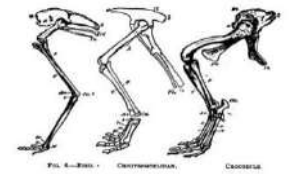


Biology

Learning goal: Assess their understanding of meiosis, genetics, evolution and population ecology

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Collect Evolution labs

Evolution in action

<http://video.pbs.org/video/1300397304>

While watching the film, list any vocabulary words related to evolution and take notes that will allow you to create a complete summary explaining how this case demonstrates evolution.



4

Genetic variation and assortment
Evolution and reproduction

3

Events of meiosis, variation and reproduction

2

Steps of meiosis basic definitions

1

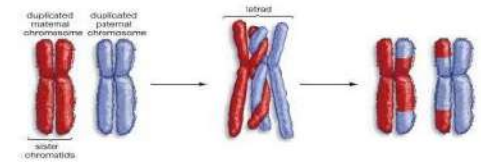
Mitosis vs meiosis, sexual vs asexual

Biology

Learning goal: Assess their understanding of meiosis, genetics, evolution and population ecology

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Learning goal: Assess their understanding of meiosis, genetics, evolution and population ecology

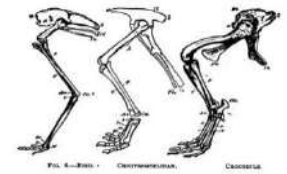
Learning scale:

1	2	3	4
Differentiate between mitosis and meiosis, sexual and asexual reproduction.	Define spermatogenesis and oogenesis. List the steps to meiosis. Define sexual and asexual reproduction.	Summarize the events that occur during meiosis. Differentiate between sexual and asexual reproduction and the correlation of genetic variation.	Explain how genetic variation is a function of crossing-over and independent assortment during spermatogenesis and oogenesis. Evaluate the genetic and evolutionary advantages to sexual versus asexual reproduction.

4	Genetic variation and assortment Evolution and reproduction
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Student's self-evaluation: Complete at home or at the end of class, use the 4-3-2-1 Learning scale (two to three sentences).

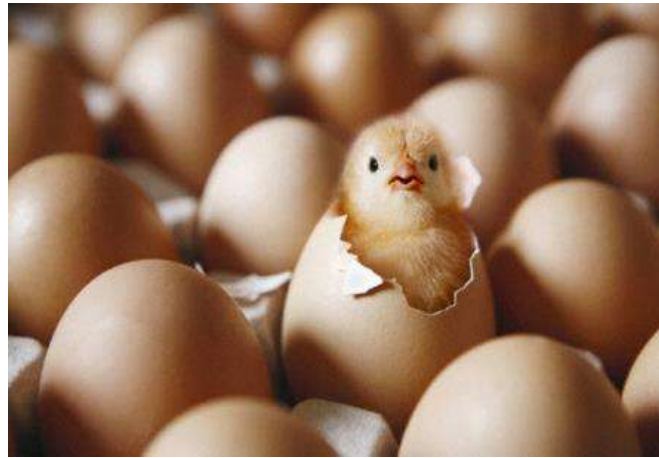
Homework: none



Eight misconceptions regarding evolution

1. Misconception: “Evolution is a theory about the origin of life.”

Response: Evolutionary theory deals mainly with how life changed *after* its origin. Science does try to investigate how life started (e.g., whether or not it happened near a deep-sea vent, which organic molecules came first, etc.), but these considerations are not the central focus of evolutionary theory. Regardless of how life started, afterwards it branched and diversified, and most studies of evolution are focused on those processes.



4

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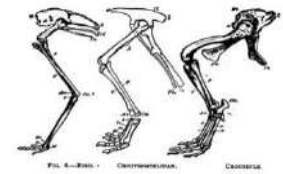
2

