

CBL Biology: Life Science Option

BSCS Green Version 10th edition



Biology, An Ecological Approach Lesson Plan for Week 2, Day 1

Outcomes for Today

Standards Focus: **6g 7a 8ab**

PREPARE

1. Background knowledge necessary for today's reading

In order for organisms to survive, they must be tolerant to changes in environmental conditions. We know that animals can move to new locations in order to avoid environmental extremes such as temperature fluctuations. Although plants cannot move, they tend to be more tolerant to the same environmental factors. As humans continue to modify their environments, they run the risk of changing the limits of their tolerance. In other words, they will have modified their environment beyond what they are capable of surviving in. Global warming is an example of this.

2. Vocabulary Word Wall

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

tolerance **optimum** **variable** **abiotic** **range**

- 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.
 - All organisms exhibit behaviors that are a result of the environments in which they have adapted to live in.
 - Animals and plants live in large groups called populations.
 - Living in these systems cause animals to exhibit territoriality and other behaviors necessary for survival.

4. Read directions for investigation

5. Read text. Chapter 20, Patterns In the Biosphere: Behavior, Selection and Survival, Text Section 20.8, pp. 582-583

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

Setting	Characters	Pages
Texas	blacksnake	582
Minnesota	geranium	
Australia	koala	

RESPOND

6. Fix the facts. Clarify what is 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:

An important environmental factor for living things to adjust to is temperature. Optimum conditions are those in which an organism can grow and reproduce to the best of its ability.

Tolerance is an organism's ability to withstand a range of environmental conditions.

There are many environmental conditions that determine whether an organism will survive or not.

Koalas are dependent upon eucalyptus trees for food.

7. Post information on the billboard. Add new information to ongoing whole class projects posted on the wall

- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

EXPLORE

8. Explore today's investigation with inquiry activities

9. Explore today's simulation with inquiry activities

10. Collect data and post

One possible activity:

A Survey of Plant tolerance

In this activity, students will take a walk about the school campus to observe a variety of plants growing and draw conclusions about which ones appear to be more tolerant of temperature extremes.

Procedure

Review the concept of tolerance as outlined on pages 582-583 of the student text. Explain to students that they will be observing various living plants around their school to ascertain which ones seem to be more tolerant to such environmental factors as, temperature, sunlight, and foot traffic. They will make a list of the plants and provide anecdotal comments about their observations of tolerance. For example, how do dandelions seem to be doing? Do they grow in a variety of microhabitats? What happens if students pick all the leaves of a dandelion? Will the plant reappear? It might be a good idea to provide a rough set of questions to apply in this scientific data gathering process.

Activity

Ask students to record data in their notebooks. Remind them to include detailed descriptions.

Discussion

Follow up with student feedback and discussion. Develop a list of common findings or themes. Review with students that scientific data gathering is a process in detail.

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 environmental factor has the greatest impact on living things?

What is meant by an organism's tolerance?

List some examples of abiotic conditions.

What environmental factors are necessary for a Kaola's survival?

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

Key Paragraph

All organisms function most effectively under certain environmental conditions. We can determine tolerance limits of a species for one environmental factor by varying that factor and measuring some aspect of the species' performance. The resulting curves are typically bell-shaped, with the tails representing the limits of a species tolerance for a particular environmental variable and the values in between representing the range within the organism of species can live. The conditions most favorable for growth and reproduction for that species are called the optimum conditions.

EXTEND

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

Increasing One's Tolerance

Prompt students to write to this prompt:

"If you could increase your tolerance in one area (heat, cold, etc.), what area would you pick and why. Write a paragraph explaining your answer.

12. Close with a short summary

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

CBL Biology: Life Science Option

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Biology, An Ecological Approach Lesson Plan for Week 2, Day 2

Outcomes for Today

Standards Focus: **6g 7a 8ab**

PREPARE

1. Background knowledge necessary for today's reading

Recently, the word tolerance has become relatively common in everyday language. We hear the word tolerance used in such expressions as racial tolerance, gender tolerance, social tolerance, and more. This is NOT what this lesson is about. However, you may want to ask students what such expressions mean. Next move the discussion into the world of biology and environmental science. Why would it be to an organism's advantage to be tolerant? Does this have implications for the first type of tolerance mentioned in this paragraph? Look for themes in such discussions to assist students with increasing their understanding of concepts. Build upon the themes as part of good lesson instruction.

2. Vocabulary Word Wall

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

germinate inhibit digestive tract hypothesis inhibit

- 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.

A seed contains a miniature plant called an embryo as well as a source of food for the embryo.

