



6/22/2014



*Cryphonectria parasitica* tendrils on chestnut tree bark (Photo: Ministry of Agriculture and Regional Development Archive, Ministry of Agriculture and Regional Development, Bugwood.org)



# Plant Speciation

B3 Summer Science Camp  
at Olympic High School

Dr. Jennifer Weller



# Creating offspring

- Plants are things that don't move on their own. What types of problems does this present for survival of the organism and producing offspring?
  - Overcome predation
  - Overcome bad weather/toxic environment
- Plants don't have an immune system- what types of problems does this present?
  - A specific response has to be inherited
  - A general response requires a large arsenal of chemicals

# Plant reproduction and species

- What is a species? How do you recognize it?
  - Can two organisms combine their genetic material to create offspring
    - Are the offspring fertile?
    - Do the offspring resemble the parents?
  - Does combining genetic material always mean *re-combining* genetic material?
    - The theory of evolution is concerned with the rules for recombining genetic material
    - Geneticists are also interested in the mechanisms for recombining genetic material
      - Natural Selection



<http://evolution.berkeley.edu/evolibrary/home.php>

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[www.darwinday.org/englishL/life/beagle.html](http://www.darwinday.org/englishL/life/beagle.html)

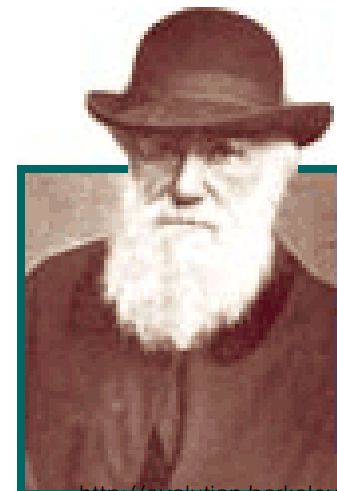


[www.darwinday.org/englishL/life/beagle.html](http://www.darwinday.org/englishL/life/beagle.html)

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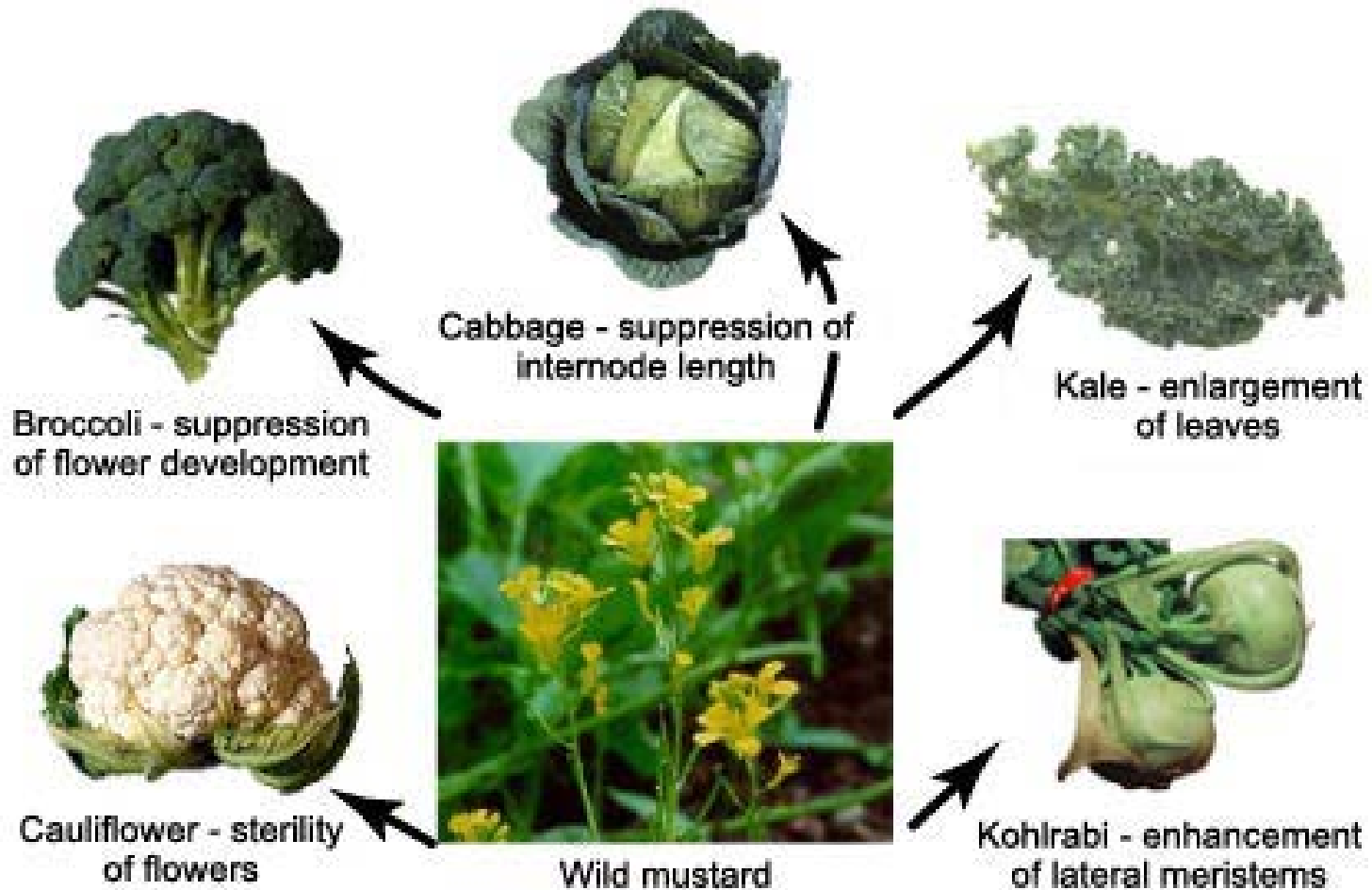
**I have called this principle, by which each slight variation, if useful, is preserved, by the term Natural Selection.**

