

CBL BIOLOGY: LIFE SCIENCE OPTION

BSCS Green Version 10th edition

Biology An Ecological Approach

Lesson Plan Quarter 1, Week 10, Day 1



Outcomes for Today

Standards Focus: 2f 4ae 5ab 6df

PREPARE

1. Background knowledge necessary for today's reading.

The terms carbohydrates and “carbs,” fats, and proteins are tossed about freely in pop culture, especially in advertising. We are bombarded daily with the words and images. The scientific meanings and definitions are sometimes lost in this “fog.” Try and explain this to students.

Scientific terms such as cellulose (not cellulite!) may be come “polluted” with images from the media!

2. Vocabulary Word Wall.

Introduce 5 important, useful words from today's reading.

carbohydrates

starch

protein

lipids

nucleotides

- 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

This is the time to review these terms and concepts yet again:

- Matter and energy relationships
- Chemical reactions
- The ATP ADP cycle of energy
- The transfer process with ATP as the “energy currency.”

4. Read directions for investigation/activity.

5. Read text. Section 4.8 & 4.9 pp. 96-98

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

setting	Characters	pages
Any living organism	glucose, fructose, sucrose starch, and cellulose	97

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:

Carbon atoms must be important as they are present in all living things.

Carbon atoms come in many forms.

Some of the forms are carbohydrates, lipids (fats), proteins, and starch.

Carbohydrates are the building blocks of living things.

Cellulose is a plant product used to build stems and other rigid structural parts of plants.

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:

Now would be a good time to revisit the concept of “fats and carbs” as related to diet.

See the 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

What properties allow the carbon atom to be found in all living things?

List the basic types of carbon containing molecules found in living things.

What are carbohydrates?

What are the three most common types of sugars used in energy production?

Explain why cellulose is so important to plants?

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

Key Paragraph

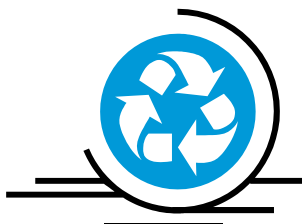
Although organisms are composed of many different chemical elements, carbon is the central element for all living systems. Carbon atoms can join together to form chains or rings. Furthermore, carbon atoms can combine with hydrogen, oxygen, nitrogen, sulfur, and phosphorus to form a vast number of organic compounds.

EXTEND

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

12. Close with a short summary.

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



Ch. 1 Student Investigation # 4.4

Fast Fats: A Nutritional Analysis of America's Obsession with Fast Foods

Objectives:

Students will:

- understand the ways in which nutritional food labels are read and used on common foods
- determine the number of calories in a peanut (or the amount of fat in potato chips) so that comparisons to other foods can be made
- understand the detrimental effects of fats on the body and their relationship to heart disease, diabetes, and obesity
- increase awareness of healthy food choices for themselves and their classmates by designing and conducting a scientific experiment using observational skills and data analysis

Overview:

Few will disagree that fast foods are a staple in the diets of many Americans. Even our nation's schools feature vending machines full of foods that are high in calories, short on nutrition, and all too easy to buy. With busy lifestyles and complicated schedules, what are the long term effects of a diet high in saturated fats? What about all the "good carbs" and "bad carbs" we have been hearing so much about?

In this lesson, students will examine nutrition labels for caloric intake using various snack foods. Then, they will determine the number of calories in a food item. Finally, they will conduct a research project in which they examine the food choices of their classmates.

Materials

- Internet access
-
- NewsHour transcript: "Fast Food Nation," http://www.pbs.org/newshour/extra/features/jan-june01/fast_food.html (attached to this lesson in printed format)
- Several bags or boxes of "snack foods"
- Dry measuring devices including measuring cups and spoons
- Calculators

Worksheets to record data

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PART I: Pre-lesson Activity

1. Give students the story "Fast Food Nation" attached to this investigation. Students should record the main points of the article in a notebook or journal and prepare a brief synopsis for the class. A brief debate is a great way to get them interested.

