

CBL BIOLOGY: LIFE SCIENCE OPTION
BSCS Green Version 10th edition
Biology An Ecological Approach
Lesson Plan for Week 5, Day 1



Outcomes for Today

Standards Focus: 2e 9abfgh

PREPARE

1. Background knowledge necessary for today's reading.

With this little introduction to the phylum Porifera (sponges), the phylum Cnidaria (jellyfish, coral, etc.), and the phylum Platyhelminthes (flatworms), we begin the journey up the evolutionary animal tree. It needs to be understood that there are some missing links in this evolutionary pattern, but this is the classification system that a vast majority of biologists subscribe to. Students generally find the study of animals interesting, so build on this interest with the activities suggested in these lessons.

2. Vocabulary Word Wall.

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

sessile sieve symbiotic diffusion nettles

- 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.

Welcome to the kingdom of animals. So far we have learned:

Animals are well adapted to their environments.

Animals can move about.

Most animals have appendages such as wings, arms, and legs.

As animal size increases, so does their complexity in terms of body systems.

4. Read directions for investigation/activity.

5. Read text. Ch14, Eukaryotes: Animals, Text Section 14.3-14.4 pp. 390-93

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

Setting	Characters	Pages
aquatic environments more aquatic environments animal intestines	sponges anemones, jellyfish, and corals tapeworms	391 391- 392 392

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:

I had no idea a sponge was an animal.

Sponges live in water.

If you tear up a living sponge, all the pieces will form new little sponges.

If you tear up a sponge and put all the pieces in a container together, they will reform a new sponge.

Sponges and cnidarians don't move about.

Sea anemones and coral are two examples of the many cnidarians.

Cnidarians live in water.

Flatworms are often parasites like tapeworms.

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.

Two possible activities:

Activity One: Introduction to Hippocampus

This website:

<http://www.hippocampus.org>

Hippocampus is a good resource to refer to from time to time. As we move into the study of animals, there are many links from the Hippocampus home page. For example, this link:

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

contains some great review as well as additional points in the primitive animals addressed in this lesson.

Activity Two: What types of sponges hold more water?

Objectives

- to determine if natural sponges or synthetic sponges are more absorbent
- to use statistical methods to compute data
- to graph a box plot

Materials

several sponges, both natural and artificial
a triple beam balance

Pre-Lab Question:

- What sponge type do you predict will hold more water? Explain.

Procedure:

1. Weigh the dry natural sponge sample to the nearest gram. Record the weight.
2. Repeat for artificial sponge.
3. Place the natural sponge into a beaker of water until fully saturated. Take out, let excess water drip off. Weigh to the nearest gram. Record the weight.
4. Repeat for artificial sponge.
5. Divide the wet weight into the dry weight and calculate the percentage.

Discussion

Why do you suppose you got the results you did?

What conclusions can you draw about natural sponges and water?

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

Describe the skeleton of a sponge.

What does the word sponge mean?

How do the algae help the cnidarians they live with?

What is a coral reef?

List several examples of cnidarians.

Describe the digestive system of a flatworm.

How does a tapeworm obtain its food?

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

Key Paragraph

Flatworms are adapted to a great variety of habitats. Many, including tapeworms and flukes, are parasites of animals including humans. Free-living forms such as planarians, may be marine or may live in fresh water or moist soil.

EXTEND

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

What happened to the "Sammy the Sponge"?

Many sponges used today are natural and are harvested from the ocean. Review this process with students and then instruct them to write a little paragraph about how life has changed for "Sammy the Sponge" on his journey from the ocean bottom to the car wash.

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 5, Day 2



Outcomes for Today

Standards Focus: 2e 9abfgh

PREPARE

1. Background knowledge necessary for today's reading.

As mentioned in the previous lesson, each lesson in this week's series is a "march up the evolutionary tree" of the animal kingdom. Students are generally familiar with the arthropods (spiders, insects, crabs, etc.) and less familiar with the mollusks (clams, squid, and octopuses). The roundworms covered in this lesson are even less familiar to students. Spend a little time ascertaining their familiarity.

2. Vocabulary Word Wall.

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

mantle **crustacean** **segmented** **krill** **larval**

- 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.

As size increases, animals generally become more complex in terms of their bodily systems and structures.

As a general rule, animals have many more adaptations than plants, and can move about their environment.

All animals have common challenges of finding food, shelter, and reproducing themselves.

Sponges and Cnidarians are simple animals even though they look somewhat like plants.