**—Charles Darwin from "The Origin of Species"**



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# Evidence for Evolution - variation can be observed and selected for in the crops we grow.



# Evidence for Selection – adaptation to environments and predators/prey

## ◉ Structural Adaptations

- ◉ Mimicry
- ◉ Camouflage

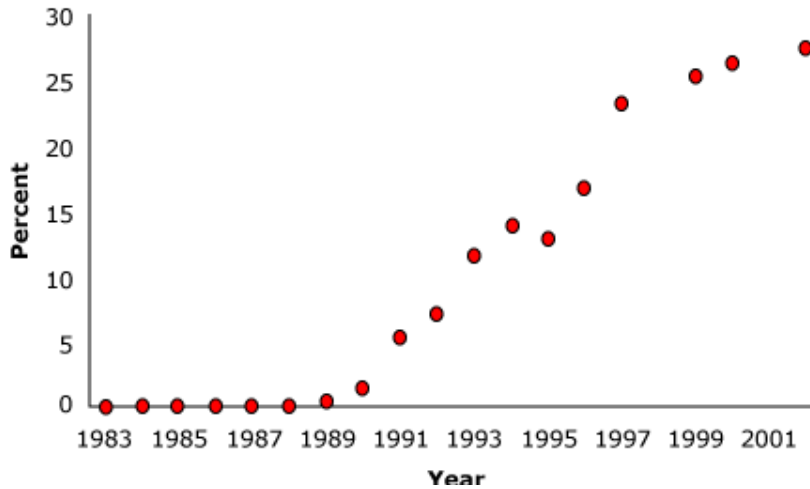


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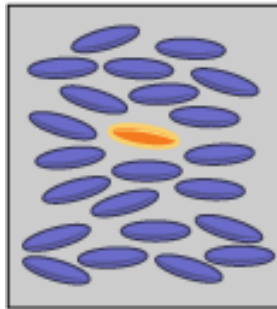
<http://science.howstuffworks.com/animal-camouflage2.htm>

Resistance to the antibiotic Vancomycin rose dramatically over the 1990s in US hospital intensive care units.

