

Evolution by Natural Selection



: What does Kanye West have to do with evolution?

Essential question: What was in Darwin's book, *On the Origin of Species*? Can't I just read the Cliff Notes/ Spark Notes version of this book?!



What does the word
"adaptation" mean to you?

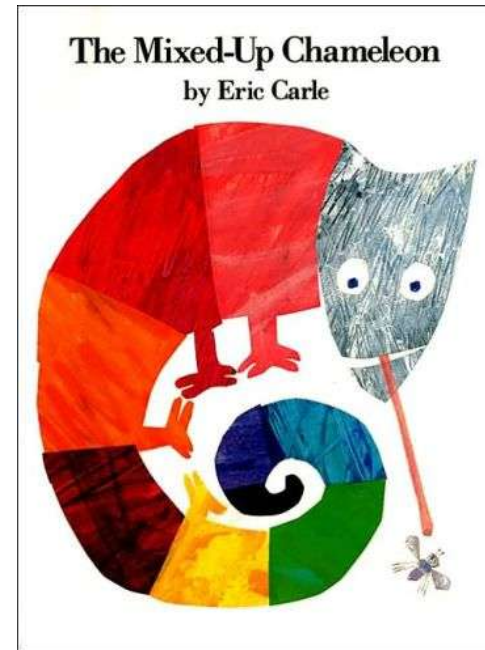
Survival of the Fittest:

- In biology, an adaptation is ANY inherited characteristic that increases an organism's chance for survival. The possibilities are limitless! Just look at an organism and see how it works well in its habitat.
- Ex of adaptations: camouflage, mimicry, behavioral adaptations



Camouflage

- blending in with one's surroundings to increase chances of survival



<http://www.youtube.com/watch?v=KYnQt-mzWJE>

Mimicry- looking like another organism to increase chances of survival



- Paper wasp

- Day flying moth

Mimicry

»Red on yellow - kills a fellow« or »Red touching black - is a friend of Jack«

(Conant 1958)



Eastern Coral Snake
(venomous)

Scarlet King Snake
(non-venomous)



Mimicry



- Monarch
poisonous

Viceroy: harmless!

Hunting in a Pack!

- Wolf Park in Battleground, IN



- What does the word “fitness” mean to you?

CGMSN 😊

- In biology, **fitness** is the ability of an organism to survive and reproduce.



