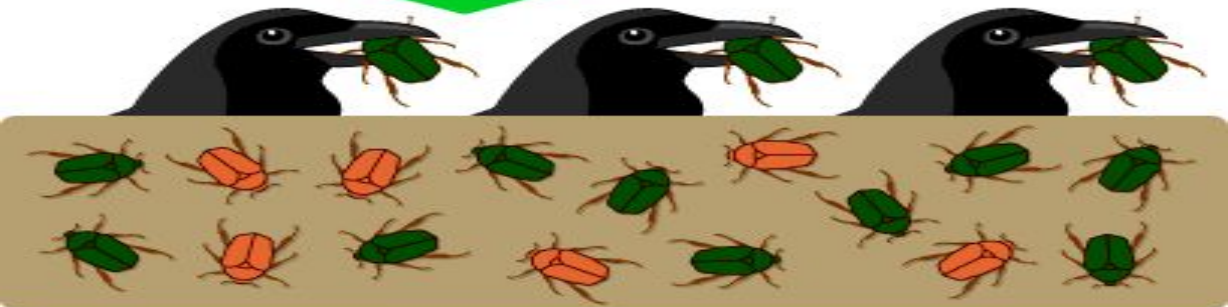


Natural selection, in a nutshell:

Yum! Green beetles! Our favorite!



...generations later...



...generations later...



Green beetles have been selected against, and brown beetles have flourished.

Adaptation

- An **adaptation** is an inherited trait that helps an organism survive and reproduce in its environment.

Adaptations of the American Beaver



©Sheri Amsel

Adaptation

Remember natural selection can only act on the heritable variation that EXISTS in a population.



Natural selection does not grant organisms what they "need".

Extinction

- **Greater competition, new predators,** and the **loss of habitat** are examples of environmental changes that can lead to extinction.
- Because a **natural disaster** can destroy resources quickly, organisms may die no matter what adaptations they have.
- The fossil record shows that many species have become extinct in the history of life on Earth.



Some changes come from selectively breeding by farmers.

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