Some possible debate topics include -

- Should "characters" be used for advertising when the target audience is often very young?
- Should schools limit or eliminate access to vending machines and soda machines in schools? Why or why not?
- Is it a school's responsibility to notify parents and/or students when a student is seriously overweight considering all of the ill health effects?
- What are some ways that American life leads to obesity and what can be done about it?
- Should P.E. classed be harder? Why or why not? Do you think students would approve?
- Should grocery stores and convenience stores make junk food less visible? And should the prices be higher for high fat/low nutrition foods?
- Should nutrition content of school lunches be made easily available to students who want to make better choices?
- What impact do you think food labels have on the choices Americans make with their foods? Do you think they should have warning labels similar to the Surgeon General's warning on cigarettes?

2. Using the stories and the Web, students should define the following:

- Trans fats
- Hydrogenation
- %DV (percent daily value)
- Carbohydrates
- Kilocalories

PART II: Nutrition Labels

1. Many people do not know how to read a nutrition label properly. Although nutrition labels are in place to help the consumer know exactly what is in their foods, many simply don't understand the caloric requirements of the human body as it relates to nutrition labels. Go to the U.S. Food and Drug Administration Web site at <http://www.cfsan.fda.gov/~dms/foodlab.html> to find more information and sample nutrition labels.

2. Divide the class into groups of 2-4 students. Distribute several boxes or small bags of snack foods to the students. Ask students to get out 1 serving of the food. They should not look at the nutrition label, but are to take a good guess at what they would consider one serving. Then, have each student measure the actual amount of the snack that they have withdrawn and record this in a journal.

3. Investigate the parts of the food label with the students. In particular, demonstrate the number of calories in the food items, serving size, percent daily value, and the 2000-2500 calorie diet on which the label is designed. Then have students calculate the actual amount of fat and calories in their sample size. Discuss their reactions. They should clearly see that the serving sizes are often very low. In addition, discuss the caloric intake needs of a teenager by visiting http://www.keepkidshealthy.com/nutrition/calorie_requirements.html or by completing a calorie calculator at <http://www.exrx.net/Calculators/CalRequire.html>. "

PART III: School Surveys

1. Students should now have a great idea of how fat and calories play a role in their lives. But what about their classmates? Students will put together a "secret survey" in which they will watch their classmates at lunch and determine a nutrition index of the chosen foods.

2. Divide the class into groups of 2-3 students. Obtain a lunch menu for the week and distribute copies to each student. Using colored pencils or markers, students will determine a scale rating of 1-5 for the food choices. 1 will be a very high fat, high calorie, low nutrition food item, while a 5 will be a healthy whole food like apples, real chicken breasts, and so on. They should make the key and list example foods at each level. For instance, broccoli, although a good food source, once loaded with cheese or butter can go lower on the scale. Other foods such as snack cakes would be a 1.

3. Students must then make a data table in which to record their experimental results or use this one:

http://www.pbs.org/newshour/extra/teachers/lessonplans/health/nutrition_handout.pdf.

They will spend one day in the cafeteria watching the foods that others eat. They will record this in their data table. Together, they will determine the ratings of the foods that are chosen.

4. For an even greater challenge, have students design their own observational experiments. For instance, how much money is spent on average on the snack machines each day? How many students choose apples over apple pies? And so on. It is a great way to get students to design their own experiments and record their results. A complete lab write-up would be appropriate for older students to turn in.

Student Extension Activities

1. Watch the movie "Super Size Me" and have students comment on the facts presented in the film.

2. Research and compare the marketing budgets of several large fast food or soft drink companies and ask students to debate the topic.

3. Have students create a comparative timeline of the advent of fast food popularity and the growing trends in obesity.

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Fast Food Nation

Summarized from PBS report book review, April 4, 2001 with permission

Life is more hectic than ever -- between school, sports, clubs and friends, who has time to think about what to eat? Time for plan B: fast food.

"Fast food is easy," said Sarah Hudson, a 14-year-old from Portland, Maine, enjoying a snack at McDonald's. "It's quick and it tastes good." She figures she eats fast food about twice a week.

"As long as it tastes good and it fills you up then that's all I care about," said her friend Ryan Bell, 13. "We buy it because it tastes good. If they made healthy food I doubt we would buy it."

The average American now consumes about three hamburgers and four orders of french fries every week. That's 90 grams of fat and 2,520 calories. The average person needs about 2,000 calories for a whole day.

Most Americans know that fast food isn't exactly good for them, but can't quite seem to break the habit. In fact, consumption of high-fat fast food is increasing, in part because fast food restaurants are an inescapable part of American life.

