

CBL BIOLOGY: LIFE SCIENCE OPTION

BSCS Green Version 10th edition

Biology An Ecological Approach

Lesson Plan Quarter 2, Week 8, Day 1



Outcomes for Today

Standards Focus: 1dh 2acefg 3abc 4abcef 5abcde 7bc

PREPARE

1. Background knowledge necessary for today's reading.

This is the most complex section to date in the often confusing journey toward understanding DNA and the so-called "blueprint of life." In the simplest terms, it is a several step process in which the genetic "blueprint" is carried from the DNA by RNA to the sources of the cell for protein manufacture. Use transparency/overhead #17 in the transparency book to review this with students.

2. Vocabulary Word Wall.

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

ribosome

nucleotide

amino acid

protein

codon

- 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.
 - In order for genetic material to be passed on to new organisms, it first must be duplicated.
 - This duplication takes place in the nucleus prior to cell division.
 - In order for growth and specialization to take place in living things, the genetic code must be transmitted to the areas where proteins are formed.
 - This code is carried from DNA by messenger RNA.

4. Read directions for investigation/activity.

5. Read text. Ch 8, Heredity and Genetic Variation, pp. 212-215 (Section 8.12)

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

Setting	Characters	Pages
all living things	DNA messenger RNA ribosomal RNA transfer RNA	212 212

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:

There are three types of RNA:

- Messenger RNA
- Ribosomal RNA
- Transfer RNA

The code that forms the various groups of amino acids is known as a codon.

New protein molecules are formed after receiving the codes through the messenger RNA.

The DNA molecule “unzips” to allow for the replication of the molecule.

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

- 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.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

Several possible activities:

Understanding DNA replication and protein synthesis could be enhanced through the use of computer simulations and expanded models available through the web. Here are several sites with a brief introduction:

DNA Model

This site has several graphic depictions of DNA molecules.

<http://www.ucmp.berkeley.edu/glossary/gloss3/dna.html>

Sequencing

This is a good site for a little more advanced study of the sequencing process.

http://www.pbs.org/wgbh/nova/genome/sequ_sans.html

DNA Replication Zipper Model

This is a rather basic site to assist students in understanding the “unzipping” and replication process.

http://www.eurekascience.com/ICanDoThat/dna_rep.htm

Overhead Transparency

In addition, you should consider using **Transparency 18** which is a graphic rendition of Figure 8.24.

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. Make a diagram of the steps involved in the formation of new proteins through showing the process of messenger RNA.
2. Why do you suppose DNA molecules are in the spiral double helix form?
3. How are musical notes like a sequence of genes?

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

Key Paragraph

The molecule that carries the information from the chromosomes in the nucleus to the ribosomes in the cytoplasm is RNA. Like DNA, RNA consists of chains of nucleotides. In each RNA nucleotide, however, the sugar is ribose instead of deoxyribose, and the thymine is replaced by a similar nitrogen base called uracil. RNA is synthesized by copying one of the complementary DNA strands.

Character Education at the Markkula Center for Applied Ethics

www.scu.edu/character

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

It's all in a Name

Explain that scientific names have a wide variety of origins. Often the discovering scientist(s) can give newly described substance a name. Often these new names are related to structure. Ask students this question and then have them write a short paragraph:

Suppose you discovered a new chemical compound found in nature that could be used as a cure for certain types of cancer. What name would you give it and why? Write a short paragraph on "your substance" and the new name.

12. Close with a short summary.

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 8, Day 2



Outcomes for Today

Standards Focus: 1dh 2acefg 3abc 4abcef 5abcde 7bc

PREPARE

1. Background knowledge necessary for today's reading.

The high point of this lesson could be considered the Human Genome Project. This project (described on page 216 in the text) is a monumental effort to map and identify the more than 35,000 human genes.

2. Vocabulary Word Wall.

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

innovation

intron

human genome project

- 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.

Much of the genetic research and subsequent discoveries have been quite recent. Briefly:

Gregor Mendel (circa 1860) carried out experiments with peas which led to the concept of the gene.

Thomas Hunt Morgan's work with fruit flies furthered the ideas of mutations and x-linked traits in the early 1900's.

