

# CBL BIOLOGY: LIFE SCIENCE OPTION

BSCS Green Version 10th edition

*Biology An Ecological Approach*

Lesson Plan Quarter 2, Week 9, Day 1



## Outcomes for Today

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Standards Focus: 4c 6g 7acd 8abcd

### PREPARE

#### 1. Background knowledge necessary for today's reading.

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This lesson is all about the concept of species. You may want to toss this term about to ask students what their knowledge of species is. You could simply list a group of animals or plants and ask students to identify similar species. It must be noted that the species concept is a human form of classification and isn't exact.

#### 2. Vocabulary Word Wall.

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Introduce five important, useful words from today's reading.

**reproductive isolation      sterile      offspring      species      variation**

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

### READ

#### 3. Review the vocabulary and concepts previously covered in this chapter.

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Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

There is a great deal of variety in the living things on this earth.

Biologists use different methods to classify living things.

Biologists look for patterns and similarities in order to group animals and plants.

Biologists also look at the developmental cycles to classify living things.

#### 4. Read directions for investigation/activity.

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**5. Read text. Ch9, Evolution: Patterns and Diversity, Text Section 9.2 pp. 235-238**

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- Shared Reading RRP: Read, React, Predict every 2-3 pages  
 Tape  Partner  Choral  Silent  Round Robin Reading

Setting	Characters	Pages
the Arctic	polar bear	235
pond	bull frog and leopard frog	236
all over	different species of dogs	236
North American	red and yellow-shafted flicker	236
Continent	snow geese	236

### RESPOND

**6. Fix the facts. Clarify what's important.**

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Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important concepts and post these on the billboard.

Students might mention:

All living things are unique.

In the animal and plant world, individual populations are isolated from one another due to such factors as mountain ranges and oceans, or due to differences in their own physical makeup.

Sometimes animals mate and produce young animals that are sterile.

Sterile means that the animal cannot reproduce (produce new young).

Dogs are a good example of a species that has a great deal of variation. I mean, just think of a Great Dane and a Chihuahua. They are the same species!

A hybrid can be fertile.

**7. Post information on the billboard. Add new information to ongoing class projects on the wall.**

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- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

### EXPLORE

**8. Explore today's investigation with inquiry activities.**

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**9. Explore today's simulation with inquiry activities.**

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## 10. Collect data and post.

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### One possible activity:

#### Species Search

Materials necessary: Old nature magazines or *National Geographic* magazines with many pictures of animals

Procedure: Explain to students that animals and plants were identified and have been named and classified by scientists over the years. Their job will be to name and group animal samples by observable characteristics. All animals are to receive a new name selected by the students. Direct the students to cut out (or tear out as conditions warrant) at least 20 animals. Have them group the animals by similarities on poster paper and then give their “finds” new names. Names can be based on observable characteristics, what the animal eats, or where it lives, to name several examples. Have students post their completed projects on the wall as there will be a follow-up activity.

#### Another Supplemental Activity

The following link contains an excellent article about the discovery of new species of plants and animals. This is a biologist’s dream.

<http://www.washingtonpost.com/wp-dyn/content/article/2006/02/07/AR2006020702082.html>

Other possible activities for a  class  group or  individual

- Bookmark  Open Mind Portrait  g6 Graphic Organizer  
 g7 Main Idea Graphic Organizer  c1-12 Cubing  Postcard  Prop  
 Poster  Ad  Map  Retelling  Reader’s Theatre  Cartoon  Rap

#### Key Questions

1. Why are polar bears a species?
2. What beneficial qualities might a mule have from each parent?
3. Give examples of variations in animals such as dogs and cats.
4. What is a hybrid? Give at least two examples.
5. Look at the picture of the dogs on page 237 of your text. How many hybrids are there?
6. What is a pure breed? Give several examples from the dog world.

Remember to ask  literal  structural  idea  craft  author  literature  life  
 evaluate and  inference questions every day.

**Key Paragraph**

Although every organism is unique, some have more characteristics in common than others. Organisms that are so closely similar that they can mate and produce fertile offspring are grouped in the same species.

**EXTEND**

**11.** Prompt every student to write a short product tied to today's reading

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**Back from Extinction**

Spend a little time talking to students about extinction. List a few of the commonly known extinct animals. Now you can prompt students to write in response to this question:

If you could bring back one extinct animal, what would it be and why? Write a short paragraph about this.