Fast Food Nation

According to *Fast Food Nation*, a new book by Eric Schlosser, 96 percent of American schoolchildren can identify Ronald McDonald. **The only fictional character with a higher degree of recognition is Santa Claus.**

Schlosser says it's nearly impossible to overstate the impact of the fast food industry on the nation's culture, economy and diet. "McDonald's Golden Arches," he writes, "are now more widely recognized than the Christian cross."

The Obesity Epidemic

Considering America's love of the french fry, it's no surprise that kids are getting bigger. The percentage of children and teenagers who are overweight has tripled in the past 30 years, according to the Center for Disease Control. One-third of overweight students are so heavy they will probably have serious health problems later in life.

Of course it's not just young people who are getting heavier -- it's all Americans. U.S. Surgeon General Dr. David Satcher is so concerned about childhood obesity that he has declared it an "epidemic."

"We see a nation of young people seriously at risk of starting out obese and dooming themselves to the difficult task of overcoming a tough illness," he said.

He's not talking about kids who are chubby or a little plump. These are kids who are more than 20 percent above their ideal weight -- kids whose weight makes it hard for them to move around, get up stairs and even breathe.

Doctors are finding that more and more severely overweight children have medical problems such as a fatty liver, a precursor to liver disease, high blood pressure, and an increasing likelihood of Type 2 diabetes. In addition, obese children are becoming prime candidates for heart attacks and strokes even while in their teens.

Researchers say it's important to realize that obesity is a health problem -- not a judgment about how people's bodies should look. Everyone has their own idea about how they like to look, but nobody wants to have a heart attack.

How can you tell if you are overweight, obese, or just about right? Doctors usually [calculate your body mass index](#) (BMI) a number based on height and weight.

Ideal weight is usually given in a range of at least 15 pounds. If you have a small frame, you should probably be toward the bottom of the range. And, logically, the opposite for bigger people.

If you are more than a few pounds above your ideal weight, you are overweight. But if you are more than 20 percent above your ideal weight, you are obese. That means your weight could start to endanger your health.

The Corporate Effect

Weight is strongly influenced by genes -- you are more likely to be heavy if your parents are heavy. But, there is something you can do. Doctors say the most important way for kids and adults to lose weight is to change their eating habits. That means finding an alternative to all-night pizza delivery, convenience stores, and fast food restaurants.

Sometimes it's even hard to find nutritious food in school, where many cafeterias have been replaced with mall-style food courts. Many schools across the country have also signed contracts with soft drink companies like Coke and Pepsi. The schools agree to install soda machines and usually guarantee a set number of sales.

In return, the soda companies give the schools some of the money that collects in the machines. Schools often use the money from these contracts for teacher salaries and special programs but such contracts often require schools to sell as many as 50 sodas per student per school year.

Recent studies by the U.S. Agriculture Department now link obesity to soft drink consumption for the first time. The studies show that students drink soda instead of eating healthy meals, and then eat more food later because they are not filled up. So students are drinking more sugar and syrup and eating more food than they would if they just ate a regular lunch.

The critics' voices have been heard. In the past few weeks Coca-Cola announced they will add water and juice to their school soda machines and will discourage exclusive contracts. Pepsi executives said they plan similar changes.

Senator Patrick J. Leahy (D-Vt.) has introduced legislation that will allow the federal government to more tightly restrict school soft drink sales. "Taxpayers are paying hundreds of millions of dollars for a federal school lunch program, but many kids are filling up on empty calories," said Senator Leahy. "That's what has to change."

Physical Education

And if that wasn't enough, there's one more thing nudging kids toward the top of the scale: the extinction of gym class. The Centers for Disease Control and Prevention (CDC) recently reported that from 1991-1997 daily participation in physical education dropped from 42 percent to 29 percent, and that almost half of all teens ages 12-21 get no vigorous exercise on a regular basis.

Schools across the country are trying to make gym class more fun by adding activities like rollerblading, rock climbing or treadmill running. Only Illinois requires daily gym class for grades K-12 but many health groups are pushing for more required P.E.

As doctors, teacher, parents and kids try to work on developing healthy eating and exercise habits, there's also the danger that some kids will go too far. Many kids of normal weight seem to think they're fat -- and can develop eating disorders that are just as dangerous to their health as diabetes and stroke.

