

CBL BIOLOGY: LIFE SCIENCE OPTION
BSCS Green Version 10th edition
Biology An Ecological Approach
Lesson Plan for Week 7, Day 1



Outcomes for Today

Standards Focus: 9acg 10 abcef

PREPARE

1. Background knowledge necessary for today's reading.

The concept of infrastructure could be used to introduce this chapter. Consider spending a little time talking about infrastructure of a city or community. Point out the typical infrastructure components such as roads, railroads, canals, and pipelines. Discuss the infrastructure of a school plant and include such components as wiring (nerves), pipes (circulatory system), pumps (heart), heating and air conditioning (lungs and breathing). Discuss fixtures such as thermostats and compare them with organs in the human body. This mental model will help students with the study of this chapter.

2. Vocabulary Word Wall.

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

homeostasis

vein

artery

capillary valve

- 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 the last chapter, we learned that digestion was the process that made food available to individual cells in the human body. How the human body distributes that food to every cell while at the same time removing waste from every cell is the focus of this chapter.

4. Read directions for investigation/activity.

5. Read text. Ch 16, The Human Animal: Maintenance of the Internal Environment, Text Section 16.1-16.2, pp. 452-455

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

Setting	Characters	Pages
human body	veins, arteries, and capillaries	452
heart	valves	453
human plasma	fed blood cells, white blood cells, and platlets	455

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:

All of the tubes and vessels in the human body make up the circulatory system.
 Arteries carry blood away from the heart.
 Veins carry blood to the heart.
 Capillaries connect arteries and veins and are very small.
 The human heart has four chambers.
 The liquid minus the blood cells found in blood vessels is plasma.
 White blood cells are like amoebas in that they attack and eat harmful bacteria.

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:

Exercise and Pulse Rate

Refer to Investigation 16.1 on page 474 of the text. In this exercise, students are asked to design a simple experiment intended to draw a correlation between exercise and pulse rate.

Procedure

Review the concept of hypothesis. Ask students to develop a hypothesis about their heart rate and the amount of exercise they are going to test.

Activity

Follow series of exercises designed to elevate the heart rate of the typical body.

Discussion

What is the relationship between exercise and heart rate?

What is “recovery time”?

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 three types of blood vessels and the function of each.

What is the purpose of valves in the heart?

Why is blood flow through capillaries so slow?

Why do one’s legs and feet swell after a long plane ride?

What can be done to prevent this complication?

Describe the structure and function of plasma.

Describe the unique structure of a red blood cell.

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

Key Paragraph

Humans, like all vertebrates, have a system of tubes or vessels that circulate fluid and transport materials throughout the body. These tubes or vessels make up the circulatory system, which carries raw materials to the cells and removes wastes from

the cells' environment. Human circulation occurs in a closed environment through three types of blood vessels: arteries, veins, and capillaries.

EXTEND

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

The Ride of Your Life

Set the stage with students by telling them they have been given the ability to be "miniaturized" to the size of a red blood cell and they will be injected into the bloodstream of a human. Ask them to write a travelogue indicating all the places they are about to travel and in the correct sequence from their injection location.

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 for Week 7, Day 2



Outcomes for Today

Standards Focus: 9acg 10 abcef

PREPARE

1. Background knowledge necessary for today's reading.

As a general rule, most students have some level of understanding about arteries, veins, and the heart. In other words, they have an understanding about the generalized picture of the human circulatory system. The media are filled with hospital dramas and related popular culture knowledge. In this lesson, students are exposed to two important systems which help the body fight diseases due to injury, bacterial infection, and related pathogens. In order to assess student prior knowledge as well as build interest, ask students the following question: "Why don't you bleed to death from a little cut?" A visual demonstration might help here. Fill up (inflate) a rubber surgical glove (from the nurse's supplies) or a balloon with water. Make a small hole with a pin and watch the entire glove or balloon "bleed to death."

2. Vocabulary Word Wall.

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

stroke **clot** **heart attack** **node vessel**

- 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.

For the human body to effectively function, systems must be in balance (homeostasis).