**12.** Close with a short summary.

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Extend the reading to the students' lives or to the world.

# CBL BIOLOGY: LIFE SCIENCE OPTION

BSCS Green Version 10th edition

*Biology An Ecological Approach*

Lesson Plan Quarter 2, Week 9, Day 2



## Outcomes for Today

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Standards Focus: 4c 6g 7acd 8abcdf

### PREPARE

#### 1. Background knowledge necessary for today's reading.

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Charles Darwin is a name that many people recognize. For example, ask students how many of them have seen this little emblem on the back of automobiles:



Ask them if they know what it means. Do not provide any answers or interpretation. Proceed with the lesson and then return to this symbol at the end of this lesson for the short writing assignment.

#### 2. Vocabulary Word Wall.

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Introduce five important, useful words from today's reading.

**Charles Darwin   Galapagos Islands   finch   overpopulation   Thomas Malthus**

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

### READ

#### 3. Review the vocabulary and concepts previously covered in this chapter

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Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

As students begin to understand Darwinian evolutionary concepts, it might be helpful to point out that Charles Darwin was first a naturalist. Long before his famous voyage, he made detailed observations of nature. His observations can serve as a review up to this point:

There is a great deal of variation in all living things.

Character Education at the Markkula Center for Applied Ethics

[www.scu.edu/character](http://www.scu.edu/character)

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There are great differences between some organisms as well as many similarities.  
 Scientists group living things according to these differences and similarities.  
 The term species is given to those organisms that can reproduce fertile offspring.

**4. Read directions for investigation/activity.**

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**5. Read text. Ch 9, Evolution: Patterns and Diversity, Text Section 9.3, pp. 238-239**

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- Shared Reading RRP: Read, React, Predict every 2-3 pages  
 Tape  Partner  Choral  Silent  Round Robin Reading

Setting	Characters	Pages
HMS <i>Beagle</i>	Charles Darwin	238
Galapagos Islands	Charles Darwin	238
	many species of finches	239

## RESPOND

**6. Fix the facts. Clarify what's important.**

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Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important concepts and post these on the billboard.

Students might mention:

Charles Darwin was more than just a passenger on the sailing ship, the *Beagle*. While visiting the Galapagos Islands, Darwin collected many plants and animals for study.

The Galapagos Islands sound like a most interesting place, somewhat like another planet.

When Darwin returned to his home in England, he continued to study the specimens and information he collected and recorded on the Galapagos Islands.

The scientist, Thomas Malthus seemed to be predicting the future with his warnings of human overpopulation over 100 years ago.

**7. Post information on the billboard. Add new information to ongoing class projects on the wall.**

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- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

## EXPLORE

8. Explore today's investigation with inquiry activities.

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9. Explore today's simulation with inquiry activities.

---

10. Collect data and post.

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### One possible activity:

#### Where in the heck are the Galapagos Islands?

Obtain a good map of the world. Have students locate the Galapagos Islands off the coast of South America. Next, use the computer and Google Earth to “zoom in” on the islands (free download at <http://download.earth.googlepages.com/>). Have students search around the islands using this feature and answer the questions located in the question section of this lesson plan.

Have them post their findings on the wall.

Other possible activities for a  class  group or  individual

Bookmark  Open Mind Portrait  g6 Graphic Organizer

g7 Main Idea Graphic Organizer  c1-12 Cubing  Postcard  Prop

Poster  Ad  Map  Retelling  Reader's Theatre  Cartoon  Rap

### Key Questions

Google Earth Questions (to be answered with the aid of Google Earth program):

How many islands are located in the Galapagos chain?

What are some of the physical features of the islands?

What is the closest large land mass and how far away is this mainland?

Other Questions (from the text):

Regarding the finches Darwin studied, where did he think their ancestors came from? Why did he believe this?

What was Thomas Malthus' concern about human population?

Do you agree with Malthus? Why or why not?

What did Darwin have to say about populations and how they might be kept from overpopulating?

Remember to ask  literal  structural  idea  craft  author  literature  life  
 evaluate and  inference questions every day.

