CBL Biology: Life Science Option

BSCS Green Version 10th edition
Biology An Ecological Approach
Lesson Plan Quarter 2, Week 4, Day 1

Outcomes for Today

Standards Focus: 2abde

PREPARE

1. Background knowledge necessary for today's reading.

We now begin to address the biology of sperm and egg (male and female) formation. Once again, work to set a "scientific or clinical attitude" amid the often never-ending comments and teen age snickering! This might be a good time to talk about sexual harassment issues and implications as a caveat to students.

2. Vocabulary Word Wall.

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

gamete **ova** **sperm cell** **male** **female**

•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 concept chart as you quickly review it.
Organisms must reproduce in order for the species to survive.
Male and female organisms must first contribute gametes (sex cells) in the sexual reproductive process.
In asexual reproduction, a single organism can contribute the entire allocation of genetic material to the offspring.
Regeneration (animals) and vegetative reproduction (plants) are forms of asexual reproduction.

4. Read directions for investigation/activity.

5. Read text. Ch 6, "Continuity Through Reproduction", Section 6.3, pp. 154-156

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

Setting	Characters	Pages
testes ovary tropical reef	sperm ova blueheaded wrasse	154 154-155

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:

Only sex cells can unite to form new organisms.
The male sex cells are sperm cells while the female sex cells are ova or egg cells.
The female sex cell (egg) is generally much larger than the male sex cell (sperm).
Sperm cells can move. They do this by "swimming," that is wiggling their tails.
The definition of male and female is simple:
Males produce sperm.
Females produce eggs.

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:

A fish that can switch sex!
As mentioned in the text, the blueheaded wrasse can change sex. This often intrigues students. Have them research this amazing little coral reef creature and make a poster or do a report. Use these links as starting points:

http://www.seaweb.org/resources/oceanreport/OR1999.html

Scroll to this date and listen to the audio report
Fish that Switch Sex (4/12/99)

Here are two other resources.

http://www.woodbridge.tased.edu.au/mdc/Species%20Register/wrasse.htm

http://www.nationalaquarium.ie/species/cuckooWrasseProfile.php

Students may also research other animals that can change sex (there are more than a few).

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
Using the Venn diagram discussed in previous lessons, compare sperm and ova.
What is the biological definition of male and female?
Why does a sperm cell contain high concentrations of mitochondria?
Where are the mitochondria located in the sperm cell?
Why would it be helpful for survival for some animals to change their sex?

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

Key Paragraph
In sexual reproduction, certain types of cells, called gametes, can unite to form a new individual. The other cells that make up the individual are known as body cells. In most types of sexual reproduction, each parent produces a different type of gamete. For example, one parent may produce large, stationary gametes, and the other parent may produce smaller gametes that can move. In some organisms, the reproductive cells of both parents look similar.

EXTEND

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

Through the text reading and their own guided research, students have studied in detail the life cycle of a unique little fish known as the blueheaded wrasse.

Have them write a short paragraph from the perspective of the fish on what it is like to change sexes. The prompt might be something like, "I was once a female and now I'm not." As alternative writing activity, students could write a little poem or rap on the wrasse. Call it a wasse rap, or maybe a rapping wrasse. The possibilities are many here.

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 4, Day 2

Outcomes for Today

Standards Focus: 2abde

PREPARE

1. Background knowledge necessary for today's reading.

There is always the possibility that the subject of "when life begins" and the religious and moral views associated, will surface during the study of fertilization and reproduction in humans. It is important for you to be clear in your mind the biological concepts and principles involved. You must be careful not to venture into the religious aspects of this highly emotional, and often controversial, arena. In other words, stick to the standards.

2. Vocabulary Word Wall.

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

zygote **haploid** **diploid** **chromatids** **meiosis**

•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 concept chart as you quickly review it.
Organisms must reproduce for the species to survive.
Reproduction can involve a male and female parent (sexual) or just one parent (asexual).
In order for sexual reproduction to be successful, an egg from the female and sperm from the male must first be produced.

4. Read directions for investigation/activity.

5. Read text. Ch 6, "Continuity Through Reproduction", Sections 6.4 & 6.5, pp. 156-160

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

setting	Characters	pages
sex cell nucleus	chromosomes chromatids crossing over	156 157

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 new individual organism begins at fertilization, a process in which the sperm and egg unite.
A zygote is the name given to the first stage (a fertilized egg consisting of one cell).
Sex cells contain half of the number of chromosomes of typical body cells.
Each organism has a set number of chromosomes for its species.
The number of chromosomes must be reduced by one half in order to produce the sex cells.
This number of reduced chromosomes is now known as haploid (one half).
The regular body cells are referred to as diploid as they contain the full compliment of chromosomes.
Meiosis is a process in which the number of chromosomes in reduced by one half in the development of the sex cells.
Sperm and egg cells are a result of this reduction division.
These haploid cells from each parent combine to form the full compliment of chromosomes.

