

CBL BIOLOGY: LIFE SCIENCE OPTION

BSCS Green Version 10th edition

Biology An Ecological Approach

Lesson Plan Quarter 3, Week 10, Day 1



Outcomes for Today

Standards Focus:1 fhi

PREPARE

1. Background knowledge necessary for today's reading.

Why are plants green? This would be a good time to define and discuss the science of color. Ask students the simple, but not so simple, question, "What is color?" Ask students if they have observed color as viewed under different light sources. For example, a red car parked under the orange glow of sodium vapor streetlights does not appear red. Why is this? What is white? What is black? An understanding of light energy and colors is an important part of the study and understanding of photosynthesis.

2. Vocabulary Word Wall.

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

chloroplast photosynthesis wavelength pigment chlorophyll

- 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.

Plants are complex multicellular organisms.

The energy necessary for a plant's life activities comes from the sugars manufactured during photosynthesis and cellular respiration.

4. Read directions for investigation/activity.

5. Read text. Ch 19, The Flowering Plant: Maintenance and Coordination, Text Section 19.1-19.2, pp. 540-544

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

Setting	Characters	Pages
inside chloroplasts	thylakoids, grana, stroma	542

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:

Photosynthesis in plants converts the sun's energy into food.

Photosynthesis takes place in the chloroplasts of the plants.

Photosynthesis cannot occur without light.

All life on earth is directly or indirectly connected to the sun.

Visible light is only a small part of the entire spectrum of light.

Plants appear green because the plant pigments absorb all the light wavelengths except green, which is reflected back as green color.

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 Color Spectrum How does it work?

See Supplemental Student Investigation 19.1 attached to this lesson. Note: This may be a two-day activity.

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 what specific parts of the plant does photosynthesis take place?

What is the source of all light on earth?

What happens to most of the light that reaches the surface of the earth?

List the colors of the visible light spectrum in proper order.

How do pigments in plants help with photosynthesis?

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

Key Paragraph

Photosynthesis is a series of reactions in which plants use the sun's energy to synthesize complex energy-rich molecules from smaller, simpler molecules. In eukaryotic cells, all of those reactions take place in the structures known as chloroplasts. Even when they are removed from a cell in a laboratory, chloroplasts can carry on the entire process of photosynthesis by themselves.

EXTEND

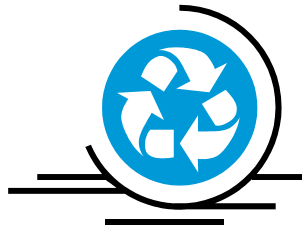
11. Prompt every student to write a short product tied to today's reading.

Chlorophyll Man (or Woman)

Review the importance of chlorophyll with students. Next direct them to create a small comic strip with the title, Chlorophyll Man. Have them illustrate their comic strip and provide the narrative script. Post the strips about the room.

12. Close with a short summary.

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



Supplemental Student Investigation 19.1 The Color Spectrum: How does it Work?

Objective:

Students will understand the following:

1. The difference in wavelength size in the electromagnetic spectrum
2. That visible light makes up a very small portion of the electromagnetic spectrum
3. That light travels in a straight line and refracts when it passes from one substance to another, which is
4. The principle behind why a prism separates white light into individual colors
5. That colors seen by the eye are a result of light being reflected, not absorbed

Materials:

For this lesson, each group will need the following:

meter stick or metric ruler (marked in millimeters)

scissors

Scotch tape

several pieces of paper in the following colors: red, orange, yellow, green, blue, violet, white, and black (paper will be cut into 1-inch-wide strips)

black marker

flashlight (optional)

prism

data sheet (attached at the end of this investigation)

Introduction

In this activity, students will create a model of the infrared, visible, and ultraviolet portions of the electromagnetic spectrum. The model they create will be made to scale based on wavelength. In order to complete this lab, students should understand the metric system and be able to convert between different metric units. They should also understand the concepts of wavelength and frequency.

