

**CHAPTER 15**

*Study Guide*

**Section 1: Darwin's Theory of Evolution by Natural Selection**

In your textbook, read about developing the theory of natural selection.

For each statement below, write true or false.

- \_\_\_\_\_ 1. Charles Darwin served as naturalist on the HMS *Beagle*.
- \_\_\_\_\_ 2. The environments that Darwin studied exhibited little biological diversity.
- \_\_\_\_\_ 3. While in the Galápagos Islands, Darwin noticed slight differences in the animals from one island to the next.
- \_\_\_\_\_ 4. Darwin discovered that the Galápagos mockingbirds were different species.
- \_\_\_\_\_ 5. Darwin named the process by which evolution proceeds *artificial selection*.

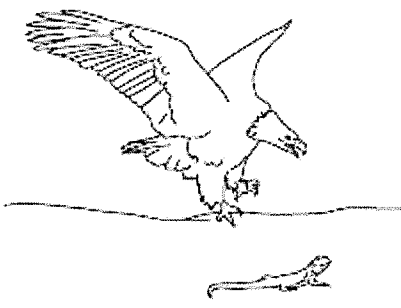
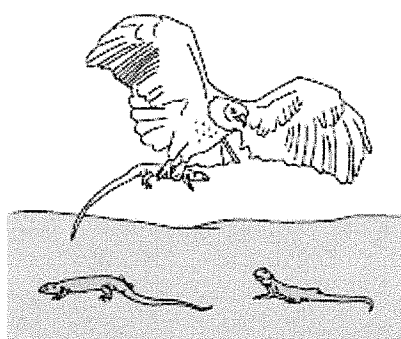
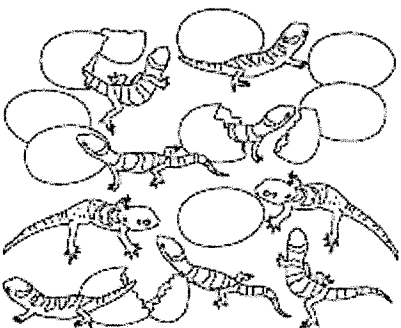
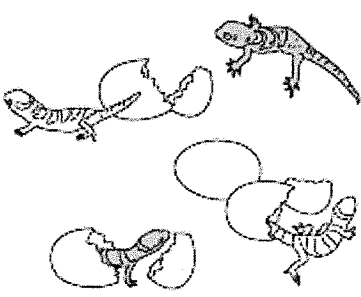
Match the point from Darwin's theory of evolution to the appropriate diagram.

A. There is a struggle to survive.

C. There is variation among offspring.

B. Living things overproduce.

D. Natural selection is always taking place.

<p>_____ 6.</p> 	<p>_____ 8.</p> 
<p>_____ 7.</p> 	<p>_____ 9.</p> 

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CHAPTER 15

**Section  
Quick Check**

**Section 1: Darwin's Theory  
of Evolution by Natural Selection**

*After reading the section in your textbook, respond to each statement.*

1. **List** the four basic principles of Darwin's theory of natural selection.

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2. **Recall** how Alfred Russel Wallace's theory compared to Darwin's theory of evolution by natural selection.

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3. **Summarize** Darwin's ideas about evolution in one or two sentences.

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4. **Compare** and **contrast** artificial and natural selection.

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5. **Show** how artificial selection could be used to develop a new breed of wheat with higher fiber content.

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# Study Guide

## CHAPTER 15 Section 2: Evidence of Evolution

In your textbook, read about the fossil record.

Match the description in Column A with the term in Column B.

### Column A

- \_\_\_\_\_ 1. show that the species present on Earth have changed over time
- \_\_\_\_\_ 2. thought to be the ancestor of birds
- \_\_\_\_\_ 3. are newly evolved features such as feathers
- \_\_\_\_\_ 4. are traits shared by species with a common ancestor
- \_\_\_\_\_ 5. thought to be the ancestor of armadillos

### Column B

- A. glyptodont
- B. ancestral traits
- C. fossils
- D. derived traits
- E. dinosaur

In your textbook, read about comparative anatomy and comparative biochemistry.

Complete the table by checking the correct column(s) for each description.

Description	Homologous Structure	Analogous Structure	Vestigial Structure	Comparative Biochemistry
6. Modified structure seen among different groups of descendants				
7. Eyes in a species of blind fish				
8. DNA and RNA comparisons that might indicate evolutionary relationships				
9. Bird wings and butterfly wings that have the same function but different structures				
10. A body structure that is no longer used for its original function but that might have been used in an ancestor				

## Study Guide, Section 2: Evidence of Evolution continued

In your textbook, read about geographic distribution and types of adaptation.

If the statement is true, write true. If the statement is false, replace the italicized term or phrase to make it true.