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:

Understanding meiosis and reduction division can be a challenge. These are internet links that can help students understand the processes:

Introduction and review materials
http://learn.genetics.utah.edu/units/basics/tour/

Introduction to genes and chromosomes

http://morgan.rutgers.edu/MorganWebFrames/Level1/Page1/p1.html

This site has some very good visual simulations.

http://www.biology.arizona.edu/cell_bio/cell_bio.html

This site also has a Spanish language version.

After reviewing these sites with students, have them develop a short research project on one small aspect of an area of interest to them.

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

What is a zygote and how is it formed?
Why is it that each parent contributes only one half of the genetic material (chromosomes) to the new organism?
Sketch the process of meiosis and label key parts and organelles of the cells.
How are sperm and egg cells different?
What are gametes?
Remember to ask ☐literal ☐structural ☐idea ☐craft ☐author ☐literature ☐life ☐evaluate and ☐inference questions every day.

Key Paragraph

A new individual begins at fertilization, when the gametes of the nuclei of two gametes-one gamete from each parent-unite and produce a zygote. Gametes differ in appearance from body cells. They also contain only half of the number of chromosomes that body cells have.

EXTEND

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

Students are now learning about the process of biological fertilization. How is biological fertilization knowledge influenced by social values? Find an example of some sort of article from a magazine at the supermarket checkout stand. (There is no shortage of literature in this area filled with misinformation, popular culture, and complete fabrication.) Post several such articles in the classroom and have students write a "biological rebuttal" to the editor. Maybe you could even mail a few in and see what happens.

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 4, Day 3

Outcomes for Today

Standards Focus: 2abde

PREPARE

1. Background knowledge necessary for today's reading.

Most students can generally understand the process of mitosis in a simplistic form of "freeze frame" analysis. The comprehension of meiosis is more difficult to understand. It is important that students understand that before the sex cells (gametes) combine in fertilization, the chromosome number must be halved. This is meiosis in its simplest format.

2. Vocabulary Word Wall.

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

chromatids spindle chromosome nuclear membrane centromere

•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 concept chart as you quickly review it.

It is important to review the processes of sexual and asexual reproduction including advantages and disadvantages of each.

Here are some key points:

Asexual reproduction produces exact replicas of the parent.
Asexual reproduction does not result in genetic variation.
Genetic variation can result in increased survivability of the species (population).

Meiosis is necessary for sexual reproduction.

4. Read directions for investigation/activity.

5. Read text. Investigation 6.1, "Continuity Through Reproduction", pp. 168-169

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

setting	Characters	pages
the nucleus of a cell	chromatids, spindle, centromeres	168

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:

"This is just like mitosis (it isn't) and we did this already!"
"This is more complex than mitosis."
Meiosis results in one half the numbers of chromosomes (and genetic material).

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:

A Model of Meiosis

Materials needed
modeling clay (red and blue)
pipe cleaner
large piece of drawing paper
(all per small groups of no more than three students)

Procedure
This activity is fairly straightforward. Follow the procedure as outlined in Investigation 6.1 on page 168 of the text.

The final product will be individually constructed student models of meiosis. Keep the models for display and future reference.

As an alternative to the clay, play dough could be used. (See notes at the end of this lesson plan.)

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

How is the process of the construction of the model different from the construction of the student mitosis model?
Why is the construction of such a model a good learning experience?
What was done differently on this model as compared to the mitosis (or other models) constructed?

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

Key Paragraph
Many biological events are easier to understand when they are explained by models. In this investigation, you will use a model to simulate the events of meiosis.

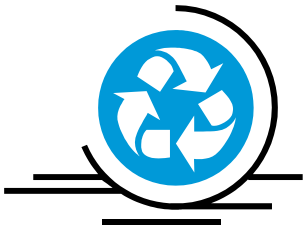
EXTEND

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

Do you ever wonder how you learn (metacognition)? Think about this for a minute or two. Now, "step outside of yourself" and take a look at how you constructed the meiosis model. Write a short paragraph describing what you see.

12. Close with a short summary.

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



Supplemental Student Investigation 6.1
Student-Constructed Meiosis Models

INTRODUCTION:

Included here is an alternative process for the meiosis model. Students will use play dough instead of modeling clay. The recipe is included.

* Play dough recipe: This makes about 850g (30oz) - enough for three groups.

- 1 C. baking soda
- 1 C. flour
- 1 C. corn starch
- 4 t. cream of tarter
- 2 T. oil
- 1-3/4 C. water
- **Stove top method:**

  Mix and cook until the dough leaves the side of pan. Cool on plate with wet cloth on top.

  Oven method: Bake @ 150 F. overnight.

  ** To color play dough use food coloring or tempera paints. (Using rubber or disposable gloves is a good idea.)

ACTIVITIES AND PROCEDURES

Follow the procedure as outlined in Investigation 6.1 on page 168 of the text.

CBL Biology: Life Science Option

BSCS Green Version 10th edition
Biology An Ecological Approach
Lesson Plan Quarter 2, Week 4, Day 4

Outcomes for Today

Standards Focus: 2abde

PREPARE

1. Background knowledge necessary for today's reading.

We now come to the part of biology where the now over-used terms of penis and vagina are introduced (in a biological sense). There is certainly no shortage of "prior knowledge" here. It might be a good idea to do a little pre-assessment activity. Work to get the "giggles and silliness" out of the students' systems as well as "attitudes" under control. Be sure to set your expectations for meaningful classroom discussion. It will then be time to move the discussion toward a biological or clinical format.

