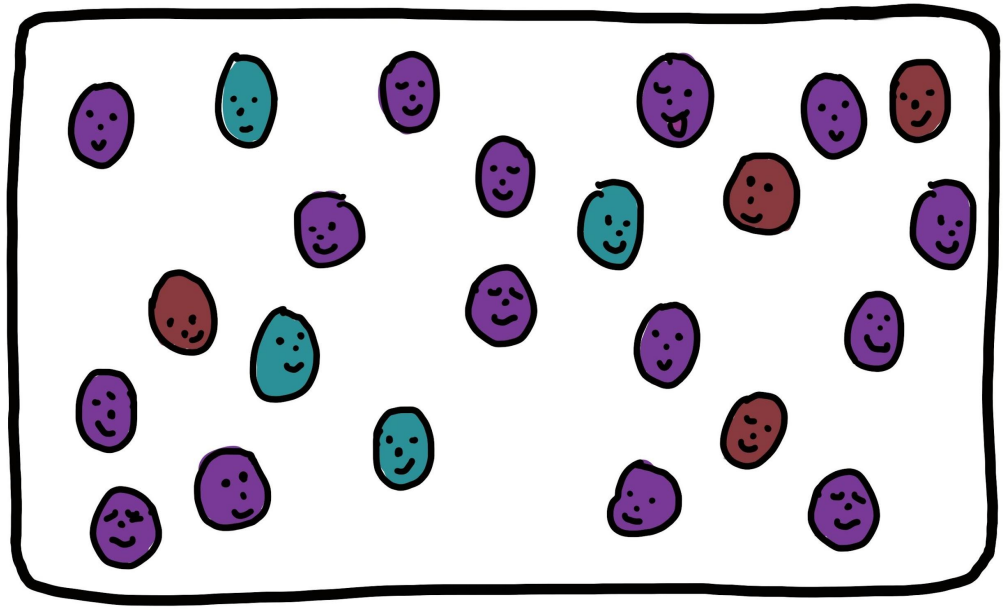
Geographical Isolation as one of the factors



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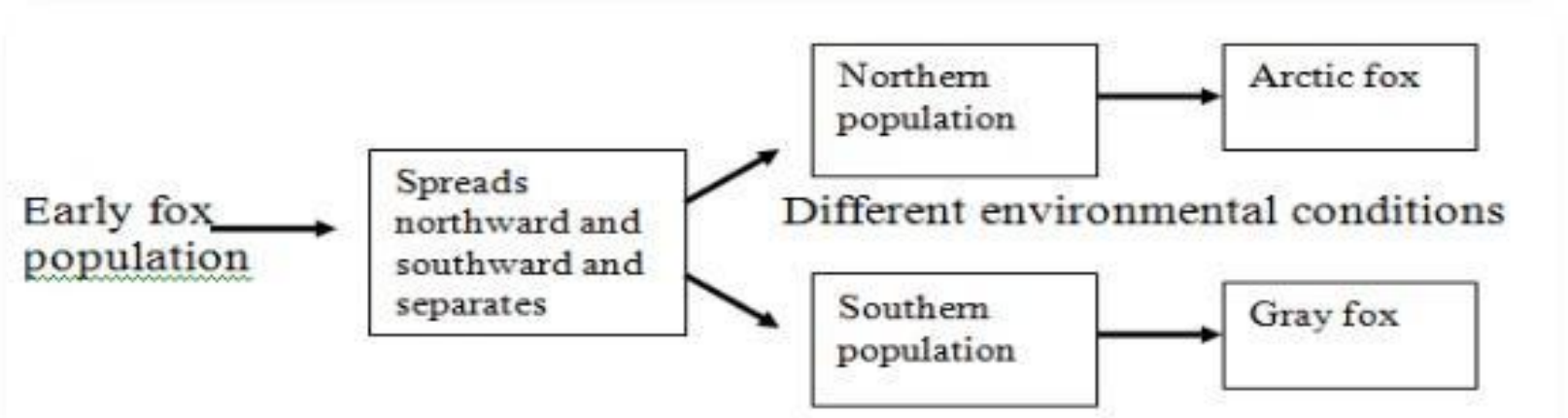
INTRODUCTION

Geographic isolation of a group of organisms eventually stops gene flow from other groups of same species. Thus isolated group evolves by accumulating new mutations not to be found in members of related groups.

