

Life Sciences 11

LG 9

Evolution

Evolution – Change Over Time

Evolution is the story of life on Earth, how simple organisms gradually gave rise to the incredible diversity of species we see today. From tiny genetic changes to dramatic adaptations, evolution explains why organisms look, behave, and survive the way they do. It connects fossils to living species, links DNA to survival, and helps us understand everything from antibiotic resistance to why giraffes have long necks.

In this Learning Guide, you'll explore the big ideas behind evolution, including how traits are passed on, how populations change over time, and how scientists use evidence to explain these changes. You'll investigate the work of key thinkers like Charles Darwin, examine real-world examples of natural selection, and compare different explanations for how evolution occurs. Through textbook readings, review questions, note-taking, and online research, you'll build a deeper understanding of how evolution shapes life on our planet. This assignment will help you understand the theory of evolution, the scientists who shaped it, and the mechanisms that drive evolutionary change and by the end of this unit, you'll be able to explain why evolution is one of the most powerful and unifying ideas in biology. The Biology 11 teachers tried to make a joke about evolution, but it's still... *evolving!*

Use pages 268–313 of your Biology 11 textbook to complete this learning guide. Digital links (if easier):

<https://www.thsscience.com/resources/Biology%20Miller%20Levine%20Chapter%202013.pdf>

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Answer all questions in full sentences. Include diagrams, labelled images, and examples where requested.

Part 1: Foundations of Evolution

A. Textbook Reading & Review Questions

1. Read **pages 268–271**.
2. Complete **Section Review questions #1–4** on **page 271**.
3. Answer the following questions in **complete sentences**:
 - o **What is the principle of common descent?** (page 271)
 - o **What is adaptation?** (page 271)

B. Additional Reading & Questions

1. Read **pages 283–285**.
2. Complete **Section Review questions #1–4 on page 285**.

C. Research Task: Evolution in Action

Use **reliable internet sources** (educational websites, science organizations, or textbooks) to complete the following research tasks. Answer in **full sentences**, using proper scientific language.

1. Charles Darwin Report

This individual played a crucial role in advancing our understanding of evolution, and his work helped lay the foundation for recognizing how genetics influences evolutionary change. Write a **short report** addressing the following:

- Who was Charles Darwin, and why is he important to the study of evolution?
- Describe Darwin's voyage to the Galápagos Islands
 - What observations did he make?
 - What organisms did he study?
 - What patterns did he notice?
- What book did Darwin write, and why was it significant?
- What was the name of Darwin's theory?
- Explain the process of natural selection, including:
 - Variation
 - Overproduction
 - Competition
 - Survival of the fittest
 - Reproduction

2. Kettlewell's Peppered Moth Experiment

Research Bernard Kettlewell's peppered moth experiment and explain:

- What question was Kettlewell trying to answer?
- What happened to the moth population over time?
- Why did the population shift from mostly light-colored moths to mostly dark-colored moths?
- What environmental change caused this shift?
- Why is this experiment considered a classic example of natural selection?

➤ **Be detailed and clear in your explanation.**

Part 2: Mechanisms of Evolution

A. Textbook Reading & Review Questions

- Read and create brief, point-form notes on pages 291–313.
- Focus on:
 - Key terms
 - Important processes
 - Examples discussed in the text

B. Review Questions

- On page 316, complete:
 - Multiple Choice: #1–8
 - True and False: #1–8

C. Comparing Evolutionary Theories

Research Jean-Baptiste Lamarck and answer the following:

- Who was Lamarck?
- Explain how Lamarck's theory would explain the evolution of the giraffe's long neck.
- Explain how Darwin's theory explains the same trait.
- Clearly compare and contrast Lamarckism vs. Darwinism.

D. Evolutionary Patterns

In complete sentences:

1. Distinguish between:
 - Genetic drift
 - Punctuated equilibrium
2. State which explanation is better supported by modern scientific evidence and explain why.