So what can you do? Here are [ten tips for healthy living](#) to help improve your body inside and out.

The CDC and the President's Council on Physical Fitness offer the following tips:

1. Eat more fruits and vegetables. Go for at least five servings a day.
2. Get off your duff. Doctors recommend 30 minutes a day of moderate exercise. Walking to and from school or a friend's house counts!
3. Watch less TV. Believe it or not, studies show kids who watch more TV are more likely to be overweight. TV watching uses up time that could be spent in more active pursuits. And exposure to tons of yummy-looking junk food ads can give you the false feeling that you're hungry.
4. Give yourself a break. Don't obsess over looking like models in magazines and calendars (Those pictures are airbrushed anyway). Visit your doctor: he or she will tell you if your weight is within the range of normal. If you are only a little overweight, you can probably slim down by making small changes in your eating habits -- cutting out soda or joining a sports team.
5. Drink water. (Your body is 98 percent H₂O). Water flushes out toxins and helps you feel fuller.
6. Foods aren't good or bad. You can fit in a higher-fat food, like pepperoni pizza, at dinner by choosing lower-fat foods at other meals. And don't forget about moderation. If two pieces of pizza fill you up, don't eat a third.
7. Read the labels. Almost every item in the kitchen has important info right on the label. When you are lookup up calories and fat, don't forget to check the portion size! It might be a lot smaller than you think!
8. Start your day with breakfast. Breakfast fills your "empty tank" to get you going after a long night without food. And it can help you do better in school.

9. If you are on a strict diet, let yourself have a small treat once in a while (but not every day!). That way you won't feel starved or cheated.

10. Talk to someone. If you're unhappy about your weight or eating habits, talk to your parents, doctor, or school nurse. There are people out there who can help.

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Biology An Ecological Approach

Lesson Plan Quarter 1, Week 10, Day 2



Outcomes for Today

Standards Focus: 2f 4ae 5ab 6df

PREPARE

1. Background knowledge necessary for today's reading.

Fats (lipids) have a very negative connotation with many people. In this section of the chapter, it is important for students to understand lipids (fats) from a scientific perspective.

2. Vocabulary Word Wall.

Introduce 3 important, useful words from today's reading.

lipids

cholesterol

plaque

- 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

This is another important step in understanding the chemistry of matter and energy in living systems and organisms.

Chemical reactions convert food into various substances which can then be made available for future use.

Lipids (fats) are yet another substance for this purpose (in addition to carbohydrates and sugars).

4. Read directions for investigation/activity.

5. Read text. Section 4.10 pp. 98

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

setting	Characters	pages
Membranes of living systems	Cholesterol	98

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:

Lipids are composed of the common elements found in living things: carbon, hydrogen, and oxygen.

Lipids are important for storing energy.

Lipids are also important in animal cells for support.

Cholesterol is a waxy fat which can form inside blood vessels causing problems with circulation.

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 Effects of Too Much Cholesterol

Introduction

This is a simple exercise designed to help students obtain a visual awareness of what happens when plaque builds up on the walls of arteries due to increase of cholesterol within the blood. It is straightforward. No frills here.

Materials Needed:

- Poster board cut to 4" X 5 1/2" size
- Tape
- Clay
- Craft Stick
- Computer with internet access

Activity Description:

The students should view the web pages on the cardiovascular system and be aware of the circulatory functions. This lesson will help the student to understand what happens when cholesterol builds up within the blood and causes plaque to form on the walls of arteries.

The students should take a 4" X 5 1/2" piece of poster board and roll it into a cylinder approximately 1 1/2" in diameter. Tape both the inside and outside of cylinder to help to maintain shape. With the use of craft stick, students place the clay on the inside of the cylinder a little at a time. Have the students observe how the opening begins to narrow. Another way to do this exercise is to smear some of the clay on before the tube is rolled up.

When the project is completed, students can "test" the efficiency of their tube (blood vessel) by breathing through it.

Have the students answer the following questions in complete sentences after working on the cholesterol project.

- What would be happening to the amount of blood passing through a narrow artery?
- What would happen to your heart because of the narrowing?
- Will this have any effect on blood pressure? What kind of effect?

After completion of the project, have the students write a one or two paragraph summary explaining what they learned about cholesterol and what it can do to your body. Emphasize that the all work should be written in proper standard English. After the summary is turned in have the students discuss what they learned .