This includes blood and lymph systems (often referred to as the circulatory system).

The circulatory system moves various liquids including plasma, blood cells, and nutrients and waste products.

The heart is an important organ (pump) which is absolutely essential for a healthy body.

4. Read directions for investigation/activity.

5. Read text. Ch16, The Human Animal: Maintenance of the Internal Environment, Text Section 16.3-16.4 pp.455-457

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

Setting	Characters	Pages
human blood stream the human body	platelets	455
	lymph vessels	456
	lymph nodes	456

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:

Usually when we receive a small cut or scrape, the bleeding eventually stops and a scab forms.

Platelets help “plug up” or stop bleeding by clotting.

There are also chemicals which help with clotting.

Fibrin is a substance that forms threads which trap the platelets which stop the bleeding after a cut or injury.

Hemophilia is a condition in which a person can bleed to death from a small cut.

Heart attacks and strokes can kill a person.

The lymph system is another series of vessels in the human body which helps with the removal of harmful substances from the body.

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:

The Lymphatic System and Blood Overview

You will need a computer with internet access. Go to this site:

<http://www.hippocampus.org/Biology/index.html>

Note: This is a very good website with many lessons in biology. It is worth reviewing and bookmarking.

Scroll to the section on the Lymphatic System. This is a very good visual review of the systems covered in this lesson and the previous one.

Procedure

Allow students to observe and listen to the lesson narrative.

Activity

Direct students to summarize through the jigsaw process what they have learned from the computer version.

Discussion

Follow up with some simple review questions outlined in this lesson.

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 the difference between blood and plasma?

When is blood clotting beneficial?

When is blood clotting a problem?

What is a stroke? What are the effects and how is it caused.

What is the lymph system and how does it function?

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

Key Paragraph

Normally, when you have a cut or scrape, the blood at the skin surface hardens or clots. Blood clotting comes about through a complex sequence of events that involve small cell fragments called platelets and some 30 proteins called clotting factors. Clotting begins when platelets come in contact with a rough surface, such as torn tissue. Platelets gather on the rough surface, become sticky, and attract more platelets, forming a plug that partially seals the wound. They also release substances in the plasma that begin a chain of chemical reactions converting inactive substances and solutions to active clotting factors.

EXTEND

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

Off to Battle

Set the scene by telling students they are the author of a new children's book called *The Blood Warriors* (that should get their attention). Tell them to write a little story about the "Army of Platelets" that stands by ready to defend the body against terrorist bacterial invaders. Have them write a little story about "Commander Hemo the Magnificent" and how she controls and leads her army of Red Blood Corps (corpuscles) to defend against any and all invaders. Ask them to illustrate this writing masterpiece.

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 7, Day 3



Outcomes for Today

Standards Focus: 9acg 10 abcef

PREPARE

1. Background knowledge necessary for today's reading.

Simply put, defense against invaders is what this lesson is about. To create a visual metaphor, enlist students in a discussion on any type of defensive system that they may be aware of. For example, consider the castle and moat with a drawbridge picture. How do the inhabitants of the castle protect themselves from attacking invaders? You can then return to this and similar pictures when making comparisons. The term "immune" is relatively common in the language, but what does it mean to your students? Before beginning this lesson, ask students to use the word in a sentence. This will give you a relatively clear understanding of their points of reference and understanding.

2. Vocabulary Word Wall.

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

immunity pathogen mucus antigen autoimmune

- 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 the human body to function and be healthy, the body chemistry must be stable.

The circulatory system consists of the heart (a pump), arteries (high blood pressure), capillaries (connects veins and arteries), and veins (low blood pressure).

Blood cells (red and white) circulate in the plasma (a liquid).

Blood clotting helps prevent blood loss through injuries and wounds.

The lymph system consists of a series of vessels which move fluids back into the blood stream after treatment by white blood cells.

4. Read directions for investigation/activity.

5. Read text. Ch 16, The Human Animal: Maintenance of the Internal Environment, Text Section 16.5-16.7, pp.457-465

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

Setting	Characters	Pages
the human body	skin	457
human blood	lymphocytes	458

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:

Immunity is the ability of the human body to fight off disease.