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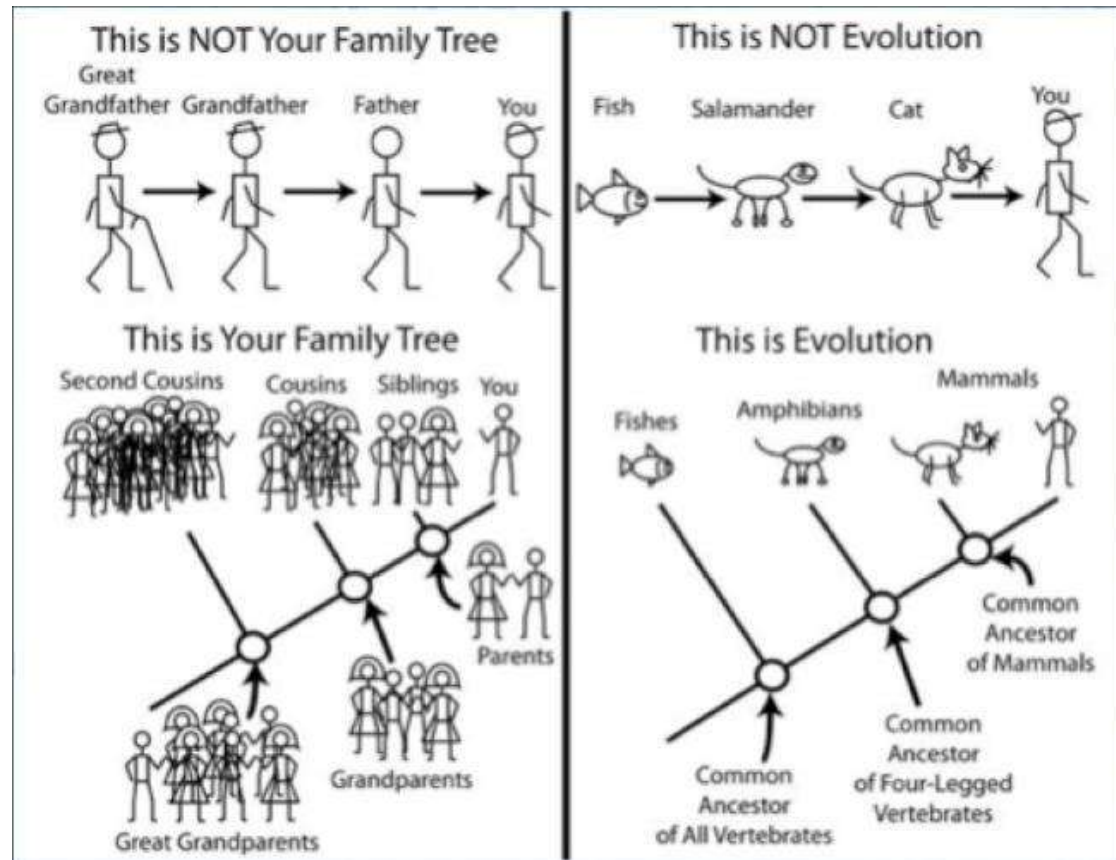
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Learning goal: Assess their understanding of meiosis, genetics, evolution and population ecology

Eight misconceptions regarding evolution

2. Misconception: “Evolution is like a climb up a ladder of progress; organisms are always getting better.”

Response: Natural selection weeds out individuals that are unfit in a particular situation, but for evolution, no organism has to be perfect – just well adapted.



4

Genetic variation and assortment
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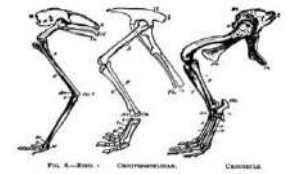
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Eight misconceptions regarding evolution

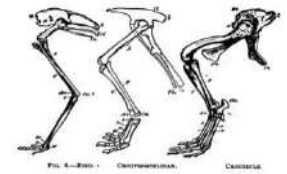
3. Misconception: Evolution means that life changed “by chance.”

Response: Chance is certainly a factor in evolution, but there are also non-random evolutionary mechanisms. Random mutation is the ultimate source of genetic variation, however natural selection, the process by which some variants survive and others do not, is not random.

The streamlined shape of these yellow fin tuna is no accident. A more streamlined shape allows these fish to move through the water faster. During their evolution, natural selection favored the more streamlined tuna.



