

CBL BIOLOGY: LIFE SCIENCE OPTION

BSCS Green Version 10th edition

Biology An Ecological Approach

Lesson Plan Quarter 2, Week 3, Day 1



Outcomes for Today

Standards Focus:1acegij

PREPARE

1. Background knowledge necessary for today's reading.

Send in the Clones

There has been much information in the media (fact and fiction) about cloning, including human cloning possibilities. A discussion about cloning would be a good introduction to this lesson. It is important to understand the cell division process in order to understand cloning. The two can be confusing, but students generally have some prior knowledge (even if it is inaccurate) about cloning. As a general rule, they are interested in this topic. Build upon this interest.

2. Vocabulary Word Wall.

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

mitosis

prophase

metaphase

anaphase

telophase

- 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.

Chicken or egg??

All cells come from preexisting cells. This happens through the process of duplication and division. In other words, one cell becomes two very similar cells. The basic unit of all living things is the individual cell. Before cells divide, the genetic material must be duplicated so that each new cell will contain the necessary DNA.

This is an ongoing progression and in order to make sense of it, biologists “pause” the process in order to describe each ongoing phase.

4. Read directions for investigation/activity.

Attached to this lesson plan is Supplemental Investigation 5.4.

5. Read text. Ch 5 “The Cell” Section 5.10 pp. 136-138

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

setting	Characters	pages
cell	chromosomes organelles spindle fibers	136- 137

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:

Mitosis can be compared to a video with each phase a “pause” in the process. There are a series of steps in cell division.

The chromosomes containing genetic material duplicate themselves before the cell divides.

The other organelles also duplicate and move to opposite ends of the cell in this process.

In the next step there begins a division between the two new emerging cells as the process becomes complete.

Mitosis in both plant and animal cells is similar.

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:

Web links

There are several good web sites to help students understand mitosis. This one has a great animation feature:

http://www.biology.arizona.edu/cell_bio/tutorials/cell_cycle/cells3.html

This is also a good site:

<http://www.mbl.edu/publications/LABNOTES/1.2/mitosis.html>

Play-Dough Mitosis

After sharing information with students, have students construct a model of the mitosis process. Please see the supplemental investigation attached to 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

List the four basic stages of mitosis and write a short statement describing each.

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

Key Paragraph

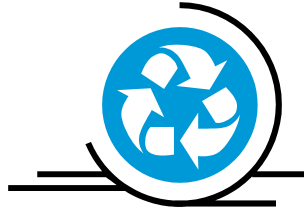
Although mitosis is a continuous process, it is convenient to “freeze” the action at intervals and describe the process as a series of stages. This is similar to looking at a single frame in a motion picture. The photographs in figure 5.16 show the stages of mitosis in plant cells.

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

Scientists have been experimenting in the area of clone research. They have been successful at cloning a number of organisms including “higher level” animals such as sheep. If it were possible, would you like to be cloned? Write a short paragraph explaining why or why not.

12. Close with a short summary.

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



Supplemental Student Investigation 5.4 Student-Constructed Mitosis Models

INTRODUCTION:

Many students have trouble visualizing mitosis in cells as three-dimensional units, containing several different stages. As they study pictures of mitosis in the text (page 137), they can get the false impression that cells are flat, two-dimensional units. They are not.

BACKGROUND:

If students constructed a cell model in the first week of this quarter, this will be an easy follow up. If they have not done this, please revisit Week 1 Day 4's lesson plan and consider doing that activity first.

PURPOSE:

The purpose of this activity is to provide students with a hands-on activity which will enhance their understanding of the 3-D characteristics of cells while reinforcing their knowledge of plant and animal cell mitosis.

OBJECTIVES:

Students will be able to construct the various stages of mitosis using play-dough and other materials outlined below:

1. Compare and contrast the phases of mitosis.
2. Demonstrate and understand the three-dimensional aspect of cell structure.
3. Identify the various stages of mitosis.