Certain conditions must be present in order for seeds to germinate.

Seeds are a way for a plant to reproduce and provide for a continuance of the species.

Seeds also allow a plant to survive harsh conditions such as winters and dry periods.

4. Read directions for investigation

5. Read text. Chapter 20, Patterns In the Biosphere: Behavior, Selection and Survival, Text Section 20.2, pp. 589-591

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

Setting	Characters	Pages
Petri dish	Radish, tomato, lettuce, and vetch seeds	590

RESPOND

6. Fix the facts. Clarify what is 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:

It takes more than just water to make a seed sprout (germinate).

Tolerance means, in some ways, resistance.

A hypothesis is an “educated guess.”

In this exercise, we are going to test our seeds under various conditions to see what factors influence their ability to sprout.

7. Post information on the billboard. Add new information to ongoing whole class projects posted 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:

Environmental tolerance

Follow the directions outlined in Investigation 20.2 beginning on page 589.

Discussion

Follow up with some general observations before proceeding to the questions. Again, go with any themes that seem appropriate.

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

Create a matrix for the data from this investigation

Along the X axis include the various conditions (continuous light and cold, continuous light and warm, etc.) and along the y axis the various seed species.

Count the number of sprouts after five days and after ten days.

Use this table to answer the following questions:

Under which conditions did the greatest number of tomatoes, radish, lettuce, and vetch sprout?

Which species had the greatest tolerance for light, dark, cold, and warm?

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

Key Paragraph

Seeds of some desert plants will not germinate (sprout) until rain washes out the chemicals in the seeds that inhibit germination. Other seeds must pass through the digestive tracts of animals before germinating. Some wheat seeds will not germinate until they have been exposed to low temperatures for a certain period of time. In this investigation, you will examine the tolerance of some seeds to certain environmental factors.

EXTEND

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

My Tolerance

As students to be analytical regarding this prompt:

What area of environmental conditions are you most tolerant? For example, are you tolerant of cold or heat? Explain your answer in a paragraph.

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 for Week 2, Day 3

Outcomes for Today

Standards Focus: **6g 7a 8ab**

PREPARE

1. Background knowledge necessary for today's reading

The short version of this lesson is that human impact on natural habitats is the greatest threat to the web or life on earth.

Begin this session by brainstorming with students just what this concept means to them and their world. Perhaps the best way to do this would be to look for a local example of habitat destruction. There is usually no shortage of possible examples. Likewise, habitat restoration and enhancement should also be researched and shared with students for discussion. The point here is to make this “real” for students.

2. Vocabulary Word Wall

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

carrying capacity **famine** **mortality** **extinct** **urban** **ecologist**

- 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.

So far in this chapter, we have looked at all of the behaviors and related factors that impact the survival of all living things. Genetics plays a major role in these behaviors although much behavior necessary for survival is learned. This is more evident in the high order animals such as birds and mammals.

In addition to behaviors, the greatest impact on groups of living organisms comes from habitat alteration due to human activities. Many times, entire ecosystems are wiped out and with each breaking down of these systems another part of the entire web of life is weakened.

4. Read directions for investigation

5. Read text. Chapter 20, Patterns In the Biosphere: Behavior, Selection and Survival, Text Section 20.9, pp. 584-586

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

Setting	Characters	Pages
an urban playground lawn!	desert bighorn sheep!	584
a large city	Pigeons	585
the Florida fresh waterways	manatees	585

RESPOND

6. Fix the facts. Clarify what is 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:

Human population growth continues to take away space for other living things. When humans move in, animals have one of three choices: 1. move out, 2. adapt, 3. die off.

7. Post information on the billboard. Add new information to ongoing whole class projects posted 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 Web of Life as portrayed in The Diversity Code

This short web video is a take off on the movie and book, The DaVinci Code. It would help if students had a little understanding of the storyline of The DaVinci Code. You may want to review this with them before playing The Bio Diversity Code on the projector.

Procedure

Locate this short video at:

<http://www.daversitycode.com/>

It is easily downloadable.

Activity

Show the BioDiversity Code to students at least once. Hold a class discussion on the meanings and concepts portrayed.

Discussion

Have students write the sequel to this animated lesson. Have them sketch a few scenes from their creation.

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

When humans move in and take over a natural habitat, what three choices are the animals living there faced with?

What are some of the benefits to the animals who live near humans?

Give several examples of habitat destruction.

What is a migration route?