Geographic isolation

It occurs when two populations of a species or two groups of the same population become physically separated into areas with different environmental conditions.



Example: Part of a population may migrate in search of food and then begin living in another area with different environmental conditions.

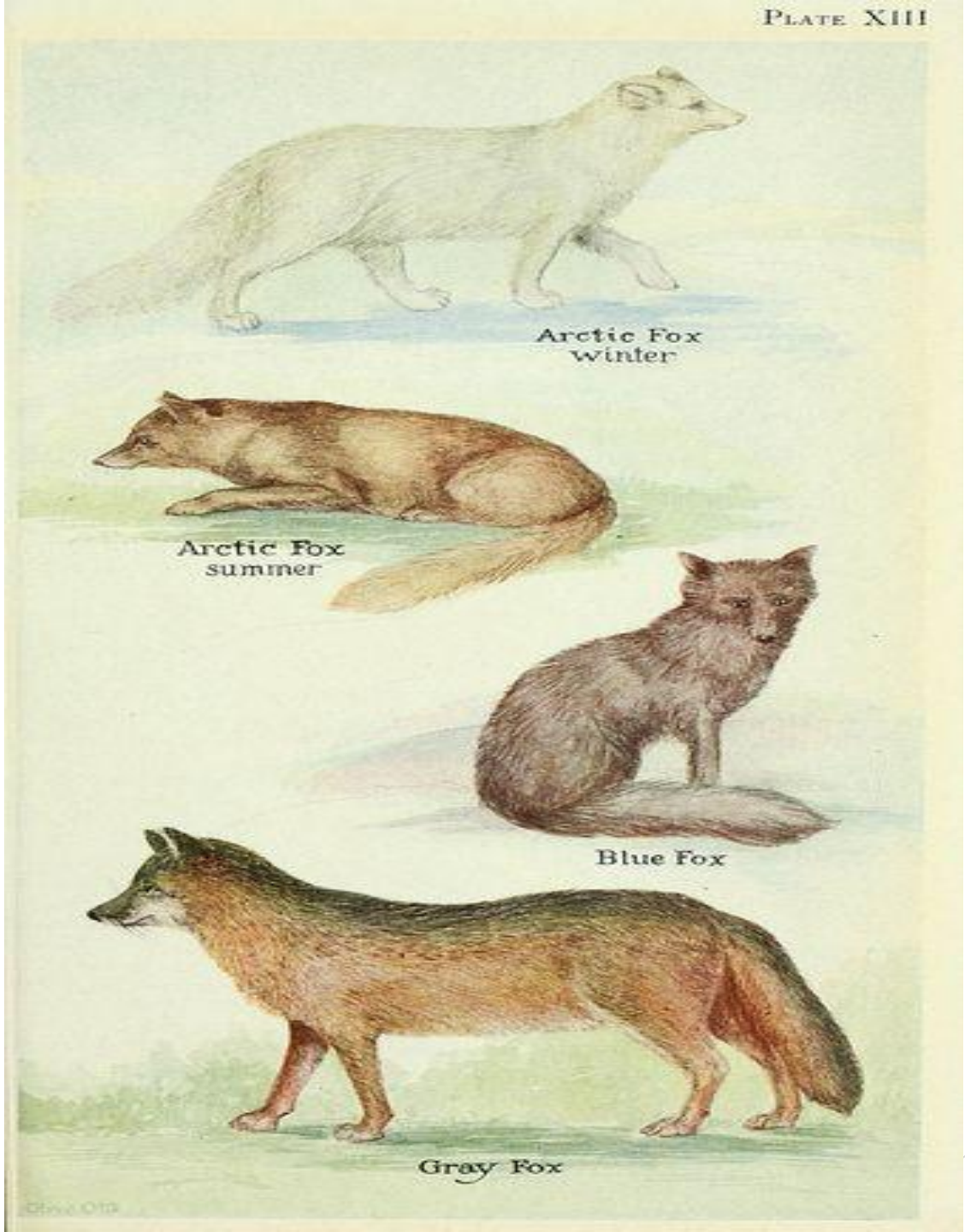
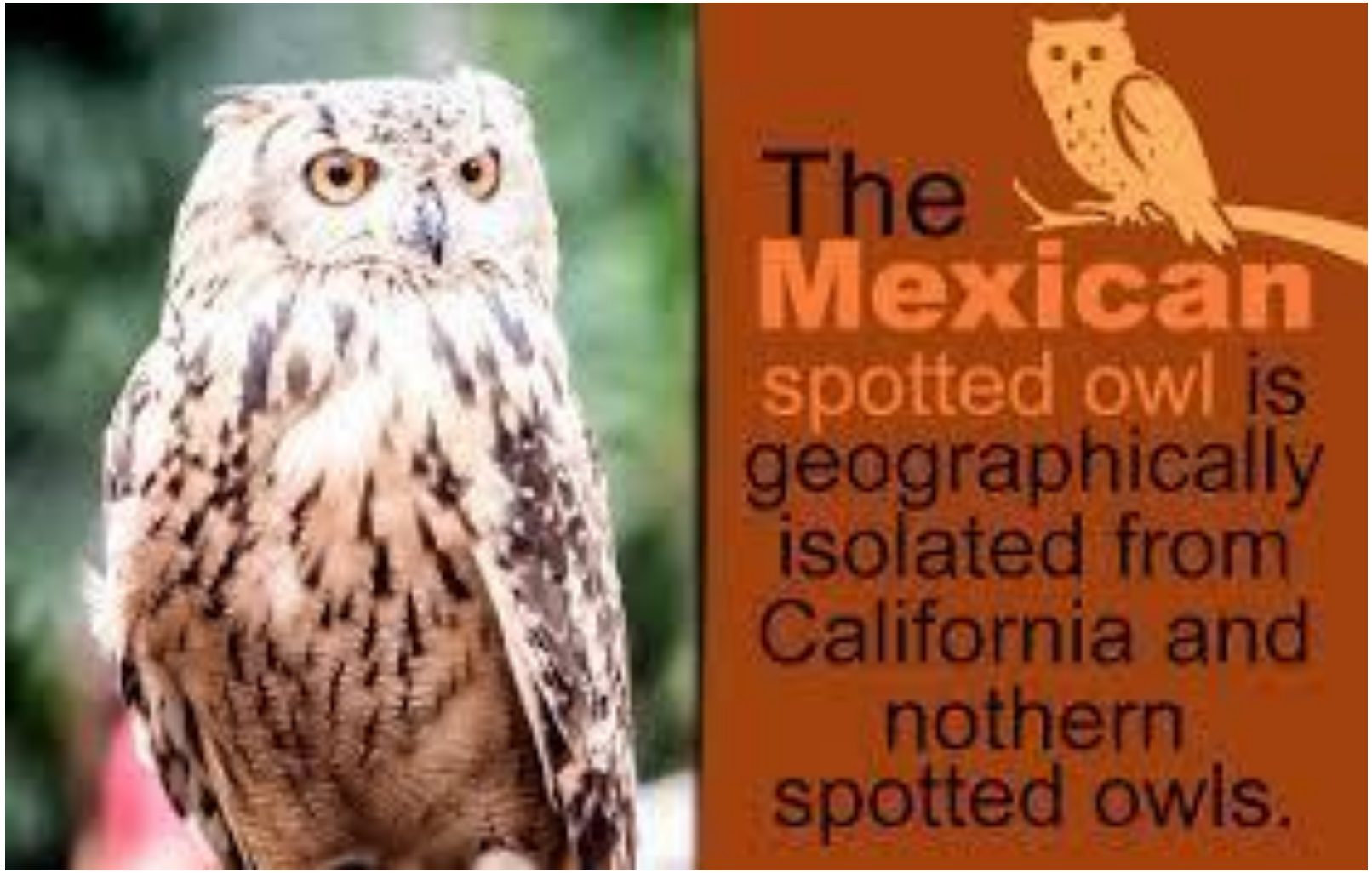