RESOURCES/MATERIALS: Play-dough, food coloring or tempera paints (red, purple, green, blue), one pair disposable gloves, yarn or undercooked spaghetti, pepper, plastic-bubble packing, aluminum foil, plastic wrap, pencil shavings, scissors, one large knife (watch this one) , glue

* Play-dough recipe: This makes about 850g (30oz) - enough for 3 groups.

- 1 C. baking soda
- 1 C. flour

- 1 C. corn starch
- 4 t. cream of tartar
- 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:

1. After studying mitosis cell structure, divide the class into small groups.
2. Gather all materials and have them laid out according to the number of student groups. (See materials list above.)
3. Distribute materials and illustrations of the various stages of mitosis to each group.
4. Inform groups they will be making one stage of the mitosis process.
5. When all of the cell parts are completed and in place, have them observe progress in the other phases
6. Depending on the length of time available, the various stages can be arranged in proper order, or you can follow up during the following day.

PUTTING IT ALL TOGETHER:

The students are excited to see their stages in the cell mitosis process. This can lead to an excellent opportunity for students to share ideas, reasons, and information with the groups and the class. This is also an ideal opportunity to compare the similarities and differences of the stages. These should be put on display. Several could be saved for future years. The play- dough will harden. This activity works equally well as a structured, teacher-directed activity or a creative small group or individual endeavor. The students' own experience and knowledge are the only determinants.

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Lesson Plan for Week 3, Day 2



Outcomes for Today

Standards Focus: 1acegij

PREPARE

1. Background knowledge necessary for today's reading.

Almost everyone has some history with cancer. Whether it is a family member or friend, cancer has touched the lives of many. This might be a good time to talk a little about cancer without going into details of the etymology. A discussion to assess student knowledge and perceptions in this area could help build interest related to the idea of cell specialization.

2. Vocabulary Word Wall.

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

**specialized
cancer**

predetermined

abnormal

unspecialized

- 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.
- All living things are made of individual units called cells.
There are one-celled plants and animals.
An individual cell can grow only so large.
In larger organisms, cells must specialize and perform different functions.
This is similar to other systems. The larger the system, the more the various individual units must specialize.

4. Read directions for investigation/activity.

5. Read text. Ch 5 “*The Cell*” Section 5.11 pp. 138-140

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

Setting	Characters	Pages
all complex organisms	specialized cells	138

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:

We all begin life as a single cell.

Different cells divide at different rates.

Cancer is a process in which cells divide rapidly and abnormally.

If we could figure out why some cells divide and grow irregularly, maybe we could find a cure for cancer.

Abnormal cell division and replication can eventually kill the cells and organism.

Cells have a limited life span, so life can go on only through cell reproduction.

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:

Cancer and Me

This would be a good time to invite a cancer survivor to class to share experiences as well as coping skills. This would be a good opportunity to put a “face” on this disease.

Here is a good starting resource:

http://www.bigspeak.com/topics/cancer-experts.html?s_kwcid=cancer%20speaker|595417746

In addition, the American Cancer Society has many good resources.

This is the link for speakers:

http://www.cancer.org/docroot/ESN/content/ESN_3_1X_Man_to_Man_36.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

Give some examples of specialized cells and their functions.

What types of human cells almost never divide? Why is this so?

What makes cancer cells different from non-cancer cells?

What happens to dividing cells if they do not receive accurate genetic information?

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

Key Paragraph

Complex organisms, such as humans, develop from the division of a single cell. Throughout their lifetimes, humans may form about 200 different types of cells, each having a specialized function. Your cells change and become specialized according to a genetically determined developmental program. As cells become specialized, they take on specific shapes, and their divisions may become more distinctive.

EXTEND

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

What's on your mind?

When you hear the word **cancer**, write the first ten words that come to mind. Include these words as you create a paragraph that is meaningful to you.

12. Close with a short summary.

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

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Lesson Plan for Week 3, Day 3



Outcomes for Today

Standards Focus: 1acegij

PREPARE

1. Background knowledge necessary for today's reading.

A key concept in this lesson is the process of growth. Build interest by asking questions such as “What is growth? How do living things grow? What are examples of growth? How does growth take place in living things? Are there other types of growth? How does a baby change into an adult?” By generating discussion and interest with such questioning and discussion, you will be able to ascertain the level of prior knowledge of your particular student population.