**Key Paragraph**

How does such diversity and variation come about? In the nineteenth century, Charles Darwin offered one answer to this question. In 1831, at the age of 22, Darwin signed on as a naturalist with the H.M.S. *Beagle* for a four-year voyage around the world. During this trip, Darwin studied the natural history and the biology of South America and various islands in the Pacific.

**EXTEND**

**11.** Prompt every student to write a short product tied to today's reading

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**So what does it mean?**

**The Darwin Fish Auto Emblem**



Follow up on this lesson by showing students this little emblem seen on many cars these days. Have them write a short paragraph on what they think it means.

**12.** Close with a short summary.

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Extend the reading to the students' lives or to the world.



# CBL BIOLOGY: LIFE SCIENCE OPTION

BSCS Green Version 10th edition

*Biology An Ecological Approach*

Lesson Plan Quarter 2, Week 9, Day 3



## Outcomes for Today

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Standards Focus: 4c 6g 7acd 8abcdf

### PREPARE

#### 1. Background knowledge necessary for today's reading.

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This lesson is an ongoing examination of the work of Charles Darwin. A possible introduction discussion idea might be to take a little time to talk about the idea of the powers of observation. You might bring in several articles, specimens, or just about anything to have students observe. Have them individually write down their observations. Make sure you distinguish between observable characteristics and the concept of assumptions. Words like "ugly" can be used as examples of assumption.

#### 2. Vocabulary Word Wall.

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Introduce five important, useful words from today's reading.

**artificial selection    natural selection    adaptation    acquired characteristics**  
**Jean Baptiste Lamark**

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

### READ

#### 3. Review the vocabulary and concepts previously covered in this chapter.

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Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

Living (and extinct) organisms are both different and similar in many aspects.

The same species are so similar that they produce fertile offspring.

The differences within the same species are known as variations.

Environmental conditions can bring about differences in species.

Hybrids are a combination of species. They can be fertile (same species) or sterile (different species).

Charles Darwin was a naturalist and scientist who first began to describe some of the laws of natural selection.

**4. Read directions for investigation/activity.**

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**5. Read text. Ch 9, Evolution: Patterns and Diversity, Text Section 9.4, pp. 240-241**

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- Shared Reading RRP: Read, React, Predict every 2-3 pages  
 Tape  Partner  Choral  Silent  Round Robin Reading

Setting	Characters	Pages
various farm settings	a wide variety of chicken breeds.	240
19 <sup>th</sup> century France	Jean Baptiste Lamarck	241

## RESPOND

**6. Fix the facts. Clarify what's important.**

---

Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important concepts and post these on the billboard.

Students might mention:

Darwin noticed that animal breeding was going on long before he went to sea on the *Beagle*. Animal breeders were known to have developed certain breeds of cows for high milk output.

Darwin figured that if human breeders could create artificial conditions for the selection of desired characteristics in animals, nature must also be doing it. He called this process in nature natural selection whereas when humans manipulated the situation to produce desired characteristics, it was artificial selection.

There was another scientist back then, Jean Baptiste Lamarck, who was trying to figure out how one species of organism could produce another that was somewhat different.

A specific characteristic that an organism develops during the course of its life is known as an acquired characteristic. This is not passed down to the next generation.

**7. Post information on the billboard. Add new information to ongoing class projects on the wall.**

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- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

## EXPLORE

8. Explore today's investigation with inquiry activities.

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9. Explore today's simulation with inquiry activities.

---

10. Collect data and post.

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### One possible activity:

#### Darwin's Finches

Charles Darwin was intrigued by the wide variety of finches he found while visiting the Galapagos Islands. Please see supplementary activity attached to this lesson for an activity about the finches.

Other possible activities for a  class  group or  individual

- Bookmark    Open Mind Portrait    g6 Graphic Organizer  
 g7 Main Idea Graphic Organizer    c1-12 Cubing    Postcard    Prop  
 Poster    Ad    Map    Retelling    Reader's Theatre    Cartoon    Rap

#### Key Questions

Give examples of variation among at least three different species of animals. Be specific.

What are the differences and similarities between natural selection and artificial selection? Give examples.

What are adaptations? Give examples. What are some adaptations that humans exhibit.

What are acquired characteristics? List several human acquired characteristics.

Remember to ask  literal  structural  idea  craft  author  literature  life  evaluate and  inference questions every day.

#### Key Paragraph

If natural selection acts on variations among members of a population, what accounts for these variations? Darwin proposed that variations appear randomly and without design. If a new variation allows its bearer to produce more offspring, it will spread through future generations.