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

Key Paragraph

Many rare and threatened species live in vulnerable, specialized habitats, such as small islands or even single trees. Human alteration of these fragile ecosystems often creates habitat “patches” that are too small to support the number of individuals needed to sustain a population. A great deal of careful planning and cooperation on a global scale is required to help wild populations survive human activity and interference.

EXTEND

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

A Short Sad Story

Ask students to write their own little short story or play about animal extinction due to habitat destruction. Direct them to base their story on a popular television series or a movie. For example, Homer Simpson turns from yellow to green.

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 for Week 2, Day 4

Outcomes for Today

Standards Focus: **8e**

PREPARE

1. Background knowledge necessary for today's reading

In order to study life on earth from the past, it is important to understand the process of fossilization. To build student interest in this area, obtain some fossil samples to share with the class. Ask the students to make observations on the fossils as if they were a scientist who just made the discovery of each of the fossils you have to share with them.

2. Vocabulary Word Wall

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

fossil paleontologist ecosystem radioactive dating nuclei

- 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.

Review the basics of classification in section 10.1 with students

Principles of classification are the same whether they are with fossils or living organisms.

4. Read directions for investigation

5. Read text. Chapter 20, Patterns In the Biosphere: Behavior, Selection and Survival, Text Section 20.2, pp. 589-591

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

Setting	Characters	Pages
rock strata	fossils	594
Mesozoic times	Stegosaurus	596
Cambrian period	Trilobites	598
oceans of today	brachiopods	598

RESPOND

6. Fix the facts. Clarify what is 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:

Scientists can determine how old fossils are by using sophisticated dating techniques.

Paleontologists are scientists who study fossils.

Fossils don't tell the complete story because only parts of the original animal are preserved.

There were times in the past when entire populations of animals (like the dinosaurs) disappeared. This is referred to as mass extinction.

7. Post information on the billboard. Add new information to ongoing whole class projects posted 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:

Deep Time

In this activity, students investigate the ages of rocks and fossils using the internet.

Procedure

Review basic concepts of fossils with students. Make observations on some of your sample fossils.

Activity

Go to this website:

<http://www.indiana.edu/~ensiweb/lessons/deep.les.html>

It contains all you need for a variety of activities. Worksheets are included.

Discussion

More activities can be found through this portal website:

<http://www.paleoportal.org/>

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

Just what are fossils and how are they formed?

In general terms, how do scientists determine the age of fossils?

What kinds of information can scientists find out by studying fossils.

What is one theory of how the dinosaurs died off?

What parts of the animal are generally preserved in fossils?

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

Key Paragraph

The fossil record offer abundant evidence of change. It also reveals great stability. For example, 21st-century oceans contain brachiopods, animals with hinged shells. The brachiopods of today are similar to those from the Paleozoic seas. Ocean environments are usually more stable than land environments. Thus, many adaptations that allowed early forms to survive apparently are still useful.

EXTEND

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

Cave Man Cartoon

Cartoons often show prehistoric man (cave men) and dinosaurs living at the same time. Through fossil records and dating, we know this could not have been possible as humans appeared on earth long after the dinosaurs became extinct.

Direct students to create a little cartoon strip to set the record straight.

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 for Week 2, Day 5

Outcomes for Today

Standards Focus: **8e**

PREPARE

1. Background knowledge necessary for today's reading

It is interesting to note that it was botanists who first began to notice patterns of similar plants growing in far reaching locations of the earth. This led to further questioning and research and eventually the formation of an understanding of plate tectonics. This is a good example of how the various disciplines of science should not be studied in isolation. Use this opportunity to engage students in a discussion on the educational process. Talk about the idea of depth of knowledge. Talk about disciplines and how each is an artificial construction of learning. Learning by single subject and in isolation is not natural.

2. Vocabulary Word Wall

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

Pangea continental drift marsupial paleoecosystem magma

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter

Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

In order to understand the past, scientists study the present as it relates to classification and structures of organisms.

Scientists can determine the age of fossils through potassium 40 and carbon 14 dating processes.

Fossil records help us understand the various changes that have taken place over geologic time.

Geologic time is a long time ago.

Many species have become extinct over geologic time. The dinosaurs are just one example. Trilobites are another example of an extinct species.

4. Read directions for investigation

5. Read text. Chapter 20, Patterns In the Biosphere: Behavior, Selection and Survival, Text Section 21.4-21.5, pp. 599-603

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

Setting	Characters	Pages
Australia New Zealand South America	southern silver beech	599
Africa, Anarctica, South America, Australia	Paleozoic seed fern	599

RESPOND

6. Fix the facts. Clarify what is 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:

Scientists noticed that very similar plants were found on faraway locations separated by oceans.