PLATE XIII
Arctic Fox
winter
Arctic Fox
summer
Blue Fox
Gray Fox


The
Mexican
spotted owl is
geographically
isolated from
California and
nothern
spotted owls.

Geographic isolation

- Populations may also become separated
  - by a physical barrier (such as a mountain range, stream, lake, or road),
  - by a change such as a volcanic eruption or earthquake, or
  - when a few individuals are carried to a new area by wind or water.

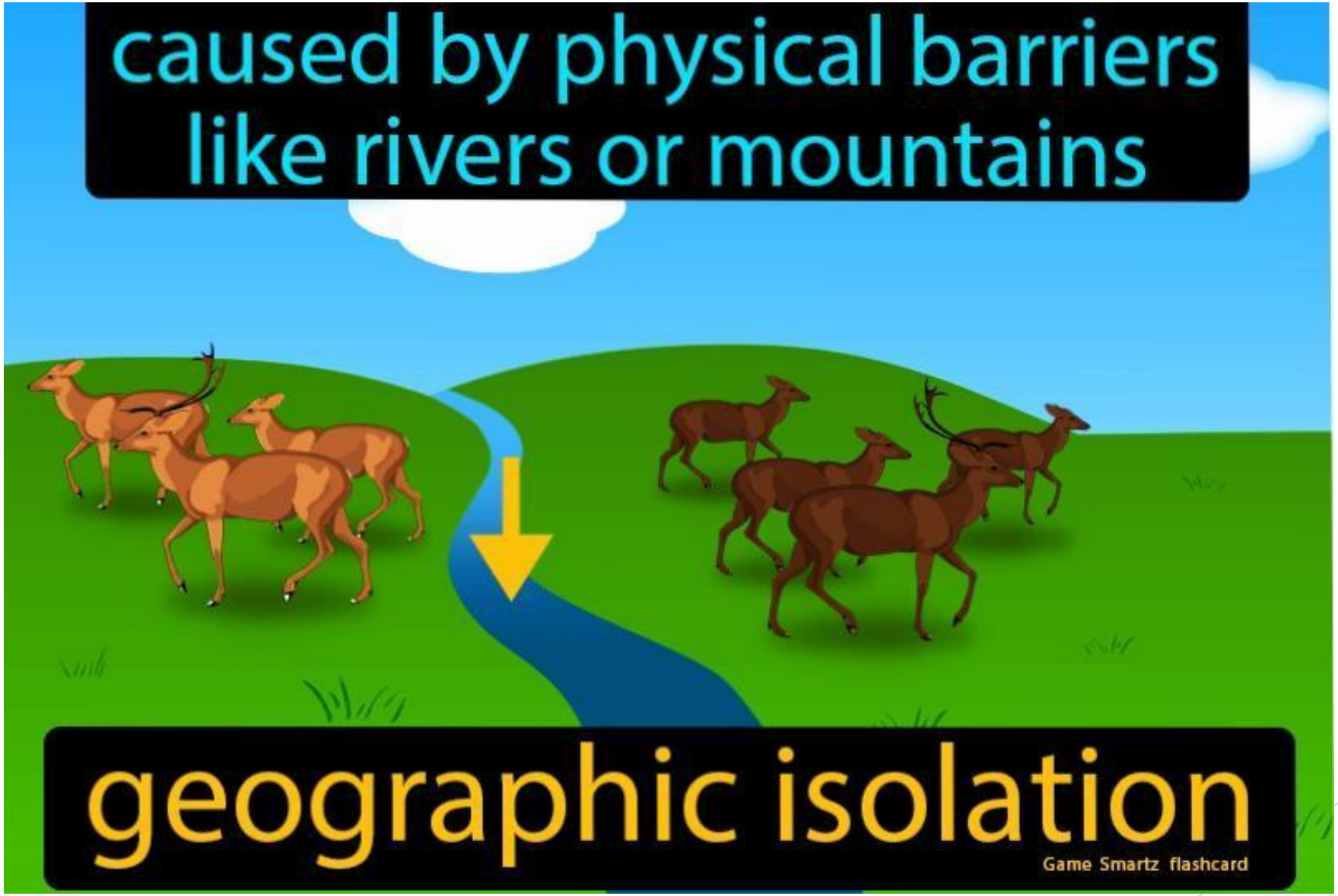
- A **biome** is a kind of ecosystem, such as a desert, a tropical rain forest, or a grassland.
- The same biome can occur on different continents because similar environments provide similar opportunities for life and similar constraints.
- As a result, similar environments lead to the evolution of organisms similar in form and function.