Activity Level I

Hand out a data sheet to each student and divide the class into small groups of two or four. Make sure each group has the materials necessary for the activity.

Explain to students that the wavelengths for the visible, infrared, and ultraviolet portions of the spectrum are represented in meters on their data sheets. Students will need to complete a metric conversion calculation to find the length of the waves in nanometers. Explain to students that one nanometer is 10^{-9} of a meter. To put this length in perspective, tell them that the diameter of a penny is 19 billion nanometers. The scale that will be used to build their model of

the spectrum is 1 nanometer equals 1 millimeter. So if a wavelength is X nanometers, the model for that wavelength should measure X millimeters. Students will need to show the work they've done on their calculations in the space provided on the data sheet.

Work together as a class on the metric conversion calculation for red light. It is good to begin with red light rather than infrared, which is listed first on the data sheet, because the length of the scale model for infrared light is significantly longer than the scale models of any of the visible light colors. It is nice to let students discover this for themselves.

Have students fill in the scale length in the millimeters column on their data sheet for red light. Remind students that this column should always be the same as the final answer for wavelength in nanometers.

Now explain to students that the colored strips of paper will be used to represent the different colors in the visible spectrum. Red paper will be used for the wavelength of red light, orange paper for orange light, and so on. White paper will represent infrared, and black paper will represent ultraviolet.

Have each group cut a strip of red paper that is the same length as the number they have written in the column for scale length in millimeters. (If standard 8.5×11 -inch paper was used to make the strips, one strip by itself will not be long enough to make the model. Point out to the groups that they may need to tape more than one strip together to get a long enough length of paper.)

Once groups have a piece of red paper that is 750 millimeters (75 centimeters) long, have them mark the *actual* wavelength of red light, 7.5×10^{-7} meters, on the strip. At this point, walk around the room and check on each group's progress.

Each group should now complete a metric conversion calculation and cut strips for each of the electromagnetic waves represented on the data sheet. When the groups have finished, they should have eight strips of paper of different lengths and colors in their model.

Have groups align their strips horizontally, directly underneath each other, with the longest strip (which should be infrared) on top and the shortest strip (which should be ultraviolet) on the bottom. Tape all of the strips together to make one large sheet. Hang all groups' models of the spectrum around the classroom.

Once groups have completed their model spectrum, give each a prism. Tell students to shine white light through the prism in order to see the visible spectrum they have just modeled. This demonstration works best if a flashlight is shone on the prism in a darkened room. If this situation is not possible, sunlight in a regularly lit room will also work, but the colors will be less vivid.

Students are to record the colors they see, from top to bottom, in the space provided on their data sheet. Discuss how wavelength contributes to the amount of refraction or the deflection of light waves as they pass from one substance to another. Red light has the longest wavelength in the visible spectrum and therefore reflects the least. It is found at the top of the visible spectrum. Violet light has the shortest wavelength in the visible spectrum and therefore reflects the most. It is seen at the bottom of the spectrum. Discuss how the colors we see are actually light that is reflected by objects. For example, a red apple absorbs all colors of light *except* red.

It is the red light that is *not* absorbed that bounces back to our eye and gives the apple its red color.

When students have completed the prism portion of the activity, have them work out the problem at the bottom of their data sheet. Students may work as a group, but each student should have a solution written on his or her data sheet.

When students have finished with their work, collect the data sheets from each group. Data sheets will serve as part of the evaluation for this activity.

The Color Spectrum



DATA SHEET

In this activity we will be building a model of the infrared through ultraviolet portions of the visible spectrum. Below you will find values for the wavelengths that will be included in the model. The wavelengths are given in meters. The scale you will use for your model is 1 nanometer equals 1 millimeter. You are to calculate the values for the waves in nanometers and then in your model measure one millimeter for every nanometer. You are to show all of your calculations in the space provided below.