**EXTEND**

**11.** Prompt every student to write a short product tied to today's reading

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**Artificial Selection**

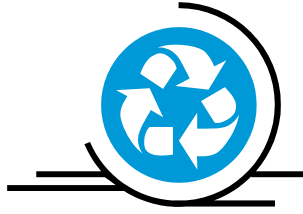
Propose this question to students and then have them write on the topic:

Is a beauty contest a process of artificial selection? Why or why not? Explain your answer.

**12.** Close with a short summary.

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Extend the reading to the students' lives or to the world.



## Supplemental Student Investigation Darwin's Finches Diversity in Bird Beaks

### Objective:

To understand diversity through investigation of the various finches found on the Galapagos Islands.

**Materials:** The diagram of the various finches found on the Galapagos Islands (attached). Figure 9.9 in the text (page 239).

### Introduction

When Charles Darwin stepped ashore on the Galapagos Islands in September 1835, it was the start of five weeks that would change the world of science, although he did not know it at the time. Among other finds, he observed and collected the variety of small birds that inhabited the islands, but he did not realize their significance, and failed to keep good records of his specimens and where they were collected. It was not until he was back in London, puzzling over the birds, that the realization that they were all different, but closely related, species of finches led him toward formulating the principle of natural selection.

In his memoir, *The Voyage of the Beagle*, Darwin noted, almost as if in awe, "One might really fancy that, from an original paucity of birds in this archipelago, one species had been taken and modified for different ends."

Indeed, the Galapagos have been called a living laboratory where speciation can be seen at work. A few million years ago, one species of finch migrated to the rocky Galapagos from the mainland of Central or South America. From this one migrant species would come many -- at least 13 species of finches evolving from the single ancestor.

This process in which one species gives rise to multiple species that exploit different niches is called adaptive radiation. The ecological niches exert the selection pressures that push the populations in various directions. On various islands, finch species have become adapted for different diets: seeds, insects, flowers, the blood of seabirds, and leaves.

The ancestral finch was a ground-dwelling, seed-eating finch. After the burst of speciation in the Galapagos, a total of 14 species would exist: three species of ground-dwelling seed-eaters; three others living on cactuses and eating seeds; one living in trees and eating seeds; and seven species of tree-dwelling insect-eaters.

Scientists long after Darwin spent years trying to understand the process that had created so many types of finches that differed mainly in the size and shape of their beaks.

**Activity**

Review figure 9.9 in the text with students. Allow them to work in small groups, if possible, to answer the questions, and then present their findings. Possible methods of presentation:

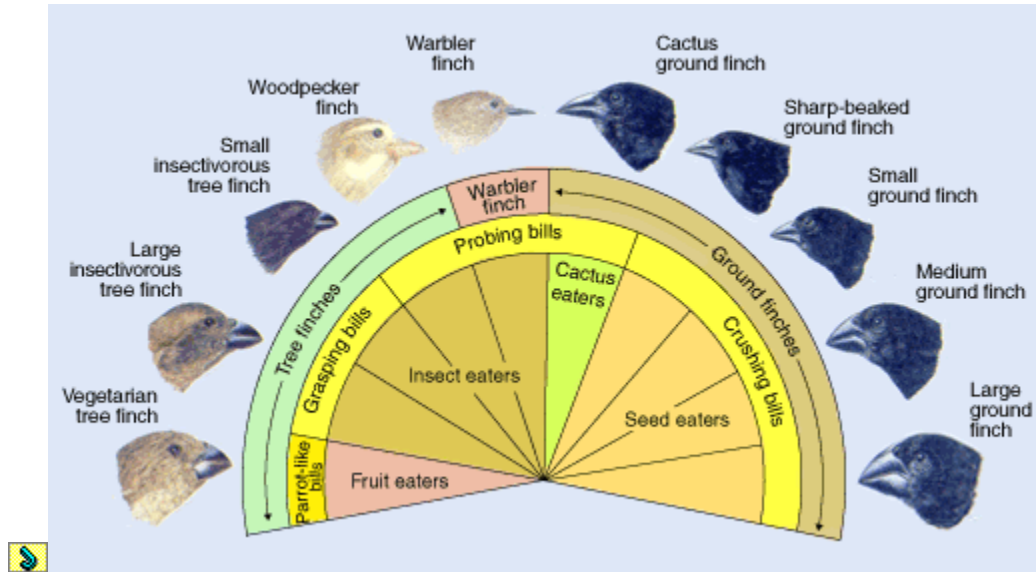
Students could represent themselves as individual finches and describe their adaptations for survival.