Around the turn of the century, Theodore Boveri and W.S. Sutton concluded that genes were located in the nucleus.

In the early 1950's Watson and Crick first described DNA.

Mary Lyon described the term translocation in 1961.

4. Read directions for investigation/activity.

5. Read text. Ch 8, Heredity and Genetic Variation, pp. 215-216 (Section 8.13)

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

Setting	Characters	Pages
the cell	DNA ribosomes	215 216

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:

Scientists are discovering new information about genetics and DNA every day.
 Scientists are using DNA to see how similar organisms are to one another.
 The Human Genome Project is where scientists have identified all of the human genes.

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

- 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.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity:

DNA Replication and Transcription to RNA, Investigation 8.2

Introduction

Understanding the replication process, in which exact copies of the DNA molecules are made, is the objective of this investigation. This investigation takes two days to complete, so you can introduce and begin the process during this lesson and complete it the following day. (In other words, work on Part A during this lesson and Part B during the next lesson.)

Directions

Follow the instructions outlined in Investigation 8.2 on page 224-225 in the text.

Additional Notes

The completed paper clip DNA molecules could be arranged on dark construction paper and labeled for classroom display.

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. How has technology assisted scientists in making new discoveries about genetics?
2. What are introns and exons?
3. What is the approximate number of genes found in the human species?
4. What is the Human Genome Project?
5. What possible good can come out of this project?

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

Key Paragraph

New technology provides the tools for new discoveries that, in turn, lead to additional technology. The relationship between science and technology is illustrated best by two of the most important innovations in molecular biology. The first is the ability to determine the exact nucleotide sequence of DNA. The second is the ability to transfer DNA from the chromosomes of one organism to those of another.

EXTEND

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

The Mind of the Scientist

In this lesson, students were exposed again to the works and discoveries of famous scientists. What drives these people? Talk a little about this with your students and then prompt them to write a short paragraph addressing this prompt:

If you could have the knowledge and power to research and discover something new, what area would you consider? Write a short paragraph in which you talk about YOUR famous discovery.

12. Close with a short summary.

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 8, Day 3



Outcomes for Today

Standards Focus: 1dh 2acefg 3abc 4abcef 5abcde 7bc

PREPARE

1. Background knowledge necessary for today's reading.

Probably the best way to build interest for this section on genetic engineering is to introduce students to Dolly the sheep. Dolly was the first mammal to be successfully cloned. More information can be obtained from:

http://en.wikipedia.org/wiki/Dolly_the_sheep

You can continue building interest by talking about some of the implications of genetic engineering. It is important to point out that there is much misinformation floating about in this area as a result of movies and other media.

2. Vocabulary Word Wall.

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

recombinant DNA diabetes cloning chromatography electrophoresis

- 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.

Heredity is the passing of genetic information from one generation to the next. Genes provide a set of instructions utilizing a sequence of DNA codes. Since genes are located on chromosomes in the nucleus of the cell, scientists can study sizes and shapes of chromosomes and make predictions about heredity.

Genes located on the same chromosomes are said to be linked.
 The Human Genome Project is a monumental endeavor designed to map the locations of all human genes (over 35,000).
 Genetic engineering is a process in which scientists can control development through the manipulation of genetic material.

4. Read directions for investigation/activity.

DNA Replication and Transcription to RNA, Investigation 8.2

5. Read text. Ch 8, Heredity and Genetic Variation, pp. 216-221 (Section 8.14)

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

Setting	Characters	Pages
England cell nucleus	Dolly the Sheep strand of DNA recombinant plasmid	219

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:

Genetic codes in all living things are very similar.
 Recombinant DNA is the result of removing DNA from one organism and adding it (splicing) to the DNA of a different organism.
 Cloning is making an exact copy of a gene, a cell, or even an organism.
 Other applications of genetic engineering include the creation of frost resistant plants, better food products, and disease resistant plants and animals.

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

- 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.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity:

Introduction (repeat from previous lesson)

Understanding the replication process, in which exact copies of the DNA molecules are made, is the objective of this investigation. This investigation takes two days to complete, so you can introduce and begin the process during this lesson and complete it the following day. (In other words work on Part A during this lesson and Part B during the next lesson.)