Fat gets a bad rap...

Here is another activity. Go to this web site:

<http://searchwarp.com/swa63544.htm>

It is important to realize that fat is necessary and important.

And finally here is a Nutrition/Art Activity called Eat Right!

WHAT YOU NEED

- Go to http://www.eduplace.com/rdg/gen_act/cooking/graphics/pyramid.html to print out the [Food Pyramid](#) (print and copy)
- 5 empty boxes close to the same size, 1 box about twice as long as the others
- Magazines, advertising supplements, supermarket fliers
- Scissors
- Large construction paper
- Paste or glue

WHAT TO DO

1. Distribute the [Food Pyramid](#) printouts and discuss with the class the kinds of food in each level and what the triangular shape means. (The wide part shows the foods you should eat most often each day, and the narrower parts the ones you should eat in lesser amounts.)
2. Arrange empty boxes in a triangular shape and label them with the names of the corresponding pyramid food groups.
3. Have partners scan magazines and other illustrated, consumable materials for pictures of food. Then ask them to cut out the pictures, sort them according to the food groups, and place the pictures in the appropriate boxes.
4. Tell partners that they are going to create a healthy "meal" by choosing pictures from each box. Remind students to consult the [Food Pyramid](#) to be sure they are using healthy foods. Allow them the opportunity to make replacements as necessary.
5. When students are satisfied with their healthy meals, distribute construction paper and ask students to use their pictures to make an attractive collage. The arrangement can be realistic or simply an attractive design that uses the varying colors and textures of the different foods.

TEACHING OPTIONS

- Students can write a list of the different foods they used and attach it to their collages.

- Make a poster-sized triangle for the bulletin board. Have students add gummed labels or colored pins to each section to represent the foods they chose.
- Have them construct a food pyramid of what they have been eating...yikes.

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 elements are common in lipids?

Why are lipids important for living systems?

What is cholesterol and why can it be a problem for humans?

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

Bridge to a language building activity

Teach a Mini Lesson using *Write AHEAD* pages # 433 and 435

[The Write Ahead Activities are on individual work-pages in a separate file]

Read about heart disease and related issues caused by excessive cholesterol on these two pages. This will help you with your writing under section 11.

Key Paragraph

Both carbohydrates and lipids are important energy storage compounds in organisms. A gram of fat, however, contains more than twice as much chemical energy as a gram of carbohydrate. Therefore, fats are more efficient storage compounds.

EXTEND

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

You have learned that cholesterol can be a real problem for humans. Write a plea from the perspective of your heart. Begin this way. "Help_____, I am your heart speaking and I have a real important request...."

12. Close with a short summary.

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

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Biology An Ecological Approach

Lesson Plan Quarter 1, Week 10, Day 3



Outcomes for Today

Standards Focus: 2f 4ae 5ab 6df

PREPARE

1. Background knowledge necessary for today's reading.

This section is an ongoing discussion and explanation of the process of chemical reactions to build up matter in living things. Proteins are more complex, but the principles are the same.

2. Vocabulary Word Wall.

Introduce 5 important, useful words from today's reading.

catalyst enzyme amino acid complex protein polypeptide

- 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

Formation of proteins is a complex series of chemical reactions requiring energy. This process begins with plants converting light energy into stored chemical energy (sugar).

The chemical reactions in living things are controlled (generally speeded up) by enzymes (classified as catalysts).

4. Read directions for investigation/activity.

5. Read text. Section 4.11 & 4.12 pp. 98-101

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

setting	Characters	pages
Living systems	Amino acids	99
Living systems	enzymes	101

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:

Enzymes speed up chemical reactions in living systems.
 Proteins combine into amino acids. These are called “building blocks” of tissues including muscle, bone, and, many other parts of living systems.
 Amino acids hook together to form chains called polypeptides.
 Enzymes make all of these chemical reactions 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:

How do Enzymes Work?

It is now time to do an activity involving enzymes. Please see the investigation attached to this lesson plan.

Additional Note:

There are several good overheads in the transparencies booklet on this subject.

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

The building blocks of protein molecules are called _____ .

A long chain of amino acids is a _____ .

What is the purpose of enzymes in living systems?

How do enzymes work?

Give an example of a common enzyme.

What happens to enzyme reactions as temperature rises?