Wave	Actual Wavelength in Meters (m)	Calculation	Actual Wavelength in Nanometers (nm)	Scale Wavelength in millimeters (mm)
Infrared	1×10^{-6}			
Red	7.5×10^{-7}			
Orange	6.25×10^{-7}			
Yellow	5.75×10^{-7}			
Green	5.25×10^{-7}			
Blue	4.5×10^{-7}			
Violet	4.0×10^{-7}			
Ultraviolet	3×10^{-8}			

Colors observed from the prism (listed in order from top to bottom):

Solve the following problem. Make sure to show all of your work!

A television wave is approximately 3 meters long. If we were to make this wave part of our model, using a scale of 1 nanometer equals 1 millimeter, how long would the strip of paper representing the television wave have to be? Cite an example of this distance.

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Lesson Plan for Week 10, Day 2



Outcomes for Today

Standards Focus: 1 fhi

PREPARE

1. Background knowledge necessary for today's reading.

Photosynthesis is a complex series of chemical reactions. The study of chemical reactions involving the element carbon is known as organic chemistry. Take some time to review some of the chemistry concepts covered in chapter 4. Of particular interest are sections 4.14 and 4.15 which cover carbon cycling. Review the CBL lesson plan from Quarter One covering this area.

2. Vocabulary Word Wall.

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

interdependent oxygen carbon dioxide molecule sugar

- 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.

Photosynthesis takes place in the green chloroplasts (mostly in leaves) of plants.

Life on earth is dependent on energy from the sun.

Photosynthesis requires light energy.

Plants appear green because chloroplasts absorb most of the light, but not the green wavelength.

4. Read directions for investigation/activity.

5. Read text. Ch 19, The Flowering Plant: Maintenance and Coordination, Text Section 19.3-19.5, pp. 544-548

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

Setting	Characters	Pages
plants	starch, sugar, amino acids, lipids	547

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:

Photosynthesis is divided into three parts:

Taking in the light

Turning the light into chemical energy

Storing the energy in the form of sugar

Chemical symbols of letters, arrows, and numbers represent chemical reactions.

Oxygen is a product of photosynthesis.

Carbon dioxide is taken in by plants during photosynthesis.

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:

<http://biology.clc.uc.edu/courses/bio104/photosyn.htm>

For a more interactive version of photosynthesis, go to:

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

This is an excellent review site for strengthening student understanding of photosynthesis.

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 major stages in photosynthesis? Describe what takes place in each stage.

List some of the common elements, molecules, and compounds that are involved in photosynthesis.

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

Key Paragraph

Three major events occur in photosynthesis: (1) absorption of light energy (2) conversion of light energy into chemical energy, and (3) storage of chemical energy in sugars. The reactions by which these events occur may be considered in two distinct but interdependent groups.

EXTEND

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

I the Plant

Direct students to write a short paragraph entitled, "Plant Proclamation." In other words, the plant is describing its justification of existence. The prompt could begin with the phrase, "I the plant hereby declare..."

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 10, Day 3



Outcomes for Today

Standards Focus:1 fhi

PREPARE

1. Background knowledge necessary for today's reading.

On this living planet (ecosphere), all living things are connected. This is also true when it comes to such processes as photosynthesis. Conditions in the environment have a profound effect on photosynthesis. Brainstorm with students some of the environmental conditions that can and do impact life functions. For example, how might temperature impact our daily lives? The environmental conditions that have a direct or indirect impact on photosynthesis also influence other biological activities. Try to help students understand this basic essential truth of the web of life.

2. Vocabulary Word Wall.

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

environment variable limiting photosynthesis adaptation

- 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.

Flowering plants are complicated organisms with many complex chemical reactions taking place at all times.

Photosynthesis takes place in the chloroplasts of plant cells and requires light. Oxygen is a by-product of photosynthesis and is produced when light is available.

Sugar is also formed during photosynthesis.

4. Read directions for investigation/activity.

5. Read text. Ch 19, The Flowering Plant: Maintenance and Coordination, Text Section 19.6-19.8, pp. 548-552

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

Setting	Characters	Pages
temperate climates	rose plants	549
hot climates	cacti	

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:

Environmental factors are those which naturally occur in nature.