2. Vocabulary Word Wall.

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

irreversible

mitosis

cytokinesis

frequency

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 concept chart as you quickly review it.

All living organisms are composed of individual cells.

Cells were first described and named by early scientists following the invention of the light microscope.

Cells are the basic “building units” of all living things.

Cells carry on various important life activities, all requiring energy.

Cells reproduce by division.

4. Read directions for investigation/activity.

5. Read text. Ch 5 “The Cell” Section 5.4 pp.148-149

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

Setting	Characters	Pages
onion root tip	cells in various stages of division chromosomes	148

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 microscopic views change with the power adjustment.
- Light is important in viewing the small parts through the microscope.
- I can actually see the various stages of onion cell division.
- No wonder they are called cells.

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:

Mitosis Observations

If you have access to the proper equipment, follow the directions for Investigation 5.4 (pages 148 & 149 of your text). In place of (or in addition to) go to this link to view mitosis:

http://www.biology.arizona.edu/cell_bio/tutorials/cell_cycle/cells3.html

Here is another good site for information and illustrations:

<http://www.mbl.edu/publications/LABNOTES/1.2/mitosis.html>

In addition, make use of transparency 13 in the transparencies book.

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

In the cells that you observed, (microscope slide or internet links) where were most of the dividing cells located? Why is this so?

Do a sketch of your observations and label any parts you may recognize.

Why do living organisms grow or stay the same only while living?

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

Key Paragraph

The growth of an organism is the irreversible increase in the number and size of cells. In other words, a plant or animal grows when it produces new cells that increase its size. When an organism grows, cell parts must be made for each new cell formed. Mitosis and cytokinesis must take place. Not all parts of a plant or an animal grow, so not all cells of a plant or animal need to carry out mitosis and cytokinesis.

EXTEND

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

Have you ever noticed how elderly people seem to shrink? Of course this varies greatly with age. What will you be like when you begin to shrink? Look ahead and write a short paragraph describing what this might be like for you.

12. Close with a short summary.

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

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Lesson Plan Quarter 2, Week 3, Day 4



Outcomes for Today

Standards Focus: 2abde

PREPARE

1. Background knowledge necessary for today's reading.

Now might be a good time to talk about the differences and similarities (maybe a Venn Diagram) between cell reproduction (division) and reproduction of an entire organism. When a cell divides, there are no parents, just two new cells. It is quite a different process with organisms such as humans. This may also be a good time to introduce the concept of species survival.

2. Vocabulary Word Wall.

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

parent

reproduction

multicellular

life cycle

extinct

- 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.

Cells reproduce by individual cell division. In other words, one cell divides into two cells.

An individual organism does not divide to produce a new individual unless it is a one-celled organism.

No organism lives forever, so it must reproduce itself for the species to survive.

All living organisms today come from preexisting organisms.

4. Read directions for investigation/activity.

5. Read text. Ch 6, “Continuity Through Reproduction” Section 6.1 pp.151-153

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

Setting	Characters	Pages
pond	frog eggs, tadpoles, adult frog	152

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 beginning of new life is an amazing event.

When cells divide, each one is a new cell and the parent cell is no more.

All organisms grow and begin reproducing at various ages.

In single celled organisms, reproduction happens only once.

In multi-celled organisms, reproduction can take place more than once.

Life cycles are often shown as a circle.

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:

Animal Life Cycles

This is an activity involving drawing and illustrations. Have students research the life cycles of selected animals and write a little summary. Using their summary, have them illustrate the life cycle of their organism. Begin with an explanation of the life cycle of a frog. Encourage students to look up complex animal life cycles like the Yucca Moth. Information available at:

<http://waynesword.palomar.edu/ww0902a.htm>

More information can be found at:

http://www.atozteacherstuff.com/Themes/Life_Cycles/

Have students post their work after reporting on it to the class. Please Note: For any student reports, have the rest of the class involved in the writing by giving feedback as “critical friends.”

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

Define parent in a biological sense.