The skin is a protective layer against invading pathogens.

Saliva in the mouth and tears in the eyes also protect our bodies from invading germs.

White blood cells gather at the location of injury to attack invading microbes and other disease producing invaders.

Antigens are substances that the body recognizes as dangerous.

Sometimes things go wrong with the body's immune system and it attacks itself.

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 visual tour of the body's immune system

This web site provides a very good review along with visual aids of the entire Immunity concept. It is well worth reviewing first before a classroom demonstration:

<http://www.hippocampus.org/Biology/index.html>

Description of activity

Instruct students to follow this activity by recording notes in their science notebooks. Next, each small team of students could review their notes and report back to the class on a part of the presentation. This re-teaching of the immune concept is a good method for internalizing the concepts.

Discussion and Follow Up

Conclude this part of the lesson by posing the question, "So what has this got to do with your life right now?"

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

Explain immunity in language that any person emerging from a local 7-11 food store would understand.

What is a pathogen? Give several examples.

What are some of the physical ways in which our bodies protect themselves from pathogens?

What is an antigen?

Why does the second exposure to a pathogen often not produce a resulting disease or sickness?

What can happen to the body if the immune system malfunctions?

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

Key Paragraph

Immunity is the capacity of the body to resist most pathogens that might damage tissue and organs. The body has two types of immunity against foreign substances. The first type is *nonspecific protection* - that is, one pathogen is not distinguished from another. The second type is *specific*, resulting in what is called the immune response. The immune response includes the production of antibodies.

EXTEND

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

The Eyes Have It

Review the idea of visual metaphors with students. Next, direct them to create a visual metaphor or illustration of the body's defenses in terms of this metaphor. For example, they might want to draw a fort with hostile invaders attacking. Instruct them to label the characters in terms of scientific terms addressed in this lesson.

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 7, Day 4



Outcomes for Today

Standards Focus: 9acg 10 abcef

PREPARE

1. Background knowledge necessary for today's reading.

This lesson covers two major systems in the human body. They are the respiratory and excretory systems. Put another way, this lesson is about breathing and peeing! Ask students to take a deep breath and hold it. Did they need to think about this? Ask them if they have ever experienced breathing difficulties. Finally, ask them, how oxygen travels from out there (point to the room) to in here (point to your chest). The key concept here is that if students can understand their own bodily functions, then they are more apt to care for their bodies.

2. Vocabulary Word Wall.

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

respiration breathing emphysema hemoglobin haemostatic

- 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 to keep balance within the human body, a series of systems work together to keep the body in *homeostasis*.

These systems include the circulatory system, the lymph system, and the immune system.

The immune system protects the body from invaders.
We will now look at the respiratory system.

4. Read directions for investigation/activity.

5. Read text. Ch16, The Human Animal: Maintenance of the Internal Environment, Text Section 16.8-16.11, pp.465-470

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

Setting	Characters	Pages
human lungs	capillaries alveoli	466
human kidneys	nephrons glomerulous collecting duct	466

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:

Respiration and breathing are not the same thing.

During exercise, carbon dioxide builds up in the body's tissues and must be removed.

The diaphragm is a strong muscle.

There are these little sacs in the lungs where oxygen enters the blood stream.

These are called alveoli.

The surface area of our lungs would cover about five parking spaces.

Emphysema is caused by smoking and/or air pollution.

Kidneys remove waste from the bloodstream.

Drinking salt water results in more loss of water from the body.

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:

The Surface Area of Our Lungs

Description of activity

Introduction

In the text, students learned that their lungs contained a rather large surface area. In humans, the average lung surface area, if spread out flat, would cover about five parking spaces. Smoking and emphysema can decrease this surface area severely.

Procedure

Go to the recycle area of your school and retrieve enough 8 ½ x 11 sheets of paper to cover five parking spaces. You could “guesstimate” this amount. Begin the activity by reviewing the concept of lung surface area. Next, take students on a little “mini-field trip” to the school parking lot. Instruct them to place their sheets of recycled paper on the parking spaces. Note, select a non-windy or even non-breezy day. Once the parking areas have been covered, assist students in calculating the surface area. Once this has been done, begin removing the sheets of paper. Indicate to the students that this is what happens when the lung capacity is reduced due to smoking. Continue with this process until you have removed at least 30% of the surface area.