Directions

Follow the instructions outlined in Investigation 8.2 on page 224-225 in the text.

Additional Activity

If you have the technology, this web site has some very good animated programs on genetic engineering, including cloning of animals:

<http://www.learner.org/channel/courses/biology/units/gmo/images.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. List several examples of how scientists can use recombinant DNA to help people.
2. List some of the human disorders that genetic screening can test for.
3. Why is it difficult to locate the genetic mutations on some genes?
4. What would be some possible problems with screening and identifying humans with genetic disorders?
5. In your own words, describe genetic engineering to someone with very little understanding of science.
6. How did Dolly the sheep get her name (internet quest)?

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

Key Paragraph

The genetic code is almost universal: the same genetic code functions in bacteria and in humans. Can the genetic instructions from one type of organism be interpreted by another type of organism?

The answer is yes. The protein-making machinery of a cell reads DNA instructions even when they come from another type of organism.

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

Genetic Screening

Propose this scenario to students. Your family is found to carry a gene that causes a medical condition in which one in 20 people die early. Do a little review on the ethical issues involved here. Prompt students to write in response to this prompt:

Would you tell your doctor about this medical condition knowing that it could cause your insurance to go up if you did? On the other hand, if you did tell, this information could be valuable in the treatment of other family members. Explain your reasoning in a paragraph.

12. Close with a short summary.

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

CBL BIOLOGY: LIFE SCIENCE OPTION

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Biology An Ecological Approach

Lesson Plan Quarter 2, Week 8, Day 4



Outcomes for Today

Standards Focus: 4c 6g 7acd 8abcd

PREPARE

1. Background knowledge necessary for today's reading.

The study of evolution is what this chapter is all about. This could be a good time to find out "What's on your (their) mind(s)." In this activity just ask students to write at least ten things that come to mind when they hear the term evolution. Ask for feedback and look for themes. This will tell you where their prior knowledge lies. Ask them if they have heard of the Scopes Monkey Trial. Explain that you will be leading them through the scientific foundations that are widely accepted by scientists and that this material is according to the state standards.

2. Vocabulary Word Wall.

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

evolution genetic material fertile variation biological diversity

- 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.

To date, we have studied about heredity (the transfer of genetic information from one generation to the next) and now we begin the study of changes in species through time.

4. Read directions for investigation/activity.

5. Read text. Ch 9, Diversity, Variation, and Evolution, pp. 232-233 (Introductory Section)

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

Setting	Characters	Pages
fossilized rock Florida	Archaeopteryx Anhinga	232 232

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:

Everything is affected by time.

For an individual living thing, life spans vary greatly, but generally 100 years is a pretty long time.

Evolution is change through time.

Fossils are hard rock.

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

- 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.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity:

Evolution is a highly charged subject as of late. Religious convictions can run counter to scientific facts. Remember, your role is to teach to the standards. The following movie can certainly build interest in the concept of evolution. Consider showing it and holding appropriate age-related discussions over the course of several days.

Inherit the Wind...The Movie (First of two days)

This drama is loosely based on the Scopes Monkey Trial, Dayton, Tennessee, 1925. However, the inspiring event for *Inherit the Wind* was the Red scare of the late 1940s and early 1950s and the excesses of Redbaiters such as Senator Joseph McCarthy and the House Unamerican Activities Committee. Therefore the "trial" in the film departs to some extent from the historical record. The movie is based on a play by Jerome Lawrence and Robert E. Lee which opened in 1955. The play and the films based on the play have come to symbolize the Scopes trial in the national consciousness of the United States.

For more information go to

<http://www.teachwithmovies.com>

As mentioned in other lesson plans, this is a very good resource. For a nominal fee, you can become a member and have access to many questions on all levels, guides, suggested activities, and more.

Other possible activities for a class group or individual

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Poster Ad Map Retelling Reader's Theatre Cartoon Rap

Key Questions

1. What is evolution
2. How does evolution occur?
3. How can religious beliefs and scientific principles come into conflict?
4. Is it true that all things are affected by time? Can you think of anything that is not? What is it?