Students might work in small teams divided up by the types of finch bills.

## Student Research Sheet

Name \_\_\_\_\_

## Adaptive Radiation: Darwin's Finches



This diagram presents ten species of finches on the Galapagos Islands, each filling a different niche on various islands. All of them evolved from one ancestral species, which colonized the islands only a few million years ago. This process, whereby species evolve rapidly to exploit empty **ecospace**, is known as **adaptive radiation**.

## Questions

1. Describe the types of variation you see in the illustrations of Darwin's finches.
2. Why do you think each species' variation makes it well adapted to its physical environment?
3. Why do you think each species' variation makes it well adapted for its food supply?

# CBL BIOLOGY: LIFE SCIENCE OPTION

BSCS Green Version 10th edition

*Biology An Ecological Approach*

Lesson Plan Quarter 2, Week 9, Day 4



## Outcomes for Today

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Standards Focus: 4c 6g 7acd 8abcdf

### PREPARE

#### 1. Background knowledge necessary for today's reading.

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*Natural selection* is actually a pretty common "pop culture" phrase as of late. Ask students if they have heard of the term in relation to everyday life. Another Darwinian phrase that is often bantered about is *survival of the fittest*. You could build interest by discussing these terms in both the pop culture and scientific formats.

#### 2. Vocabulary Word Wall.

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Introduce five important, useful words from today's reading.

**natural selection**      **habitat**                      **predator**                      **prey generation**

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

### READ

#### 3. Review the vocabulary and concepts previously covered in this chapter.

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Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

In the natural world there are noticeable patterns. Scientists have described the similarities and differences in living organisms.

Species are very similar and can interbreed.

Within species there are variations, often slight.

Nineteenth-century scientists, Darwin, Malthus, and Lamarck were pioneers in describing the concepts of evolution.

Natural selection is the primary process of evolution.

#### 4. Read directions for investigation/activity.

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**5. Read text. Ch 9, Evolution: Patterns and Diversity, Text Section 9.1, pp. 254-256**

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- Shared Reading RRP: Read, React, Predict every 2-3 pages  
 Tape  Partner  Choral  Silent  Round Robin Reading

Setting	Characters	Pages
your classroom	students	254

### RESPOND

**6. Fix the facts. Clarify what's important.**

---

Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important concepts and post these on the billboard.

Students might mention:

A habitat can be artificial or natural. The "habitat" in this investigation is artificial.  
 I have never been a predator before...or have I?  
 Color has much to do with survival (for animals and humans).

**7. Post information on the billboard. Add new information to ongoing class projects on the wall.**

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- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

### EXPLORE

**8. Explore today's investigation with inquiry activities.**

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**9. Explore today's simulation with inquiry activities.**

---

## 10. Collect data and post.

---

### One possible activity:

#### Natural Selection

Here is a simplified version of Investigation 9.1 found on pages 254-256 of the text. If time (and ability) permits, follow the directions for Investigation 9.1 on pages 254-255 in the text.

#### Introduction

We have seen that the process of natural selection is how evolutionary change occurs in nature. In this investigation you will set up a little natural selection experiment as a way to better understand the process.

#### Materials (for each small group)

Several (2-4) pieces of fabric (table cloth size) in various colors and patterns

At least 100 paper clips of assorted colors

A small bowl

A set of colored pencils similar to the paper clip colors

Five sheets of graph paper

A data book

Pens

#### Procedure

1. The fabric table cloths are the "habitat." Spread them out on several table tops. Observe the paper clips.
2. One team member will be the keeper of the clips. The other members will be "predators" and their "prey" will be the colored paper clips. The keeper records the number of turns each predator takes and the number of prey remaining.
3. The keeper spreads the clips onto the "habitat" while the "predators" turn their backs.
4. Next (one at a time) each team member turns around and quickly picks a "prey clip" out of the habitat. The "prey" clips are placed in the bowl. Have students continue this process until only 25 clips are left in the "habitat." These are the "survivors."
5. Now recover the "survivor" clips.
6. Have each team group the survivors according to color (placed together). Have them record the number and colors.
7. Next, tell students that each survivor produces three offspring. Add the "offspring" (more of the same color clips from another bag) to the survivors.
8. Repeat the activity beginning with step 3. Do not include the clips that were the "prey" and thus "consumed" by the predators in step 4.
9. Continue to repeat this process for at least two more sequences.