2. Vocabulary Word Wall.

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

testes **ovaries** **tubule** **puberty** **ovulation**

•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 concept chart as you quickly review it.
Reproduction is all about survival (continuity) of the species.
There are two types of reproduction - sexual and asexual.
Only gametes can combine to form a fertilized egg (zygote).
Meiosis is part of the process that produces sex cells.

4. Read directions for investigation/activity.

5. Read text. Ch 6, "Continuity Through Reproduction", Section 6.8 pp. 166-167

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

setting	Characters	pages
testes	sperm cells	160
ovaries	egg cells (ova)	161

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:

Testes and ovaries (male and female) are the human organs that produce gametes or sex cells.
Testes are external (on the outside of the human body cavity) while ovaries are internal.
The testes contain many tiny vessels called tubules where the sperm is produced.
Males produce sperm beginning at puberty while females produce and release approximately 500 egg cells over a lifetime.

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:
To circumcise or not to circumcise

Since this section address the male reproductive organ (penis), now might be a very good time to have students research this timely topic.

Dr. Dean Edell has written and researched much on this subject. Here is a link with multiple related links.

http://www.menstuff.org/archives/circumcision.html

Have students research this common practice and form two teams to debate the issue in a rational format. In the process of their research, they should be encouraged to understand the many cultural and religious issues. Since this is a class on biology, encourage them to weigh heavily on the biological implications.

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

What happens to sperm that is not released?
Name the special reproductive organs and their functions in both male and female humans.
Explain the differences and similarities (Venn diagram and illustrations) between the production of sperm (male) and eggs (female).
Explain ovulation. Use illustrations if necessary.
Create an appropriate illustration of both male and female reproductive systems. Name the parts and functions.

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

Key Paragraph
In humans and other animals, meiosis and gamete formation take place in special reproductive organs called testes (singular testis) in males and ovaries (singular ovary) in females. In early development, these reproductive organs look alike. The ovaries are located in the abdomen, while the two testes move downward and to the outside of the body, where they are housed in a pouch called the scrotum, which is located just below the penis.

EXTEND

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

Autobiography of a sperm (or egg)
Choose one of these "characters" and write a little story about its life. For example, choosing sperm, the title might be something like, "The race to eternity." Encourage students to be creative.

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 4, Day 5

Outcomes for Today

Standards Focus: 2abde

PREPARE

1. Background knowledge necessary for today's reading.

This lesson deals entirely with the sexual development and hormonal reproductive cycle of the human female. As discussed before, there is no shortage of information on this subject which is permeated throughout our popular culture. Lack of student prior information is generally not an issue. The challenge is to correct misconceptions and misinformation so many of our young people have gained in this area. You may want to undertake a pre-assessment activity by asking a few questions addressed in this section before you begin.

2. Vocabulary Word Wall.

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

hormones sex hormones menstrual cycle uterus menopause

- 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 concept chart as you quickly review it.

Reproduction is necessary for the continuity of the species.
Sexual reproduction involves the development of male and female gametes from each (male and female) parent.

4. Read directions for investigation/activity.

5. Read text. Ch 6, "Continuity Through Reproduction", Section 6.7, pp. 162-166

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

setting	Characters	pages
human female	ova, oviduct, uterus, ovary	162-163

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:
Gamete production in human males is the process of sperm production.
Female humans have many hormones and they act on each other and body organs in complex ways.
Sex hormones control the sexual interest as well as bodily functions related to reproduction.
The uterus is the female organ in which the developing fetus grows.
Estrogen is a female hormone.
Menstruation is the process of releasing blood and related cells from the lining of the uterus if fertilization of the egg does not occur.
After menopause, pregnancy is no longer possible.

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:

Birth control
This can be a good time for the birth control information for students. First check with your school/district policies, follow the necessary notification protocol, and then enlist the assistance of qualified speakers. Planned Parenthood continues to be a good reference/resource in this area:

http://www.plannedparenthood.org/

Remember to keep the biological and social component lines clear. Again, standards-based instruction is critical. Here is the link to the California content standards for biology and life science, grades 9-12.

http://www.cde.ca.gov/be/st/ss/scbiology.asp

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

Can a young woman become pregnant before she has experienced her first period? Why or why not?
Explain menopause to an alien who has just landed on earth, understands your language, and is very inquisitive.
How long do male humans remain fertile? Why do you suppose this is so?

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

Key Paragraph
Both the onset of puberty and the lessening of gamete formation in later life are controlled by changes in the body chemicals called hormones. Hormones act as chemical signals. Many different organs in the body produce hormones. Traveling with the blood to all parts of the body, hormones act as messengers that influence other organs.

EXTEND

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

The incredible journey
Have students write a little story (PG rated) about Sammy the sperm. They could trace Sammy's journey from his creation in the testes to his ultimate demise (whatever that might be). The journey should be from Sammy's perspective.

12. Close with a short summary.

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