The environmental factors which control plant growth are:

- light intensity
- temperature
- amount of available oxygen
- amount of available carbon dioxide

Higher temperatures speed up the chemical reactions in plants.

Lower temperatures impede or slow down the chemical reactions in plants.

Optimal conditions are ideal conditions for growth. It is another way of saying the best conditions for plant growth.

Cactus plants' optimal growing conditions occur in a hot dry environment with a great deal of sunlight.

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:

Match the Plants to the Habitat

Materials Needed

A variety of nature magazines such as old *National Geographics*

Procedure

Spend time searching for photographs of two major categories: habitats and a wide variety of plants. For example under habitats, you may have a sandy desert scene, a tropical rain forest, and a temperate forest. Under the plant category for these habitats, you may have a barrel cactus, a banana tree, and a black oak tree. Cut out a wide variety of both plants and habitats.

Activity

Instruct students to sort through the habitat and plant pictures. Have them match the plants to their proper habitat.

As an extended activity, have students categorize and arrange their habitat pictures in some sense of order.

Discussion

What adaptations do the plants in the various habitats have for survival and 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

What are the four environmental conditions that impact plant growth?

What generally happens to a chemical reaction if the temperature increases?

What happens if the temperature decreases?

Name at least two adaptations of a cactus plant for living in the desert.

What is meant by a limiting factor for plant growth? Give an example.

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

Key Paragraph

Environmental conditions profoundly affect photosynthesis and therefore, productivity in an ecosystem. Four environmental factors of particular importance are light intensity, temperature, and the concentrations of carbon dioxide and oxygen.

EXTEND

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

Plant Abuse

Begin the writing assignment with this statement. Suppose the plants at your school could talk. What would they say about students abusing them? What conditions for the better would they demand? Begin with this statement, "I the plant do hereby declare...."

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 10, Day 4



Outcomes for Today

Standards Focus:1 fhi

PREPARE

1. Background knowledge necessary for today's reading.

Plants and Hormones From previous chapters, we have learned that hormones have many effects on humans. Ask students to recall some of these interactions of hormones on the human body. For example, they can generally remember the “fight or flight” syndrome as a result of adrenaline. This hormone, produced in glands adjacent to the kidneys, impacts heart rate, breathing, and mental alertness. Recall with students that hormones are often produced in one part of the organism and have an effect on another part even though the hormones are distributed throughout the plant. These affected areas are called target areas.

2. Vocabulary Word Wall.

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

differentiate auxin agent orange giberellins cold storage

- 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.

Plants are complex, highly organized multicellular organisms undergoing a constant series of chemical reactions.

Photosynthesis is just one of these reactions, taking place generally in the leaves.

Photosynthesis produces food by combining water with light energy and producing oxygen as a by-product.
Cellular respiration is another category of chemical reactions in which energy is released.

4. Read directions for investigation/activity.

5. Read text. Ch 19, The Flowering Plant: Maintenance and Coordination, Text Section 19.9-19.10, pp. 552-556

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

Setting	Characters	Pages
plant leaves	stomates	551

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:

Plant hormones are produced in very small amounts.

Each hormone has a specific effect on certain parts of the plant.

Auxins are a type of plant hormone that promotes growth.

Other hormones help plants survive by becoming dormant.

“Cold storage” is a process of keeping apples and other fruits available all year long. This is done by slowing down the ripening process through the application of hormones.

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:

More about Plant Hormones.

These two websites will provide useful information about plant hormones:

Gibberellins are covered here:

<http://www.plant-hormones.info/gibberellins.htm>

And here is one on auxins:

<http://www.plant-hormones.info/auxins.htm>

These are both good introductory sights in preparation for the next 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 differentiation in plant growth?