They began to form ideas that the various continents were once connected.

To explain this idea of continents slowly moving apart, scientists believed that the continents were floating on the liquid core of the earth.

This moving (or drifting) of the continents was referred to as continental drift while the science that studies this process is known as plate tectonics.

7. Post information on the billboard. Add new information to ongoing whole class projects posted 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:

Continental Drift Activity

Please refer to the details outlined in Supplemental Investigation 21.1 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 characteristics do you think enable a plant or animal to survive the breakup of a continent? Try to think of at least two characteristics.

How is it that continental drift could explain the fact that very similar plants were found on different continents.

Using illustrations and diagrams, explain how continents on the earth move, Where is an example of continental drift near where you live now?

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

Key Paragraph

A general principle of paleontology is: the present is the key to the past. The patterns found in the ecosystems today provide insight into the makeup and functions of past ecosystems. The next section presents a broad overview of some of these paleoecosystems-ecosystems of the past.

EXTEND

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

The Present and the Past

Have students write a little rap about how the present is the key to the past. Have them include the following principles:

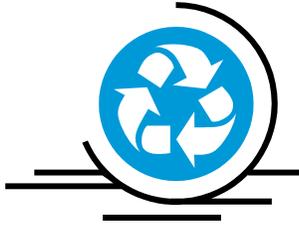
Knowing the present helps us know and understand the past.

Things are always repeating, reoccurring.

Nothing stays the same, but sameness in form and function is a guiding principle.

12. Close with a short summary

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



Supplemental Student Investigation 21.1

Continental Drift and Plant Distribution

Objectives:

Students will:

1. understand how Earth changed over a long period of time
2. understand how scientists developed a theory using fossil evidence.

Materials: A variety

The class will need the following:

Computers with Internet access (optional but very helpful)

Reference materials, including an atlas

Large sheets of paper

Colored pencils

Pencils or pens

Scissors

Clear adhesive tape

Copies of Classroom Activity Sheet: Fossil Evidence in the Southern Hemisphere

Copies of Take-Home Activity Sheet: What Gondwanaland May Have Looked Like

Activity

1. Begin the lesson by showing the class a standard physical map of the world. Tell students to look closely at the continents. Ask if they think the continents always looked as they do on the map, or if they have changed shape or location throughout Earth's history. Write their ideas on a large sheet of paper or on the board.

2. Tell students that in early 1915, the German scientist Alfred Wegener developed a theory that the continents once formed a giant supercontinent that he called Pangaea. He speculated that Earth took this form about 245 million years ago, during the Triassic period of the Mesozoic era. (The Mesozoic is the era in which dinosaurs lived.) A few years after Wegener proposed his theory, South African geologist Alexander Du Toit further theorized that Pangaea divided into two supercontinents 205 million years ago. Du Toit called the northern supercontinent Laurasia and the southern one Gondwanaland.

3. The scientists used many kinds of evidence to advance their theories. They found similar fossil remains of plants and animals on different present-day continents. The scientists hypothesized that the continents were once connected.

4. Tell students that they'll follow steps similar to those of Wegener and Du Toit to see if fossil evidence supports the theory that one supercontinent divided into two. Hand out copies of the Classroom Activity Sheet: Prehistoric Landmasses. Tell students they will focus on Gondwanaland, the supercontinent that includes what is now South America, Antarctica, Australia, Africa, Madagascar, and India.

5. Explain that students will map the locations of four different fossils:

- *Glossopteris*: a fern found on the southern continents
- *Cynognathus*: a land reptile found in South America and Africa
- *Lystrosaurus*: a land reptile found in Africa, Antarctica, and India
- *Mesosaurus*: a freshwater swimming reptile found in Africa and South America

Students should mark these locations on the sheet, using the map key code.

6. Next have students cut out the continent shapes and try to piece them together as Gondwanaland. Ask them to think about how the different shapes fit together. For homework, have students paste their finished version of Gondwanaland on the Take-Home Activity Sheet: What Gondwanaland May Have Looked Like.

7. During the next class period, have students share their versions of Gondwanaland. Are most constructions similar? Show students a picture of what scientists believe Gondwanaland looked like. For a picture, visit the Web site at:

<http://www.hartrao.ac.za/geodesy/tectonics.html>

8. Discuss where the fossil remains have been found. Does this evidence support Wegener and Du Toit's theory? Do students think it is sufficient evidence? What other information would be helpful? Conclude by telling students that over the past century, scientists have continued to find evidence supporting this theory.

Character Education at the Markkula Center for Applied Ethics

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