Other possible activities for a class group or individual

- Bookmark Open Mind Portrait g6 Graphic Organizer  
g7 Main Idea Graphic Organizer c1-12 Cubing Postcard Prop  
Poster Ad Map Retelling Reader's Theatre Cartoon Rap

### Key Questions

Have students prepare a bar graph for each “generation” of the survivors. Use the same colored pencils as the surviving clips to indicate the population.

1. Why do you think that certain colors “survived”?
2. What observations can you make about the second through the fourth and fifth generations?
3. How is the color pattern from the first generation of clips different from the color pattern of the fourth and fifth generations?
4. How is the color pattern of the survivors similar to the “habitat” of the table cloth?
5. List a few comments here about this natural selection.

Remember to ask literal structural idea craft author literature life  
evaluate and inference questions every day.

### Key Paragraph

Biologists consider natural selection to be the chief mechanism of evolutionary change and the processes responsible for the diversity of life on earth.

## EXTEND

### 11. Prompt every student to write a short product tied to today’s reading

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#### Colors

Here is a thought-provoking possibility.

Begin with this statement:

Many times people are attacked simply for the colors they might be wearing and the neighborhood they are walking in.

Now the question to ponder:

Is this a process of natural selection or artificial selection? Write a short paragraph explaining your answer.

### 12. Close with a short summary.

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Extend the reading to the students' lives or to the world.

**CBL BIOLOGY: LIFE SCIENCE OPTION**  
**BSCS Green Version 10th edition**  
*Biology An Ecological Approach*  
 Lesson Plan Quarter 2, Week 9, Day 5



## Outcomes for Today

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Standards Focus: 4c 6g 7acd 8abcdf

### PREPARE

#### 1. Background knowledge necessary for today's reading.

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Things seem to come full circle. When Darwin first considered his theory of evolution he was reluctant to publish the information because of the prevailing attitudes at the time. He was fearful that the religious and other prevailing beliefs of the time (1859) would not be fertile ground for some new thinking. I suppose one must wonder how far we have come. This may be a good time to discuss this statement: *The more things change, the more they stay the same.*

#### 2. Vocabulary Word Wall.

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Introduce five important, useful words from today's reading.

**theory**      **origin**      **penicillin**      **resistant**      **hypothesis**

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

### READ

#### 3. Review the vocabulary and concepts previously covered in this chapter.

---

Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
  - Point to the concept chart as you quickly review it.
- Charles Darwin was the primary researcher who developed the theory of evolution.

Darwin was a naturalist and a keen observer of living things and systems. During his four-year voyage around the earth, Darwin observed and collected many species of living things.

His research and that of other scientists of the time, Malthus, Lamark, and Russell, pointed to similar conclusions:

Species exhibit variations.

Those species that are most successful, survive to pass on their “successful genes” to their offspring.

Over time, the species change or adapt to meet the changes in their environment.

**4.** Read directions for investigation/activity.

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**5.** Read text. Ch 9, Evolution: Patterns and Diversity, Section 9.5, pp. 241-243

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- Shared Reading RRP: Read, React, Predict every 2-3 pages  
 Tape  Partner  Choral  Silent  Round Robin Reading

Setting	Characters	Pages
the English countryside	peppered moth	242

### RESPOND

**6.** Fix the facts. Clarify what’s important.

---

Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important concepts and post these on the billboard.

Students might mention:

Darwin was afraid, at first, to share his theory of evolution because he was fearful of the reaction. When he did present his theory, "The Origin of Species," in 1859, his fears came true.

Other scientists reached conclusions similar to Darwin's, but Darwin had the most evidence.

Darwin’s theory has been supported by the findings and conclusions of many thousands of scientists since he first published *On the Origin of Species* in 1859.

Examples of organisms adapting to meet a changing environment include the peppered moth in England.