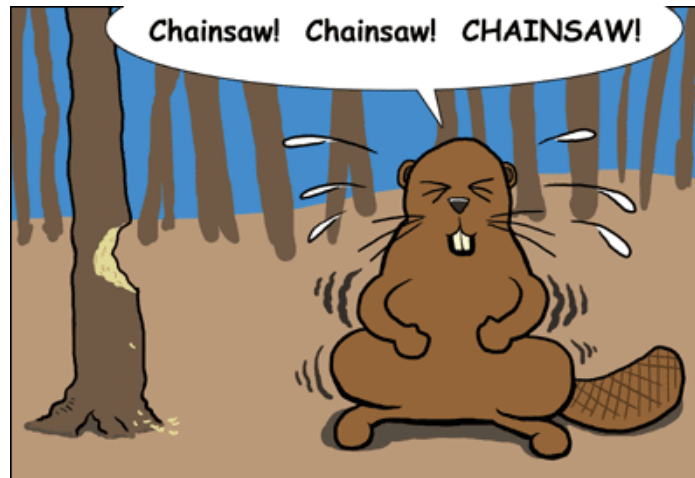
4	Genetic variation and assortment Evolution and reproduction
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Eight misconceptions regarding evolution

4. Misconception: “Natural selection involves organisms ‘trying’ to adapt.”

Response: Natural selection leads to adaptation, but the process doesn't involve “trying.” Natural selection involves genetic variation and **selection among variants present in a population**. Either an individual has genes that are good enough to survive and reproduce, or it does not—but it can't get the right genes by “trying.”



Adaptation doesn't involve trying.

4

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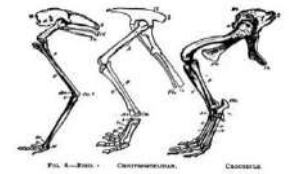
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Eight misconceptions regarding evolution

5. Misconception: "Natural selection gives organisms what they 'need.'"

Response: If **a population happens to have the genetic variation** that allows some individuals to survive a particular challenge better than others, then those individuals will have more offspring and the population will evolve.



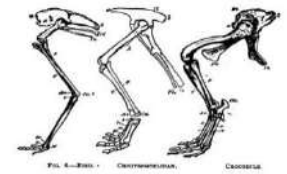
Natural selection does not grant organisms what they "need".

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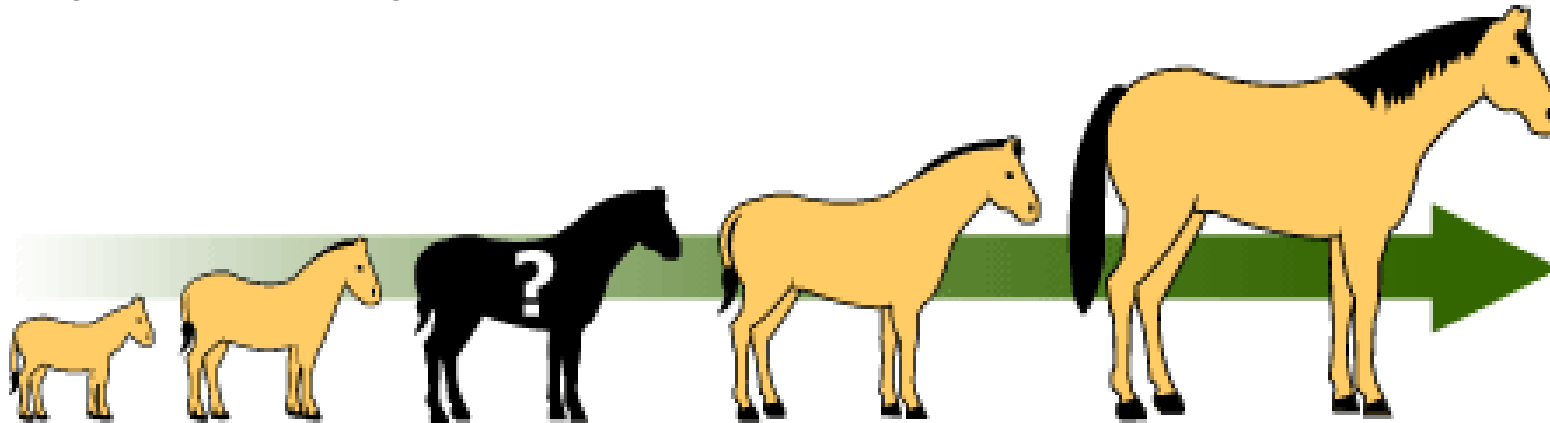
1
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Eight misconceptions regarding evolution