“Typically Geographical Isolation is a result of an accident of or coincidence.”

Geographic isolation can be caused by many factors and can result in a variety of results. Here are some examples:

Isolation by Barriers

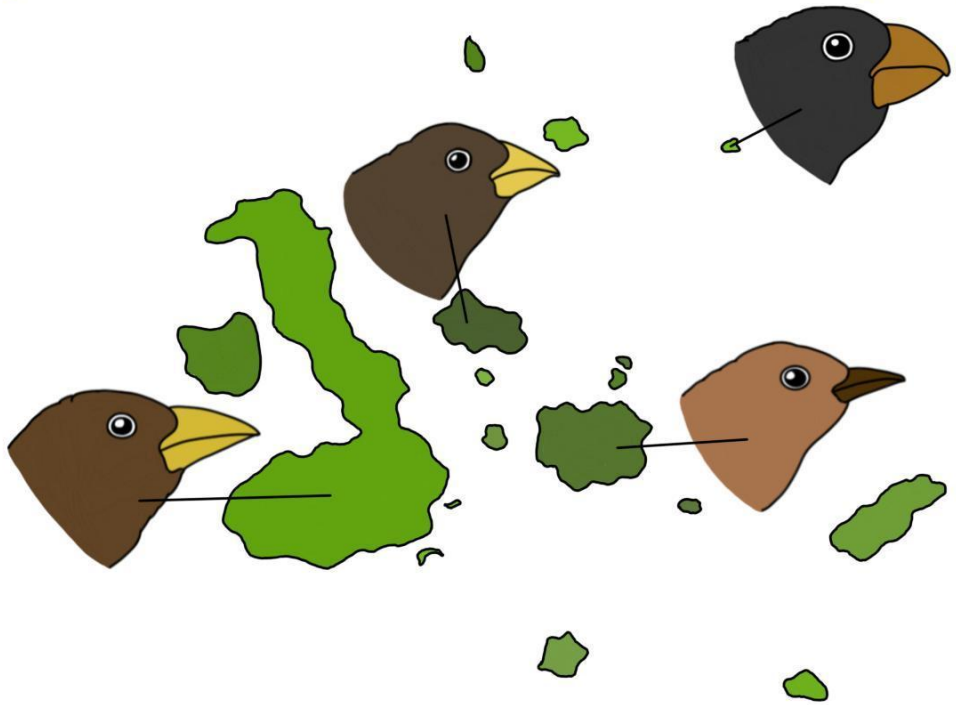
- The people of Finland, who are secluded to some degree from the rest of the world by water, develop certain diseases due to the lack of genetic material from other ethnicities and races.
- Physical barriers prevent fish from one stream from mating with fish from another stream, leading to a less varied gene pool among those fish. As time passes, the fish become unable to successfully mate with other groups.
- A mountain range prevents two types of goat from mating, causing the gene pool to become less varied


caused by physical barriers like rivers or mountains
geographic isolation
Game Smartz flashcard