Discussion

Discuss with students the idea of surface area and the visual representation of their project.

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 are the three stages of respiration in the human body?

Trace the path of air molecules from outside the human body, through the mouth, and so forth until the oxygen molecules reach the bloodstream. List all of the body parts that the oxygen molecules must pass through.

List some of the cellular waste products.

What happens if human kidneys fail?

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

Key Paragraph

Respiration is the overall process of exchanging oxygen and carbon dioxide with the environment and the blood. The process is accomplished by the respiratory system and may be studied in three stages. The first stage is the process of breathing, which involves the movement of air into and out of the lungs. The second stage is the exchange of gases between the internal surface of the lungs and the blood. The third stage is the exchange of gases between the blood and the cells of the body.

EXTEND

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

Would you give one up?

Introduction

The human body can live with only one kidney as long as it is healthy.

Prompt

Ask students to write to this prompt

Who would you give up your kidney for? How and why would you make this decision?

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 7, Day 5



Outcomes for Today

Standards Focus: 9acg 10 abcef

PREPARE

1. Background knowledge necessary for today's reading.

Change is Not Easy

What does it mean to be cold blooded? What is the message from popular media on the subject of cold blooded? This lesson is about the process of maintaining stable body temperature. Ask students what happens to their bodies if they are too hot. Ask the same question in relation to coldness. Pose this question: "If you are cold, how do you warm up if you can't turn on a heater or put on more clothes?" Simply put, the body likes consistency, especially when it comes to temperature.

2. Vocabulary Word Wall.

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

metabolism shiver evaporation radiation receptor

- 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.

The human body thrives on consistency in terms temperature, food and liquid intake, and elimination of wastes.

Various systems help keep the human body functioning and in balance (homeostasis).

They are:

Character Education at the Markkula Center for Applied Ethics

www.scu.edu/character

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- The circulatory system which includes the heart which pumps blood through arteries, capillaries, and veins.
- The lymphatic system, which helps move fluids to prevent disease.
- The immune system, which protects the body from foreign pathogens and invaders.
- The excretory system for eliminating wastes

4. Read directions for investigation/activity.

5. Read text. Ch 16, The Human Animal: Maintenance of the Internal Environment, Text Section 16.12-16.14, pp. 471-473

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

Setting	Characters	Pages
the human body	sweat	471
	heat	471
	sweat glands	473

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:

Higher outside temperature causes a speed-up of chemical reactions in the body.

Shivering produces heat.

Sweat evaporating cools the body.

Most body heat loss occurs through our skin.

Sweating cools our bodies more efficiently in drier climates like in the desert.

The brain is the command center for all these activities.

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:

Breathing and Activity

We know that when we exercise, the rate of breathing speeds up. Does this also mean that the rate of carbon dioxide exhalation (production) also speeds up? Ask students to state a hypothesis about this? Continue and ask them how they might test their hypothesis using the scientific method.

Procedure

Follow the procedures outlined in Investigation 16.3 in the text.

Discussion

Have students graph their results.

Ask them if they have proved their hypothesis.

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 are the ways in which the human body keeps us warm when the outside temperature gets colder?

What part of the body controls temperature? How?

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

Key Paragraph

Metabolism is the sum of all the chemical reactions that occur within a cell or an organism. Like other chemical reactions, these enzyme-controlled reactions are influenced by changes in temperature. Within limits, they slow down at low temperatures and speed up at high temperatures. Therefore, maintaining a constant internal temperature allows for efficient chemical processes to take place. It also permits an animal to be active when environmental temperatures are low.

EXTEND

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

The Human Body as a Factory - A Visual Art Activity

Review the various systems with the students. Have them create a visual image of the human body as a factory. Get them going by reviewing the various systems and comparing them to a factory infrastructure.

12. Close with a short summary.

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