**7.** Post information on the billboard. Add new information to ongoing class projects on the wall.

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- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

### EXPLORE

**8.** Explore today’s investigation with inquiry activities.

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**9.** Explore today’s simulation with inquiry activities.

---

## 10. Collect data and post.

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### Two possible activities:

#### The Peppered Moth Phenomenon

<http://www.explorellearning.com/index.cfm?method=cResource.dspDetail&ResourceID=447>

This is a good quiz and simulation. It can be projected or, in a lab setting, individual students can participate in the simulation and quiz.

#### Who Was Charles Darwin Anyway?

<http://www.teachersdomain.org/resources/tdc02/sci/life/evo/dar/index.html>

If you have the technology, this easily downloadable video clip gives students an insight into the significance of Darwin's theory. It portrays Darwin the man as well as the historical attitudes of his day.

Here is an excerpt from the web page:

Charles Darwin's life represented the essence of science. He was naturally curious and reflective and a keen observer who was always gathering evidence to explain the world around him. Even before Darwin stepped onto HMS *Beagle*, he was an experienced naturalist. He spent much of his early life outdoors observing nature and during college had as mentors many scientists who engaged him in long conversations about science.

But the voyage of the *Beagle* was the turning point in Darwin's life. It gave a breadth and depth to his experience that was invaluable to his later thinking. During the five-year journey of the *Beagle* (1831-1836), Darwin spent only 18 months at sea. The rest he spent ashore. His curiosity, coupled with his frequent bouts of seasickness, inspired him to take long expeditions exploring the natural history and geology of South America, the Galápagos Islands, Tahiti, and Australia. Darwin made careful observations and looked for patterns wherever he went. His key observations about the diversity and distribution of species spurred his thinking for the book that would revolutionize science: *On the Origin of Species by Means of Natural Selection*.

Darwin wrote letters to his mentors and sent his collections home throughout his journey. By the time Darwin stepped off the *Beagle*, he was already recognized by the scientific community for his expertise.

Upon Darwin's return, he spent eight years studying barnacles and believed that his in-depth knowledge in this one area sparked his thinking in others. During this time, Darwin began to develop his revolutionary theory of natural selection, which explained a mechanism for evolution. He carefully explored different lines of evidence, experimenting and gathering information to support his case for evolution.

One of Darwin's interests, pigeon breeding, played a significant role both in the development of his theory of natural selection and in the way he presented his argument in *The Origin of Species*. Darwin wanted to demonstrate that new species could be created from a common ancestor by the accumulation of small changes over generations. He believed that studying breeding by artificial selection of animals like pigeons would provide evidence.

Darwin spent 20 years gathering evidence and writing about his theory before he published it. He anguished over the controversy it would create in Victorian England. And, if the naturalist Alfred Wallace hadn't come to similar conclusions and written to Darwin for help in presenting them, it might have been even longer before the world read a word of *The Origin of Species*.

Other possible activities for a  class  group or  individual

Bookmark  Open Mind Portrait  g6 Graphic Organizer

g7 Main Idea Graphic Organizer  c1-12 Cubing  Postcard  Prop

Poster  Ad  Map  Retelling  Reader's Theatre  Cartoon  Rap

### Key Questions

Why was Darwin reluctant to publish his theory of evolution?

Why did he eventually publish it?

What is a "natural experiment"? Give an example.

Explain how the moths in England support Darwin's theory of evolution.

Why is it that penicillin, an antibiotic, is no longer effective as it once was in killing bacteria?

What have scientists found regarding Darwin's theory in the years since he first published his findings?

Remember to ask  literal  structural  idea  craft  author  literature  life  
 evaluate and  inference questions every day.

### Key Paragraph

Theories usually are modified as our knowledge increases. This process of continuous, minor modification is an example of how science works. Occasionally, as in the case of Darwin's theory, a major theory is proposed that alters the way scientists look at their data. After that, the process of modification resumes in light of the new theory.

**EXTEND****11.** Prompt every student to write a short product tied to today's reading

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Darwin eventually published his theory of evolution because his friends and associates (who were primarily scientists, naturalists, and researchers) encouraged him to do so.

Write about something that you would not have done if it were not for your friends and/or associates who encouraged you to “just do it” or go forward with an idea, a task, or proclamation of a belief.

**12.** Close with a short summary.

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Extend the reading to the students' lives or to the world.