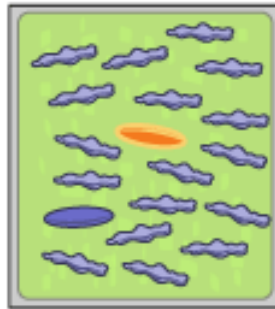


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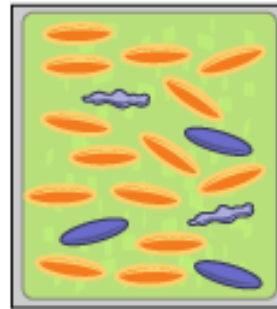
1  
A bunch of bacteria, including a resistant variety...



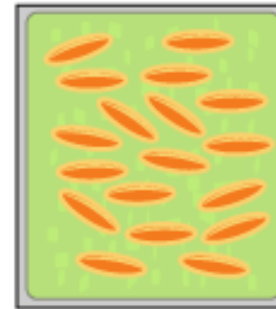
2  
...get bathed in antibiotics. Most of the normal bacteria die.






3  
The resistant bacteria multiply and become more common.



4  
Eventually, the entire infection evolves into a resistant strain.

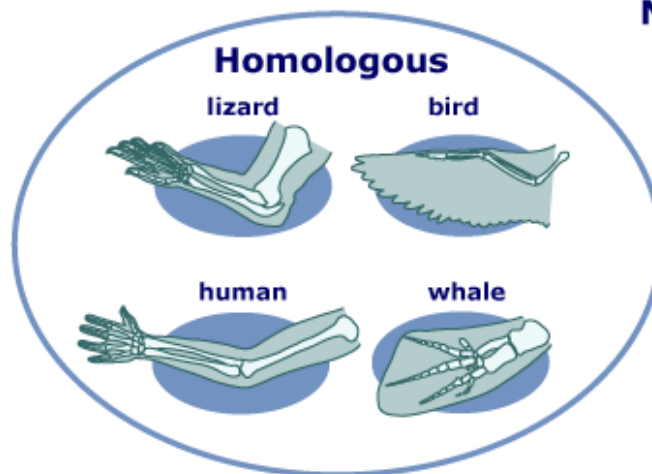
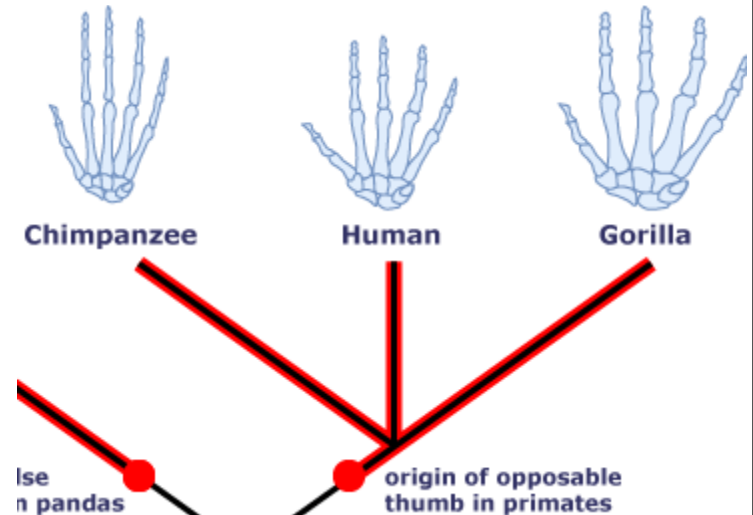


 normal bacterium      dead bacterium  
 resistant bacterium

What industries should be worried about antibiotic resistance?