What happens to a species if individual organisms fail to reproduce?

What do all methods of reproduction lead to?

What types of organisms reproduce at a most rapid rate?

Why is successful reproduction so important?

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

Key Paragraph

The secret of a biological species lies in its members' ability to reproduce and leave offspring before death occur. When organisms reproduce successfully, their species continues. A species becomes extinct if its members fail to reproduce or if they fail to

leave enough offspring to allow for deaths as a result of accidents or disease. Successful reproduction is essential to the continued existence of a species.

EXTEND

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

Here are the lyrics to "Circle of Life" by Elton John:

From the day we arrive on the planet
And blinking, step into the sun
There's more to be seen than can ever be seen
More to do than can ever be done

Some say eat or be eaten
Some say live and let live
But all are agreed as they join the stampede
You should never take more than you give

In the circle of life
It's the wheel of fortune
It's the leap of faith
It's the band of hope
Till we find our place
On the path unwinding
In the circle, the circle of life

Some of us fall by the wayside
And some of us soar to the stars
And some of us sail through our troubles
And some have to live with the scars

There's far too much to take in here
More to find than can ever be found
But the sun rolling high through the sapphire sky
Keeps great and small on the endless round

Have students write their own song/poem talking about the "circle of life."

12. Close with a short summary.

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

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Lesson Plan Quarter 2, Week 3, Day 5



Outcomes for Today

Standards Focus: 2abde

PREPARE

1. Background knowledge necessary for today's reading.

So now we begin to discuss sex in biological terms. Take a little time to create a scientific mindset for the students. Our society is inundated with popular culture ideas, attitudes, and misunderstandings in the area of human sexuality and reproduction. Everything and anything is available via the internet. Our students are awash with prior knowledge, much of it misinformation. The urge to reproduce is one that is strong, so choose your words wisely for your particular population.

2. Vocabulary Word Wall.

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

sexual reproduction	asexual reproduction	vegetative
reproduction	regeneration	potato eyes

- 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 of several types including:
- individual reproduction of an organism
 - reproduction of cells
 - reproduction of a species

4. Read directions for investigation/activity.

5. Read text. Ch 6 “Continuity Through Reproduction” Section 6.5 pp. 153-153

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

Setting	Characters	Pages
potato	“eyes”	153
sea	Sea star arm	

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:

- Reproduction requiring two parents is sexual reproduction.
- In asexual reproduction, one parent produces the new offspring with no sex.
- Sometimes plants can produce new plants by sexual reproduction.
- Some animals, such as starfish, can be broken into pieces with each piece changing and growing into a new animal.

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:

Biological views of sex vs. popular culture views of sex.

This is a collage activity.

Materials: Scientific magazines or nature magazines like *National Geographic* and popular culture magazines like *People*, *National Inquirer*, and related non-scientific resources found at supermarket checkout stands.

Procedure: talk to students about the popular culture views of sexual reproduction as well as the biological facts. Talk about such factors as advertising and commercialism. You may want to also talk about cultural issues. Instruct students to create a collage to visualize some of these concepts, facts, and societal mores. Arrange time for students to discuss their artwork.

Additional activity:

Potato Eyes

Obtain some organic potatoes (no “potato eye” inhibiting chemicals) and allow them to sprout their eyes. Transplant the shoots into small pots as an ongoing example of vegetative reproduction.

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

Again, review the concept of a Venn Diagram with students.

Use the Venn Diagram to show the differences and similarities between sexual and asexual reproduction.

How are potatoes with “eyes” and starfish similar?

Why would it be an advantage to an organism to be able to reproduce sexually?

Why would it be an advantage to an organism to be able to reproduce asexually?

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

Key Paragraph(s)

In complex organisms, reproduction generally requires two parents and two different cells, one from each parent. When these cells are united, a new individual begins. This is known as sexual reproduction.

In asexual reproduction, new individuals originate from a single parent.

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

Asexual reproduction in humans

Suppose it was possible for humans to reproduce asexually. How would this change things in your (our) world? Write a paragraph as an introduction for a new television situation comedy in which this is possible.

12. Close with a short summary.

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