4. Read directions for investigation/activity.

5. Read text. Ch14, Eukaryotes: Animals, Text Section 14.5-14.6 pp. 393-397

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

Setting	Characters	Pages
just about everywhere on land and water	roundworms	393
marine and moist habitats	mollusks (squid, scallops, and snails)	394
mostly terrestrial habitats	arthropods (spiders and insects)	395

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:

Many roundworms are predators as well as parasites.

Roundworms have a complete gut. That is, they have an opening at both ends.

Mollusks have a soft body except for the shell in some species such as clams.

Earthworms are segmented.

Arthropods have a hard outer shell along with distinct body parts.

Crustaceans are a type of arthropod group with includes insects, spiders, crabs, centipedes and millipedes.

Three-quarters of all known animals on earth are arthropods.

There are about one billion insects for every human on earth. That is a lot of insects.

Many insects go through major changes in their body shape as they grow.

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:

Beyond Spongebob

Background

SpongeBob was created by Steve Hillenburg, a former marine biologist and science teacher who went to art school to study cartooning. Like SpongeBob, Hillenburg once worked as a fry cook at a seafood restaurant. Hillenburg liked drawing marine life and thought sponges were the "oddest of all" these creatures. But the lumpy shape of natural sponges didn't feel right for the character he wanted to create. A sink sponge turned out to be perfect—it's so clean and so square, just like the innocent and un-hip SpongeBob. Squidward, has only six legs (anatomically incorrect), but he is nevertheless an octopus (mollusk).

SpongeBob always tries to do his best. He's now helping out the New York City Department of Environmental Protection by urging kids to help save water. The campaign features an enormous SpongeBob—swollen from absorbing an entire bathtub of water—with the slogan "Save Water—Don't Drip New York Dry!"

Activity

Ask students to create a new character to be added to the "Bikini Bottom" group of SpongeBob and his friends. The animal character must belong to one of the following groups:

- mollusk
- segmented worm
- crustacean

Ask students to give their character a new name and some sort of environmental crusade. Provide students with some possibilities. Ask students to draw their character and be prepared to present it to the class.

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 meant by the statement, "Roundworms have a complete gut"?

What structure helps protect many mollusks from predators?

Name some edible mollusks.

What is the ratio of humans to insects on earth?

How many body parts does an insect have? Name them.

Name the body parts of a spider.

Why is krill important in the food chain?

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

Key Paragraph

Roundworms have a complete digestive system with two openings. This adaptation permits continuous processing of food. The digestive system is usually tubelike and is suspended in a fluid-filled body cavity within the body wall. The internal body cavity represents an evolutionary advance in animal body plans, and the resulting tube-within-a-tube is the basic body plan of animals classified in all the more complex phyla.

EXTEND

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

Beyond SpongeBob

As a follow-up to the activity, ask students to write a paragraph on their creature's message to the class introducing themselves to the world.

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 5, Day 3



Outcomes for Today

Standards Focus: 2e 9abfgh

PREPARE

1. Background knowledge necessary for today's reading.

We have moved quickly through the animal kingdom and this lesson culminates the introductory study of the various groups. The chordates are, in the simplest form of explanation, animals with backbones. They are also the highest animals on the evolutionary tree. What does this mean, anyway? Have an introductory discussion with students about this concept. You may also want to talk about such things as our responsibility to protect all animals, plants, and more importantly, entire ecosystems. When viewed from the moon, the earth is a very small, beautiful, and seemingly vulnerable ecosystem. Talk about this in terms of global warming, for example.

2. Vocabulary Word Wall.

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

vertebrate cartilage gills amphibian metabolism

- 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 terms of evolutionary complexity, here is the "animal tree":

Sponges, cnidarians, flatworms, roundworms, mollusks, segmented worms, arthropods, and now, chordates.

Animals are better suited to adapt to their various environmental living conditions. They can move towards or away from a stimulus.

As a general rule, the larger an animal is, the more complex it is; hence the largest animals are chordates.

4. Read directions for investigation/activity.

5. Read text. Ch14, Eukaryotes: Animals, Text Section 14.7, pp.397-401 and Investigation 14.1 pp. 412-413

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

Setting	Characters	Pages
the sea	sharks	398
the sea	bony fish	398
moist habitats	amphibians (poison frog and marbled salamander)	398
the air	bluebirds, pelican, hawk	399

RESPOND

6. Fix the facts. Clarify what's important.

Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important **concepts** and post these on the billboard.