# Where can you find evidence for evolution?

- Fossils
- Anatomy
  - Homologous structures

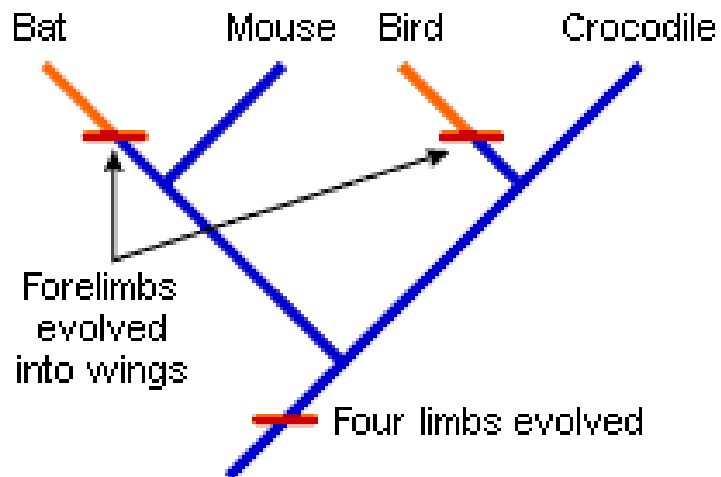
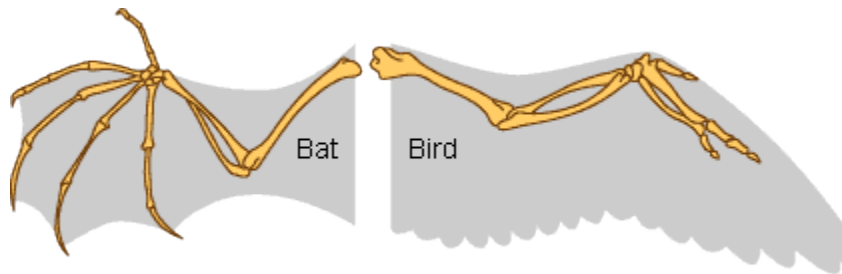


## Not homologous





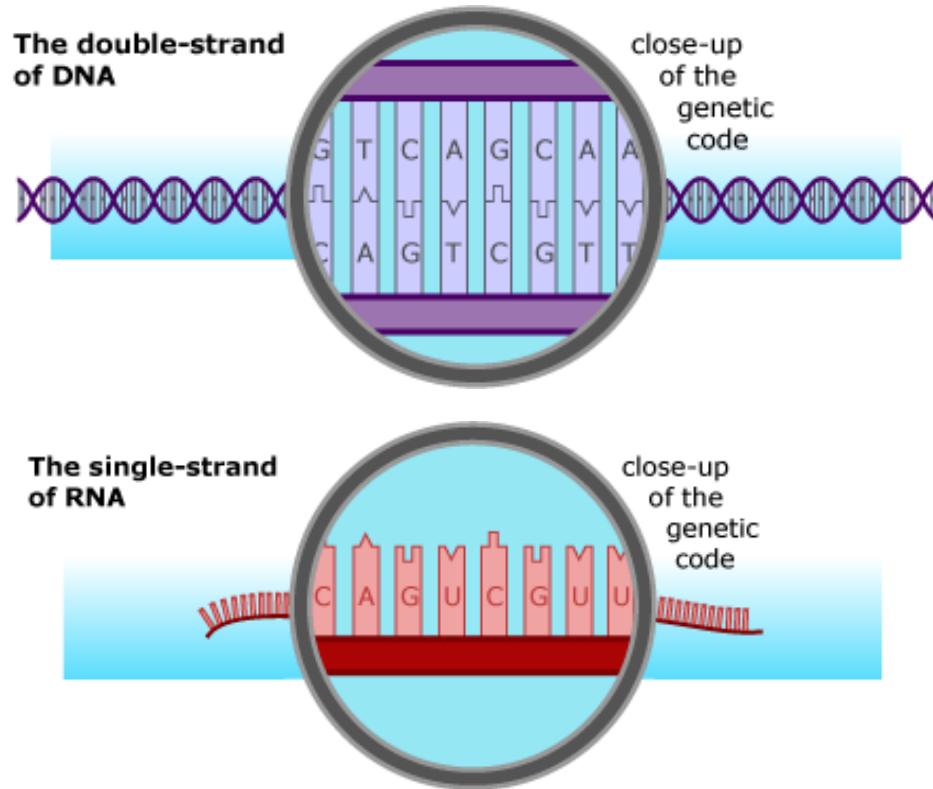
- Anatomy
  - Homologous structures
  - Analogous structures