What happens to these reactions if the temperature rises too high?

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

Bridge to a language building activity

Teach a Mini Lesson using *Write AHEAD* pages #432.

[The Write Ahead Activities are on individual work-pages in a separate file]

Read the section on food pyramids and lactose intolerance. This is an example of an enzyme malfunction in the human body.

Key Paragraph

Living things make thousands of different kinds of proteins from only 20 amino acids. These amino acids are joined by peptide bonds in different sequences and numbers to form polypeptide chains of sizes from small to large.

Interpretation:

It is the huge combination of protein substances that give each living organism its unique characteristics.

EXTEND

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

Take a simple saltine cracker and put it in your mouth. Begin to chew it but don't swallow it. What is the initial taste like? If you continue to chew it, your mouth begins to salivate more and more.

Now write a short description of some sort of food that will make you salivate just by reading your description here. Is this healthy food? Why or why not?

12. Close with a short summary.

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



Ch. 4 Student Investigation # 4.4

Enzymes

Introduction and Overview:

Enzymes are proteins that speed up or slow down a chemical reaction and are not consumed by the reaction. They play an important role in the living process. The most easily understood use of enzymes is in the digestive process. Digestion can include nutritious molecules or potentially harmful molecules like alcohol. Students will use active enzymes in their saliva to demonstrate how enzymes work on common food molecules. They are also asked to apply this concept to alcoholism.

Purpose

The activity will demonstrate enzyme activity and how changes in the physical conditions affect their performance. Students will work with active enzymes and explore the boundaries of their activity.

OBJECTIVES: (The student will be able to :)

1. define enzyme
2. observe enzyme activity
3. explain how changing the physical conditions affects enzyme activity
4. discuss the relationship between drug use and enzyme activity
5. explain the enzyme deficiencies of an alcoholic

Materials Needed:

Starch solution, 6 test tubes, Benedict's solution, Iodine solution, hot water bath

ACTIVITIES AND PROCEDURES:

1. Demonstration - add hydrogen peroxide to separate beakers containing potato cubes and liver extract. Have students list their observations and formulate an explanation. As a group discuss enzymes and how they react.
2. Perform the lab activity and answer the lab questions

Observation Discussion: Using a minimum of 50 words, answer the following questions.

1. What are some of the important properties and characteristics of enzymes?
2. Explain the action of the saliva on the starch. How does this affect digestion in your body?
3. What happens to enzyme activity when the physical conditions are changed?
4. Alcoholics do not produce the enzyme needed for the digestion of alcohol. How will this affect their ability to metabolize alcohol?

Discuss the opening demonstration allow students to change their explanation of enzyme activity. Discuss the objectives and the lab activity.

Additional Activity: Spit

Before you start you will need to set up a chart that lists test tubes #1 - #6. Leave room for a description of the test tube contents and your observation of results.

Procedure:

1. Spit into a test tube, filling it one-fourth full of saliva. All lab group members may contribute to this effort. It may help to think about mouth-watering food while contributing (lemons). Sometimes something inedible, such as a rubber band, helps. Do not put any food or drink other than water into your mouth for at least two hours preceding this laboratory. Otherwise you will contaminate your sample.
2. Add an equal amount of water to the spit in the test tube, and gently mix it all together.
3. Number the remaining test tubes #3 - #6.
4. Add 5 ml. starch solution to each of the test tubes #3 - #6.
5. Add 1 ml. saliva solution to test tubes #3 and #4. Allow both test tubes to set for five minutes.
6. While these test tubes are setting, place remaining saliva solution in the water bath.
7. Add 3 drops of iodine solution to test tubes #1 & #3. Record your observations.
8. Add 10 drops of Benedict's solution to test tubes #2. Heat these solutions in the hot water bath for five minutes. Record your observations.
9. Add 1 ml. boiled saliva solution to test tubes #5 and #6. Allow both test tubes to set for five minutes.
10. Add 3 drops of iodine solution to test tube #5. Record your observations.
11. Add 10 drops of Benedict's solution to test tube #6. Heat this solution in the hot water bath for five minutes. Record your observations.

Answer the following questions, summarizing the lab.

1. What conclusions can you reach about the action of salivary enzymes on the digestion of starch?
2. What varied in the treatment of test tubes #1 and #3? Why is this difference important in your conclusion?
3. How did heating the saliva solution affect the action of the saliva?