Isolation by Distance

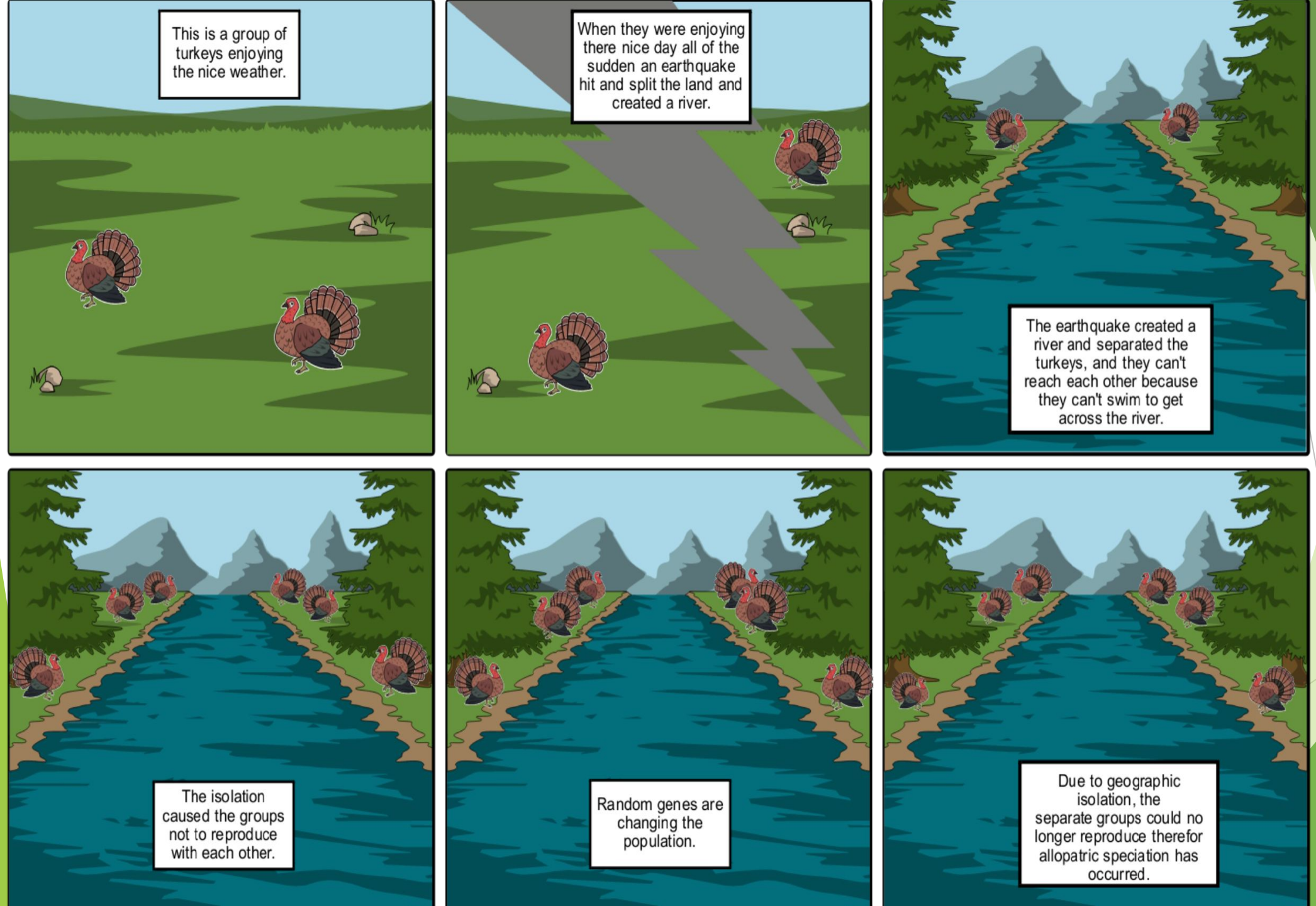
- Cheetahs separated from a larger group mate with each other, resulting in a less varied gene pool.
- Genetic interchange between finches is prevented when a flock becomes isolated from the rest on an island. Eventually, the isolated group emerges as a completely separate species.
- A group of genetically differentiated chimpanzees is unable to mate with any other chimpanzees outside of their group due to physical isolation, leading to the development of certain diseases that genetic material from the other chimpanzees would have prevented