Mix and Match

- | | |
|------------------|---|
| 1. auxin | _____ promotes the fruit ripening process |
| 2. cytokinins | _____ is produced in root tips |
| 3. gibberellins | _____ promotes cell division |
| 4. abscisic acid | _____ causes root elongation |
| 5. ethylene | _____ causes dormancy of buds |

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

Key Paragraph

As a plant grows, it increases in size, but it also differentiates, forming a variety of cells, tissues, and organs. Although its genes determine the basic form of a plant, the environment can modify the plant's development. Growth-regulating hormones that are produced by the plant play critical roles in plant responses to changing seasons and other environmental factors.

EXTEND

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

My Name Forever

Often in the world of science, new discoveries are named after the person or persons who made the discovery. Introduce this idea to students with this writing prompt: Let's suppose you are a scientist who has just discovered a new plant hormone that will be useful to growers and farmers. Write a paragraph about your discovery and the new name you will give "your" hormone.

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 10, Day 5



Outcomes for Today

Standards Focus:1 fhi

PREPARE

1. Background knowledge necessary for today's reading.

A key part of plant and animal survival is the organism's ability to adapt to changing environmental and physical conditions. Other than a few plants, such as the sensitive plant Mimosa, plants cannot respond rapidly to such conditions by moving or running away like animals. However, they can react by moving slowly in response to certain stimuli. The fact is that plant movements are just slower and generally not observable except with such visual aids as the time lapse camera

2. Vocabulary Word Wall.

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

trophism phototropism coleoptile gravitropism photoperiodism

- 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.

Flowering plants are specialized complex living organisms composed of millions of individual cells.

The process of photosynthesis is a series of chemical reactions in which light energy is captured and converted to stored chemical energy.

Each individual cell in the plant contributes to the growth and maintenance of the entire plant.

All of these activities, like in human beings, must be coordinated through a variety of plant hormones.

Plant hormones are “chemical messengers” which are produced in one part of the plant but have an effect on other parts of the plant through “target receptors.”

4. Read directions for investigation/activity.

5. Read text. Ch 19, The Flowering Plant: Maintenance and Coordination, Text Section 19.11-19.12, pp. 556-560 & Investigation 19.2, pp. 565-567

Shared Reading RRP: Read, React, Predict every 2-3 pages

Tape Partner Choral Silent Round Robin Reading

Setting	Characters	Pages
the tropics	the mimosa or sensitive plant	??

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:

Plant movements are very slow and take place over time.

The sensitive plant is an exception to this general rule about plant movement. It can close its leaves rapidly.

Growing green plants will always bend towards the light source.

The roots grow down (toward gravity) in growing plants.

The stems grow up (away from gravity) in plants.

Some plants will flower only when exposed to longer periods of light.

Other plants will flower only when the length of light or daylight is shorter.

These are called long day and short day plants.

Nursery people can “force” a plant to bloom by manipulating the periods of artificial light they receive.

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:

Trophisms

Activity

Investigation 19.2, pp. 565- 567 in the text is relatively straightforward. Some planning and preparation will be required

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

Trophisms.

Write a short description of each trophism (phototrophism, gravitrophism, etc.) and provide a short illustration or diagram of each one and the effects on plants.

Explain what is meant by short day plants and long day plants as well as day neutral plants.

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

Key Paragraph

Many plant movements seem to result from differences in growth among cells of a tissue. You probably have observed that most plants grow towards light. Charles Darwin studied this response, called phototrophism, in which cells on the lighted side of the shoot can stop growing while those on the shaded side can continue to elongate. That differential growth seems to cause the plant to bend towards the light, but what causes the differential growth?

EXTEND

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

Do Plants Have Feelings?

Some people contend that plants, like higher order animals, have feelings. Most scientists dismiss this concept; however, some nurserymen (people who grow plants in greenhouses) play classical music in the presence of their growing plants. They maintain that this helps the plants grow.

What do you think? Let's say that you believe this concept. What kind of music would you play for your plants and why?

12. Close with a short summary.

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