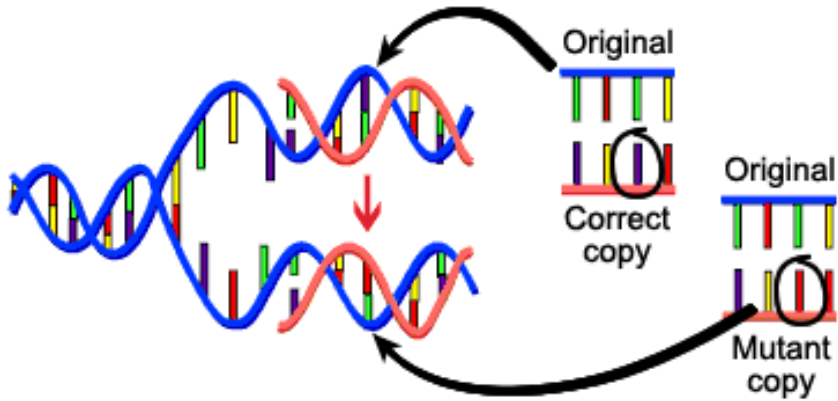
<http://evolution.berkeley.edu/evolibrary/home.php>

# Molecular Evidence of Evolution

- Evidence on the macro-scale (structures)
- Evidence on the micro scale (molecules)



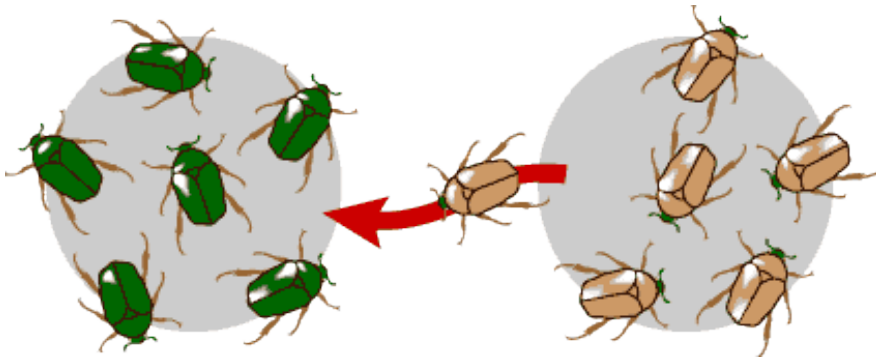
# MUTATION



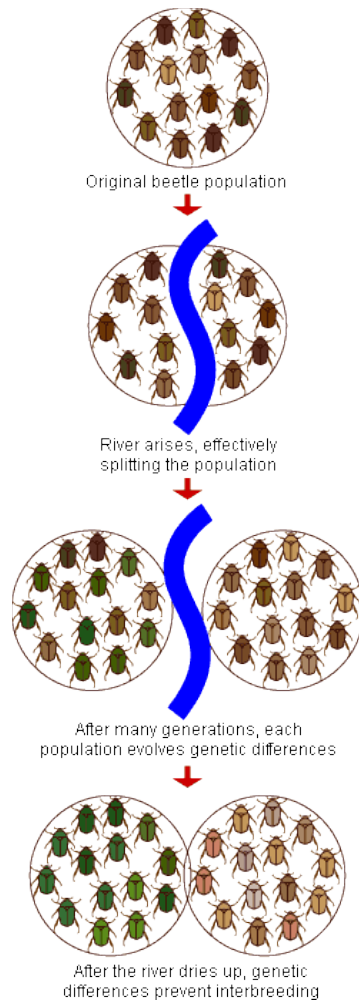
# GENETIC DRIFT



# GENE FLOW - MIGRATION



# What is speciation?



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