CBL BIOLOGY: LIFE SCIENCE OPTION

BSCS Green Version 10th edition

Biology An Ecological Approach

Lesson Plan Quarter 1, Week 10, Day 4



Outcomes for Today

Standards Focus: 2f 4ae 5ab 6df

PREPARE

1. Background knowledge necessary for today's reading.

With each lesson, the complexity of chemical and matter reaction discussion has increased in complexity and understanding. We now begin to look at some higher level reactions. This is where the beginning of DNA study takes place. Ask students what they know about DNA. It certainly has been in the media a great deal.

2. Vocabulary Word Wall.

Introduce 2 important, useful words from today's reading.

RNA

DNA

- 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

1. Matter is made of atoms.
2. Atoms make elements which combine to form compounds.
3. These combinations are chemical reactions and either absorb or give off energy.
4. Energy makes living functions possible.
5. Energy flows from the sun through plants into all living things.
6. Complex chemical reactions also form the building blocks for all living organisms.
7. Carbon is an essential part of living systems and is found in organic compounds.
8. A group of complex organic compounds are amino acids which string together to form the basis of genetic material in living things.
9. Enzymes are the catalysts for these reactions.

- mention the setting and main ideas
- point to concept chart as you quickly review it

Character Education at the Markkula Center for Applied Ethics

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4. Read directions for investigation/activity.

5. Read text. Section 4.13 pp. 101-103

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

setting	Characters	pages
Living cells	RNA and DNA	101-102

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:

- RNA and DNA are found in all cells.
- DNA contains the genetic information, or blueprint, for all living structures.
- RNA is required in the making of (or remaking) of proteins.
- RNA and DNA are referred to as nucleotides.
- Information is stored in DNA through a sequence of chemicals.

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:

Now would be a good time to introduce the idea of DNA and forensic science. There has been a great deal of publicity generated in this area ever since the O.J. Simpson trial. Look through one or more of these sites and develop some discussion / demonstration activities.

This site has some very good information on DNA analysis along with some terms and interesting activities:

DNA Analysis

<http://www.reachoutmichigan.org/funexperiments/agesubject/lessons/newton/dna.html>

Forensic DNA

This site provides a good introduction to DNA and forensic analysis. It includes a slide show on the subject:

<http://www.learninghaven.com/articles/forensic-dna.html>

More on DNA Forensics

This site is a more advanced resource on DNA forensics. Students are generally interested in such topics:

<http://www.genelex.com/forensics/forensicshome.html>

Now is the time to **Build a DNA Model using Candy**

Refer to Figure 4.21 on Page 103

Here's how:

1. Gather together red and black licorice sticks, colored marshmallows or gummy bears, toothpicks and string.
2. Assign names to the colored marshmallows or gummie bears to represent nucleotide bases. There should be four different colors each representing adenine, cytosine, guanine or thymine.
3. Assign names to the colored licorice pieces with one color representing the pentose sugar molecule and the other representing the phosphate molecule.
4. Cut the licorice into 1 inch pieces.
5. String half of the licorice pieces together lengthwise alternating between the black and red pieces.
6. Repeat the procedure for the remaining licorice pieces to create a total of two stands of equal length.

7. Connect two different colored marshmallows or gummy bears together using the toothpicks.
8. Connect the toothpicks with the candy to either the red licorice segments only or the black licorice segments only, so that the candy pieces are between the two strands.
9. Holding the ends of the licorice sticks, twist the structure slightly.

Tips:

1. When connecting the base pairs be sure to connect the ones that pair naturally in DNA. For example, adenine pairs with thymine and cytosine pairs with guanine.
2. When connecting the candy base pairs to the licorice, the base pairs should be connected to the licorice pieces that represent the pentose sugar molecules.

Note: Make sure to take pictures of the molecules before the students eat them or the ants attack!

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 blueprint?

Why is DNA called a “blueprint for life”?

What is the purpose of RNA?

What are some of the basic chemicals found in DNA?

Why is it important to understand DNA?

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

Bridge to a language building activity

Teach a Mini Lesson using *Write AHEAD* pages # 173 -174

[The Write Ahead Activities are on individual work-pages in a separate file]

This might be a good time to introduce the concept of cloning. This is discussed on these two pages in the text.