Students might mention:

The vertebrae form the backbone.

Chordate skeletons are made up of either cartilage or bone.

Sharks have a cartilage skeleton.

Amphibians include toads, frogs, and salamanders and they reproduce in water.

Reptiles are land-dwelling animals and include snakes, lizards, and turtles.

Birds and mammals are the last group and they are both warm-blooded.

There are many different kinds of chordates and they are adapted to many habitats.

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:

Water Temperature and Body Function

See **Supplemental Student Investigation 14.1** attached to 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 are the four characteristics of chordates?

Name some of the various groups of chordates and give examples of animals in each group.

What does reptile mean?

What is unique about birds and mammals?

What are the characteristics of mammals?

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

Key Paragraph

At one time in their lives, all chordates (phylum Chordata) possess four characteristics: (1) paired gill slits; (2) a dorsal, tubular nerve cord; (3) a notochord—flexible, rodlike structure that extends the length of the body; and (4) a tail that extends past the anus. Among vertebrates, the notochord is replaced by a backbone made up of bony or cartilaginous pieces called vertebrae that surround the nerve cord.

EXTEND

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

Why Me?

Ask students to write a paragraph from the perspective of the goldfish looking out at the students.

12. Close with a short summary.

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



Supplemental Student Investigation 14.1 Body Function and Temperature

Objective:

Students will understand the following:

The effect of temperature on a body function (respiration) in a cold-blooded animal.

Materials:

clear plastic cups
water
thermometers
ice cubes
timer or stopwatch
small goldfish (You can buy feeder goldfish at most pet stores for a reasonable price.)

Introduction

This investigation will serve as an introduction to the life function section of this chapter. Ask students to develop a hypothesis based on the following question: Does water temperature have an effect on the rate of respiration in goldfish?

Activity Level I (Demonstration)

Have students observe a goldfish in its small temporary watery environment of the cup. Ask them how they might measure the rate of respiration? Ask them what is respiration in a fish? (Answer: Simply measure the number of times the fish opens and closes its mouth as it pumps water through its gills. We refer to this as a “gulp.”)

Activity Level II

1. Divide the class into small groups of no more than four students. Each group will observe one fish.
2. Pour water into the cups and let them assume room temperature. This might take a little while. Once all the cups are at room temperature, instruct students to take a temperature reading. Next introduce the goldfish. Let the fish settle awhile, and then instruct students to record the number of “gulps” in a 15 second time span. Do this three times and take the average.
3. Instruct students to introduce a small piece of ice into the cup of water. Ask them to note any observable changes in the activity of the goldfish.
4. Instruct them to take another temperature reading and repeat the “gulp” measurement process described in step two.
5. Repeat the process with more ice so that there are at least three different temperature situations.

Note: goldfish can be saved for a classroom aquarium. Encourage students to name them. They will take better care of them when the fish has a “persona”!

Activity Level III

After a quick demonstration, instruct students to construct a graph showing a relationship with temperature and “gulps.”

Ask them to draw conclusions. Was their hypothesis supported?

Activity Level IV

If there is time on another day, have students follow the directions for Investigation 14.1 on page 412-413 in the text. Or if you prefer, you may substitute this investigation for the goldfish one.

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Lesson Plan for Week 5, Day 4



Outcomes for Today

Standards Focus: 2e 9abfgh

PREPARE

1. Background knowledge necessary for today's reading.

Up to this point, this chapter of study has been about various groups of animals (sponges to chordates). The focus has now shifted to the various life functions in animals. Ask students to describe a life function. It is important to understand this concept before studying the details. The three major life functions addressed in this lesson are digestion, circulation, and excretion.

2. Vocabulary Word Wall.

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

ingestion digestion excretion toxic crop

- 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 terms of evolutionary complexity, here is the "animal tree":

Sponges, cnidarians, flatworms, roundworms, mollusks, segmented worms, arthropods, and now, chordates.

Animals are grouped in these categories based on body shapes, adaptations, and genetic history.

4. Read directions for investigation/activity.

5. Read text. Ch14, Eukaryotes: Animals, Text Section 14.8-14.10 pp. 402-407

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

Setting	Characters	Pages
barnyard	chicken	403
body of a fish	gills	404
planarian	flame cells	406

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:

Some animals poison their prey.

Snakes can unhook their jaws to swallow.

A chicken swallows food without chewing it. The gizzard is the organ that grinds up a chicken's food.