geographic isolation of the Galapagos finches



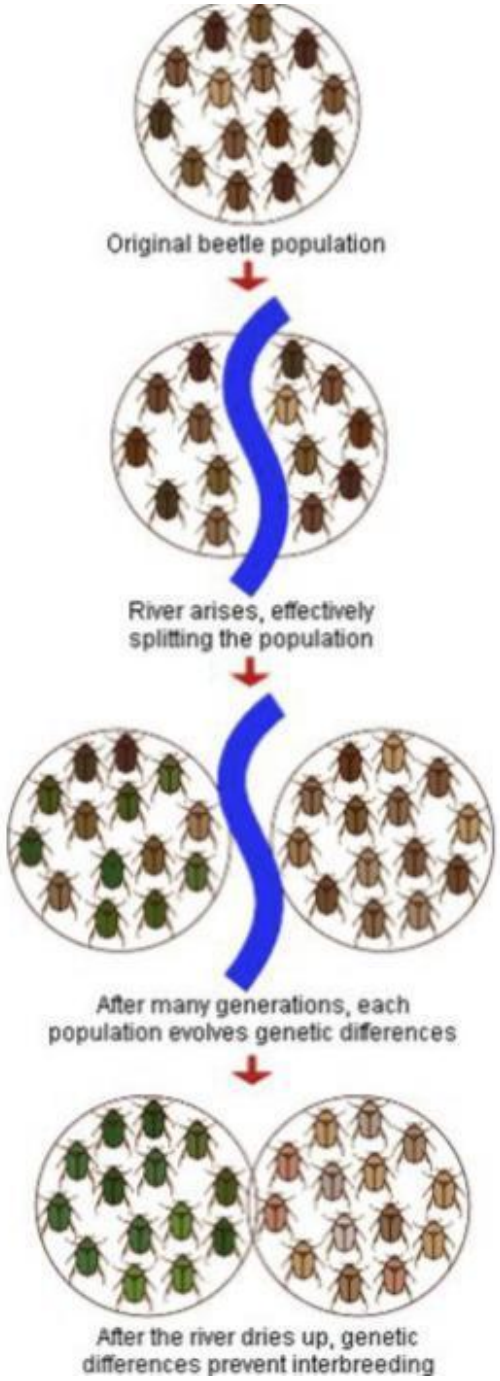
Isolation after an Event

- An earthquake causes two populations to become separate from each other. Over time, each species experiences genetic makeup specific only to their own smaller, less diverse populations.
- When a piece of land breaks off from a continent, the animals on the piece of land are only able to reproduce with their own populations. This results in the animals becoming entirely


This is a group of turkeys enjoying the nice weather.
When they were enjoying there nice day all of the sudden an earthquake hit and split the land and created a river.
The earthquake created a river and separated the turkeys, and they can't reach each other because they can't swim to get across the river.
The isolation caused the groups not to reproduce with each other.
Random genes are changing the population.
Due to geographic isolation, the separate groups could no longer reproduce therefor allopatric speciation has occurred.

Isolation by Separation

- An isolated group of beetles on a hill only work, eat and mate with one another. As a result, only genetic material within that small group is exchanged, leading to a less varied beetle population than others that mate with different subgroups.
- A population of brown-haired people is separated from those with other hair colors and, as such, does not mix genetically with populations of any other hair color, leading to a population that is


Original beetle population
River arises, effectively splitting the population
After many generations, each population evolves genetic differences
After the river dries up, genetic differences prevent interbreeding

Thank you