Key Paragraph

Nucleic acids are carbon-containing molecules present in all cells and are vital to cell function. The two types are RNA, ribonucleic acid, and DNA, deoxyribonucleic acid. RNA is required for the synthesis of proteins. Information stored in DNA determines the

genetic, or heredity, blueprint of the organism. In this way, DNA controls the activities that occur in each cell.

EXTEND

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

Based on what you know, do you think O.J. Simpson was guilty?

Teacher Note:

For information on the DNA part of the trial, go to this site and share with students first:

http://www.crimelibrary.com/notorious_murders/famous/simpson/billions_13.html

12. Close with a short summary.

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

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Biology An Ecological Approach

Lesson Plan Quarter 1, Week 10, Day 5



Outcomes for Today

Standards Focus: 2f 4ae 5ab 6df

PREPARE

1. Background knowledge necessary for today's reading.

The implications of the carbon cycle are very important. Since carbon is so essential to all living systems, its path through the systems can be followed. Carbon is also useful in a variety of processes developed by scientists to study living things. For example, carbon dating is essential to understanding how old some living things are.

2. Vocabulary Word Wall.

Introduce 5 important, useful words from today's reading.

carbon dioxide
decomposer

photosynthesis

starch

carbon cycle

- 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

This entire chapter has followed a format of increasing complexity. First there was matter, then the changing of matter and energy generation or use. Next we moved to complex substances for genetic coding. We are now at the point where we will look at how one of the primary elements, carbon, cycles through the earth's living systems.

4. Read directions for investigation/activity.

5. Read text. pp. 103-107

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

setting	Characters	pages
Earth	Animals, rabbit, sheep Producers (green plants)	105

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:

Plants take in carbon in the gas form of carbon dioxide.

Carbon is then stored in sugars.

A plant-eating animal (consumer) then eats the plant and the carbon passes into the animal.

Some carbon is given off as carbon dioxide by plants, animals, and the burning of things like trees and fossil fuels.

Decomposers also break down dead organic material and release the carbon back into the system for recycling.

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:

This is a good time to revisit the timely topic of global warming. This site has a variety of links on the subject and is accurate and up to date:

<http://yosemite.epa.gov/oar/globalwarming.nsf/content/index.html>

There are many links here, and depending upon your computer capabilities, they are good to assist students in understanding the concept.

Briefly, here is an explanation of the Greenhouse Effect.

The Greenhouse Effect: The effect produced as greenhouse gases allow incoming solar radiation to pass through the Earth's atmosphere, but prevent most of the outgoing infrared radiation from the surface and lower atmosphere from escaping into outer space. This process occurs naturally and has kept the Earth's temperature about 60 degrees Fahrenheit warmer than it would otherwise be. Current life on Earth could not be sustained without the natural greenhouse effect.

Activity.

A good activity to understand the greenhouse effect can be found by utilizing the vehicles in any nearby parking lot.

Materials needed: Thermometers and a variety of automobiles.

Procedure: With the owner's permission, open the windows of several cars and let the temperatures inside stabilize. Next place thermometers in the vehicles (not in the direct sunlight) and record the temperatures. After you have done this, close the windows. Take the temperature of each vehicle at 15 minute intervals. Do this at least 3 times. Also note the colors of the cars.

Record the data and draw conclusions. How is a car with closed windows similar to the earth? What do the windows represent in our model?

Have students graphically represent what they have observed in this activity and post their work on the classroom wall.

Other possible activities for a class group or individual

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

Key Questions

What is the source of carbon for plants?

What is the source of carbon for animals?

What are the four ways in which a plant uses sugar?

Of what value is starch in plants?

How is it possible that you will exhale (in a different form) some of the food you eat?

Why is it a carbon cycle and not a carbon flow?

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

Key Paragraph

During the past tens of millions of years, many energy-rich plants were buried before decomposers could act on them. Consequently, the molecules in the plants slowly changed over long periods of time. They were converted to fuels, like coal, oil, and natural gas. When these fossil fuels are burned, energy is released, and the carbon in these fuels is returned to the air as carbon dioxide.

EXTEND

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

The title of the new movie by former vice president Al Gore on global warming is *An Inconvenient Truth*. Why do you suppose he titled it as such? Do you know any inconvenient truths? What are they and how do they apply to your life?

12. Close with a short summary.

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