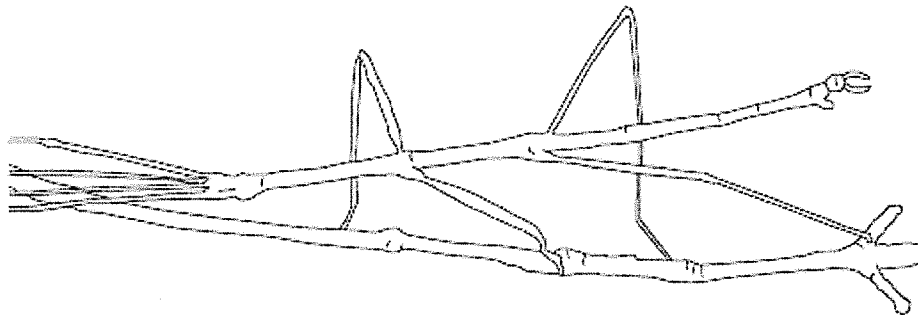
11. Evolutionary theory predicts that species respond to similar *environments* in similar ways.
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12. *Geographic distribution* is the study of the distribution of plants and animals on Earth.
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13. Similar environments can lead to the *evolution* of similar animals, even if they are not close relatives.
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14. Traits that enable individuals to survive or reproduce better than individuals without those traits are called *reproduction*.
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15. Mimicry involves a harmless species that has evolved to closely resemble a *beneficial* one.
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16. The type of morphological adaptation shown in the picture above is *camouflage*.
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17. Mimicry and camouflage are morphological adaptations that increase a species' *fitness*.
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18. *Antibiotic resistance* is a form of adaptation that causes some diseases to come back in more harmful forms.
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**Section  
Quick Check**

**CHAPTER 15**

**Section 2: Evidence of Evolution**

*After reading the section in your textbook, respond to each statement.*

**1. Define** *adaptation* as it relates to evolution.

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**2. Explain** why a once-functional structure might become a vestigial structure.

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**3. Differentiate** between homologous structures and analogous structures.

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**4. Classify** the color patterns of the harmless California kingsnake, which resemble those of the poisonous western coral snake, as mimicry or camouflage. Explain.

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**5. Predict** whether antelope and squirrels or squirrels and rabbits will have more similar DNA. Explain.

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# Study Guide

## CHAPTER 15

### Section 3: Shaping Evolutionary Theory

In your textbook, read about the mechanisms of evolution, speciation, and patterns of evolution.

Write a term or phrase that best completes each statement.

1. \_\_\_\_\_ is a change in allelic frequencies in a population that is due to chance.
2. \_\_\_\_\_ removes individuals with average trait values, creating two populations with extreme traits.
3. The most common form of selection, \_\_\_\_\_, removes organisms with extreme expressions of a trait.
4. When a small sample of the main population settles in a location separated from the main population, the \_\_\_\_\_ can occur.
5. In \_\_\_\_\_, a species evolves into a new species without any barriers that separate the populations.
6. \_\_\_\_\_ will shift populations toward a beneficial but extreme trait value.
7. In \_\_\_\_\_, a population is divided by a barrier, each population evolves separately, and eventually the two populations cannot successfully interbreed.
8. \_\_\_\_\_ is a change in the size or frequency of a trait based on competition for mates.
9. One species will sometimes diversify in a relatively short time into a number of different species in a pattern called \_\_\_\_\_.
10. The idea that evolution occurred in small steps over millions of years in a speciation model is currently known as \_\_\_\_\_.

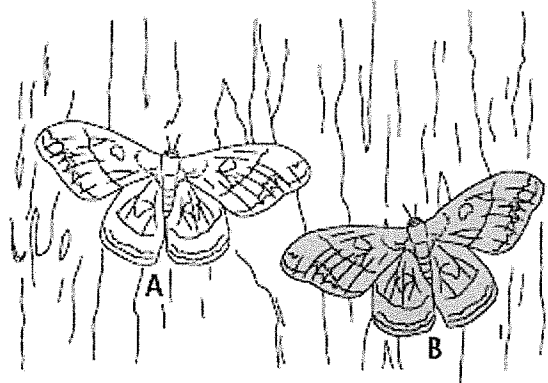
Refer to the figure. Respond to each statement.

11. **Specify** which moth would survive if pollution increases.

\_\_\_\_\_

12. **State** the name of the phenomenon illustrated.

\_\_\_\_\_



# Section Quick Check

## CHAPTER 15

### Section 3: Shaping Evolutionary Theory

After reading the section in your textbook, respond to each statement.

1. **State** the effect of genetic bottlenecks.

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2. **Define** *punctuated equilibrium*.

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3. **Describe** how scientists determine when evolution will not occur, according to the Hardy-Weinberg principle.

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4. **Compute** A population of 100 flowering plants contains 60 plants that are homozygous for orange flowers ( $OO$ ), 30 plants that are heterozygous for orange flowers ( $Oo$ ), and 10 plants that are homozygous for white flowers ( $oo$ ). Determine the frequency of the  $O$  allele and the frequency of the  $o$  allele in this population. Show your work.

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5. **Evaluate** whether or not sexual selection will always contribute toward survival of a species.

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