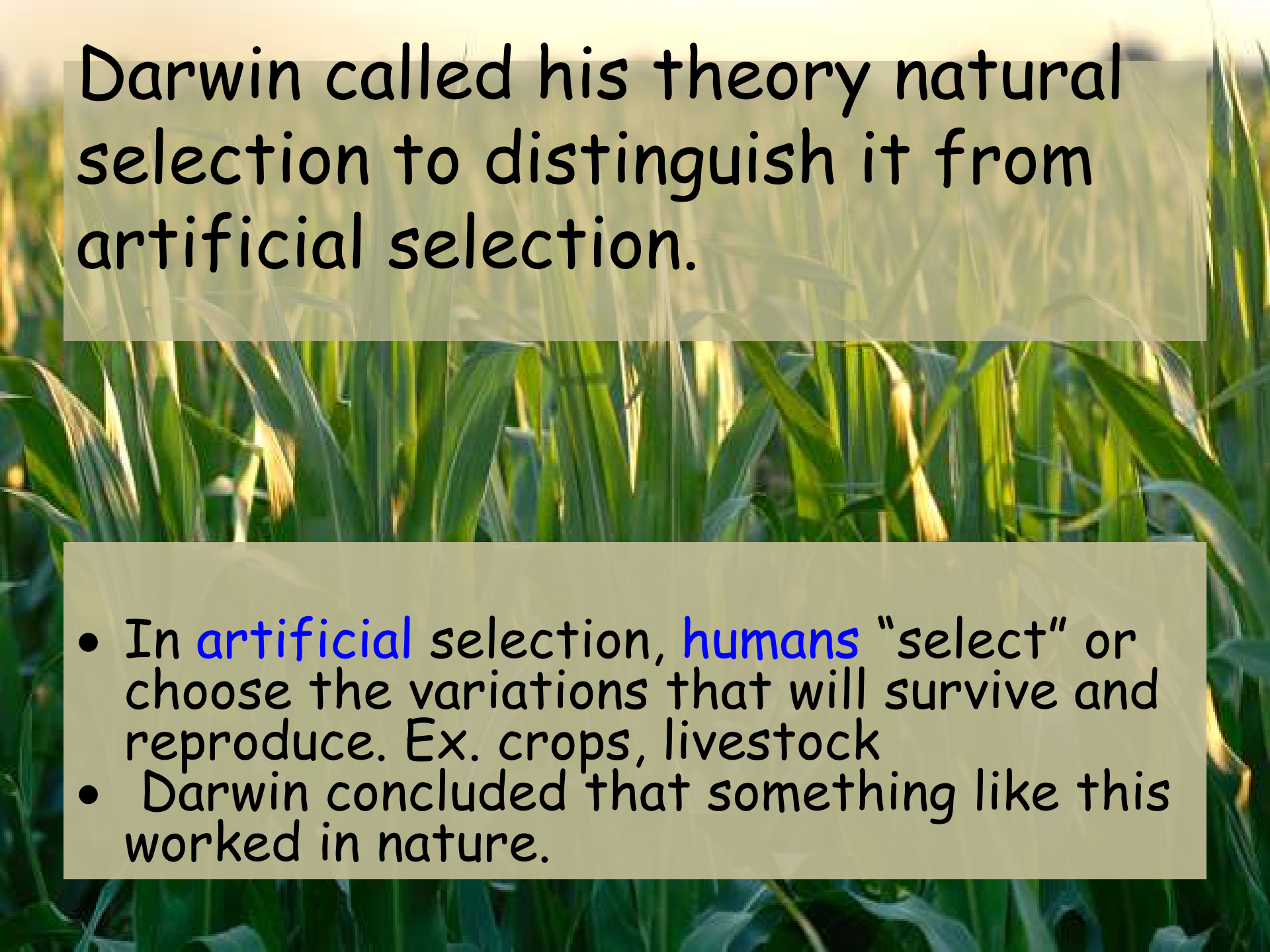
- Organisms within a species are in a **struggle for existence**, a competition for resources like food, space, mates.

Individuals with **adaptations** that make them well-suited to their environment have increased **fitness**.



- They are "...harder, better, faster, stronger" - according to Kanye.
- They could also be good at hiding like your peppered moths! 😊

- Darwin called this process **survival of the fittest** or natural selection.
- **Natural selection** is Darwin's theory about the mechanism for evolution, his explanation of how it occurred. (Lamarck's mechanism was inheritance of acquired traits).



Darwin called his theory natural selection to distinguish it from artificial selection.

- In **artificial** selection, **humans** "select" or choose the variations that will survive and reproduce. Ex. crops, livestock
- Darwin concluded that something like this worked in nature.

INDIANA STATE FAIR

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*Agi-Photo
by Lucy*

- In **natural** selection, the **environment** "selects" the organisms that will survive and reproduce. These are the organisms with the **adaptations** that give them an advantage in **fitness**.

B. Summary of Darwin's Theory of Natural Selection

- 3 Ingredients: VARIATION, SELECTION, TIME!
- <http://learn.genetics.utah.edu/content/variation/recipe/>

1) **VARIATION**: There is **variation** within a population. (variation = some individual differences)

- Some variations are **better** than others (they are adaptations that increase fitness).

2) **SELECTION**: The most "**fit**" organisms survive and reproduce. They are "**selected**" by how well adapted they are to their environment.

3) **TIME**: The future generations inherit the favorable variations. Over time, the inherited characteristics of a population **change. = evolution!!!**
(**descent with modification**)

**NOTE: The variations are caused by
MUTATIONS!**

C. Descent W/ Modification

- Over time, natural selection produces organisms that are different from their ancestors. Darwin stated that each species has descended, with changes, from other species over time. This process is called the principle of **descent with modification**.

- Darwin concluded that organisms must be related to one another and have a single common ancestor. There is one single uniting tree of life. This concept is called **common descent**.