6. Misconception: “Gaps in the fossil record disprove evolution.”

Response: The fact that some transitional fossils are not preserved does not disprove evolution. Evolutionary biologists do not *expect* that all transitional forms will be found and realize that many species leave no fossils at all. **Lots of organisms don't fossilize well and the environmental conditions for forming good fossils are not that common.** So, science actually *predicts* that for many evolutionary changes there will be gaps in the record.



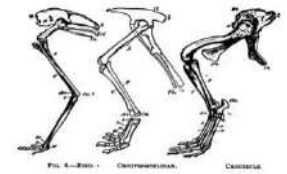
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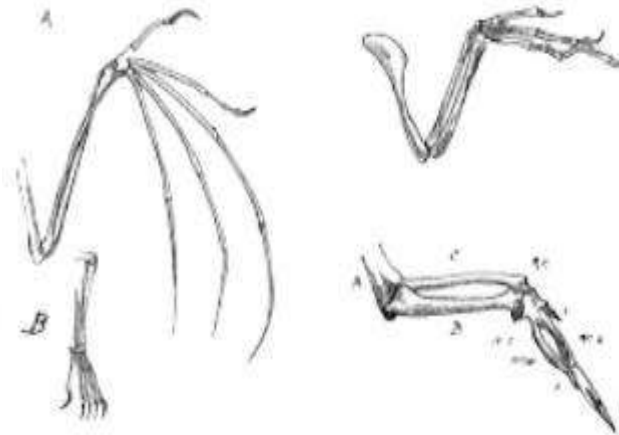
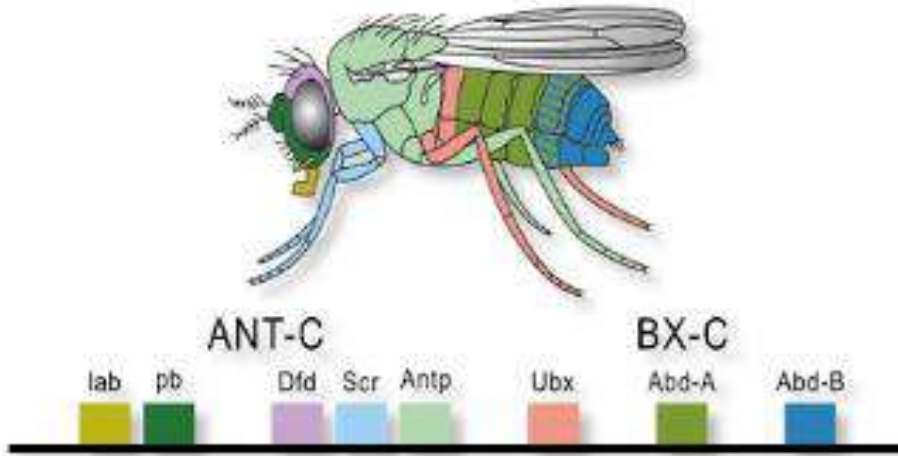
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Eight misconceptions regarding evolution

7. Misconception: “Evolution is not science because it is not observable or testable.”

Response: Evolution is observable and testable. Much of science is accomplished by gathering evidence from the real world and inferring how things work. Evidence for evolution exists in the DNA, bones and fossils, the comparison of anatomy and biogeography.

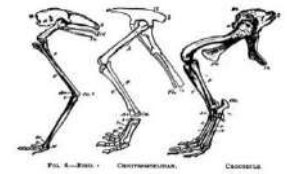


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Seven misconceptions regarding evolution

8. Misconception: “Evolution is just a theory.”

Response: Theories refer to well-supported explanations based on data

Theory	Law
Why something happens	What will happen
Explanation of nature	Predictable outcomes
Based on evidence	Based on evidence
Example: atomic theory	Example: Newton’s Law

Evolution is an observation that organisms (plants, animals, bacteria) change over time. There are theories, such as the theory of natural selection, that explain this observation.

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