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

Key Paragraph

All things are affected by time. Organisms are born, grow old, and die over periods of time. Plants sprout, grow, and bloom in some way before they die back with the changing seasons. The transmission of genetic material happens through time.

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

Quickly review examples of evolution (change through time) with students and then ask them to write a paragraph responding to this prompt:

How have you evolved during the past three years? Write a short paragraph describing changes in both your mental and physical make up.

12. Close with a short summary.

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

CBL BIOLOGY: LIFE SCIENCE OPTION

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Biology An Ecological Approach

Lesson Plan Quarter 2, Week 8, Day 5



Outcomes for Today

Standards Focus: 4c 6g 7acd 8abcd

PREPARE

1. Background knowledge necessary for today's reading.

In order to understand several of the important concepts in this section, a discussion of similarities and differences might be in order. Review the concept of a Venn diagram. Use the Venn diagram to compare similarities and differences among students in the class. (Be sure to include yourself.) This can help with the idea of unity of patterns in living things.

2. Vocabulary Word Wall.

Introduce four important, useful word groups from today's reading.

genetic code

life cycle

unity of pattern

diversity

- 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.

There is apparently only one basic genetic code for all living things.

The cell theory describes a unity of pattern on the cellular level.

Similarities in the structure of living things can be a useful tool for describing living organisms.

Evolution is supported by such concepts.

4. Read directions for investigation/activity.

5. Read text. Ch 9, Diversity, Variation, and Evolution, pp. 234-235 (Section 9.1)

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

Setting	Characters	Pages
planet earth	oak tree, horse, daffodil	234
embryonic stage of development	salamander, chicken, chimpanzee, human	235

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:

The same molecules can group together to form different organisms.
 The genetic code for all living things is very similar for each organism.
 Unity of pattern is where organisms share similar characteristics, such as a backbone.
 During the early stages of development, many animals look very similar.
 Diversity is a term used to describe the great numbers of different living things.
 Unity is a term indicating the similarities in living things.

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

- 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.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity:

Extension of day 5 (previous lesson)

Evolution is a highly charged subject as of late. Religious convictions can run counter to scientific facts. Remember, your role is to teach to the standards. The following movie can certainly build interest in the concept of evolution. Consider showing it and holding appropriate age-related discussions over the course of several days.

Inherit the Wind...The Movie (2nd of two days)

This drama is loosely based on the Scopes Monkey Trial, Dayton, Tennessee, 1925. However, the inspiring event for *Inherit the Wind* was the Red scare of the late 1940s and early 1950s and the excesses of Redbaiters such as Senator Joseph McCarthy and the House Unamerican Activities Committee. Therefore the "trial" in the film departs to some extent from the historical record. The movie is based on a play by Jerome Lawrence and Robert E. Lee which opened in 1955. The play and the films based on the play have come to symbolize the Scopes trial in the national consciousness of the United States.

For more information go to

<http://www.teachwithmovies.com>

As mentioned in other lesson plans, this is a very good resource. For a nominal fee, you can become a member and have access to many questions on all levels, guides, suggested activities, and more.

Other possible activities for a class group or individual

- Bookmark Open Mind Portrait g6 Graphic Organizer
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Poster Ad Map Retelling Reader's Theatre Cartoon Rap

Key Questions

1. Give some examples of a unity of pattern in living things.
2. Observe Figure 9.2 on page 235 of the text. What can you say about the development of a human and a chimpanzee.
3. Give some examples of diversity in your world.
4. How might diversity in a farmer's crops help prevent widespread disease?

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

Key Paragraph

Biologists have observed a unity of pattern in the structures and functions of different organisms. The most striking example of this unity of pattern is the genetic code.

There is apparently only one basic genetic code for all organisms, including humans. The cell theory describes a unity of pattern at the cellular level.

EXTEND

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

Do you think that the people (i.e., the majority) acting through their elected representatives in the state legislature have the right to control what is taught in schools owned, funded, and operated by the state? If not the majority, who else should control what is taught in schools?

12. Close with a short summary.

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