Fish take in oxygen through their gills.

Land animals breathe through either lungs or a series of tubes.

The heart is a pump.

Waste products must be removed from cells and bodies of animals. This is called excretion.

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 Digestive Properties of Soft Drinks

This is a relatively simple activity to set up, but the experiment must be left at least overnight.

Procedure

Fill a clear plastic cup partially full with the common soft drink known as Coke. Place a small piece of raw stew meat in the liquid and leave overnight. Repeat this activity with a variety of soft drinks including Jolt, Red Bull, and others. As with the Coke solution, leave this mixture at least overnight. Check the condition of the meat the following morning and record observations. Re-check in 24 and 48 hour intervals.

Discussion

What conclusions can be drawn from this little experiment?

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

Compare and contrast digestion and ingestion.

List at least four methods in which animals get their food.

What is a rumen found in a cow and why is it important?

List several ways in which oxygen is transported to animal cells.

What is the function of the heart?

Explain how at least two different animals get rid of waste products.

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

Key Paragraph

A variety of mechanisms for getting food have evolved in animals. Sponges demonstrate a rather primitive method. Individual cells, each with a single flagellum, keep a current of water moving through the sponge. When a food particle comes by, the cell may engulf and draw it into a vacuole, just as a paramecium does. This process of taking food into a body cavity is called **ingestion**.

EXTEND

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

The Journey through Chicken Little

Have students review the anatomy of the digestive tract of a chicken on page 403. Have them write a short paragraph from the perspective of a kernel of corn just picked up by a chicken.

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 5, Day 5



Outcomes for Today

Standards Focus: 2e 9abfgh

PREPARE

1. Background knowledge necessary for today's reading.

In this lesson, we will cover the remaining systems found in all animals. They include the nervous system, the support systems, and the reproductive system. One point that should be emphasized is that all of these systems are interconnected. However, we study them somewhat in isolation to simplify understanding. Like all living systems, one system may impact another. In other words, nothing happens in isolation.

2. Vocabulary Word Wall.

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

exoskeleton

endoskeleton

stimulus

ganglion

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.

Before the study of animal systems, we studied animal groups. We have covered several systems to date. The digestive system, circulatory system, and excretory system all have specific functions. All animals have these systems working within their bodies.

4. Read directions for investigation/activity.

5. Read text. Ch14, Eukaryotes: Animals, Text Section 14.11-14.13 pp. 407-411

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

Setting	Characters	Pages
various animals comparative views	brain, ganglion, nerve chord, nerves male and female, salmon, chickens, deer, moths	408 409
freshwater pond	flukes	410

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:

Skeletons support the body and muscles provide movement in animals.

There are two types of skeletons in animals.

Endoskeletons are internal such as in a humans and birds.

Exoskeletons are found on the outside of the animal. Examples include crabs and insects.

The nervous system allows animals to make changes in response to conditions in their environment.

A ganglion is a grouping of nerves.

A brain is a very large grouping of nerves.

Receptors allow an animal to receive signals from the environment such as light, heat, and touch.

Most reproduction in animals is sexual involving males and females.

Some animals are both male and female at the same time.

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:

Male or Female?

In many animals, the difference in appearance between a male and female is readily apparent. In some animals, it is not at all obvious.

Procedure

Provide students with colorful magazines with a wide variety of pictures.

Activity

Ask students to create a collage which shows two groups of animals:

- those in which the differences between male and female are easily distinguished
- another group in which the differences in appearance are not that easy to see

Make sure they provide examples and label their work.

Discussion

Ask students to discuss why it is that the differences in some animals are so obvious while in others it is impossible to tell a male from a female?

Other possible activities for a class group or individual

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

Key Questions

Give an example of a stimulus and a response.

List four different stimulus receptors found in animals.

Compare and contrast endoskeletons with exoskeletons, using examples.

What is fertilization?

Compare internal and external fertilization and provide examples of each.

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

Key Paragraph

Reproduction is primarily sexual in the animal kingdom. Even in species that ordinarily reproduce asexually, such as many of the cnidarians, sexual reproduction does take place. The alternation of haploid with diploid generations present in all plants is unknown in animals, although some animal groups have haploid and diploid groups. Male and female gametes are different in animals, and meiosis occurs just before or during gamete formation.

EXTEND

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

Fly On the Wall

Suppose there is a fly on the wall watching you this very minute. Write a paragraph describing what the fly observes in relation to your nervous system.

12. Close with a short summary.

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