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Amherst

OER in Sustainability: A Flexible and Adaptable Learning Experience

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Authors	Jacobs, Brian;Goulet, Juliette
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OER For Sustainability

A Flexible and Adaptable Learning
Experience



Northeast Regional OER Summit: 2018



Juliette Goulet, Ph.D.

Environmental Science
Assistant Professor & Department Chair
Brookdale Community College



Brian Jacobs, Ph.D.

CEO & Founder
panOpen

Principles of Sustainability Course

Facilitates deeper student exploration of complex interrelationships among contemporary environmental, social, and economic problems and the solutions to overcome them

Helps students articulate personal philosophies to guide more sustainable lifestyles (i.e. choices for resource use and other behaviors)





Key Learning Outcomes

- **Connecting:** concepts of sustainability to issues of social justice, the environment, and the economy at local, regional, and global levels
- **Applying knowledge:** how does sustainability relate to one's life and values; how do individual actions impact issues of sustainability?
- **Investigating:** environmental worldviews, politics and economics
- **Communicating:** using appropriate verbal and writing skills to communicate details of the scientific method including hypotheses, results and analyses

Why OER?

Access

- Lower cost
- Available online
- Instant access
- Equal access
- Perpetual access

Editorial Flexibility

- Updatable
- Customizable
- Flexible Formats

Student Success

UDL: Universal Design for Learning

A **scientifically valid framework** for guiding educational practice that:

- provides **flexibility** in the ways information is presented and how students respond
- **reduces barriers** in instruction
- provides **appropriate accommodations, supports, and challenges**
- maintains **high achievement expectations** for all students

UDL as a BEST PRACTICE

UDL is a best practice for every classroom, because every class includes students with diverse learning needs.

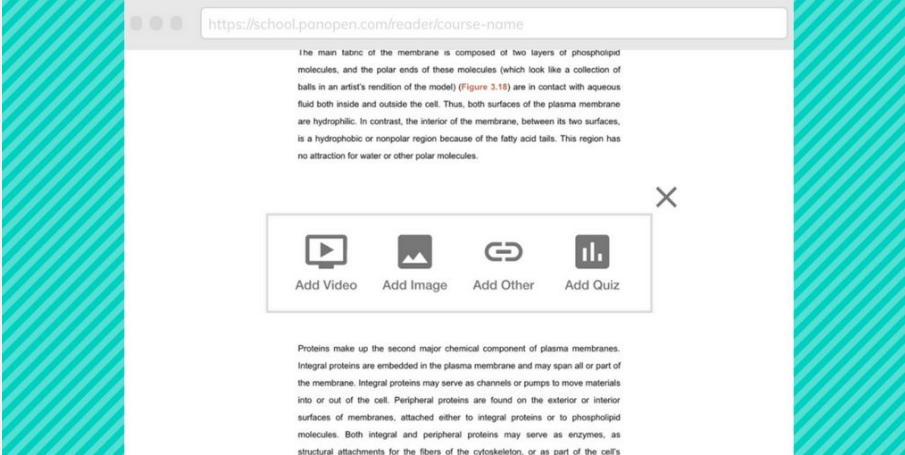
Examples:

- Students who are interested vs. disinterested
- Students who are extroverts vs. introverts
- Students who are visual vs. auditory learners
- Students who feel as though they belong in college vs. students who do not

UDL, OER + panOpen

Representing: Presenting information and course content in multiple formats so that all students can access it:

- Lectures
- PowerPoints
- Videos
- Guest speakers
- In-class exercises
- Reading from various sources, (e.g., textbooks, scholarly articles, “in the news”, student writing, etc.)



The screenshot shows a web browser window with the URL `https://school.panopen.com/reader/course-name`. The main content area displays a paragraph of text about phospholipid molecules and the hydrophobic interior of a plasma membrane. Below the text is a toolbar with four icons: a play button for 'Add Video', a mountain icon for 'Add Image', a link icon for 'Add Other', and a bar chart icon for 'Add Quiz'. A close button (X) is located in the top right corner of the toolbar area. Below the toolbar, another paragraph of text discusses proteins as a major component of plasma membranes, distinguishing between integral and peripheral proteins.

The main fabric of the membrane is composed of two layers of phospholipid molecules, and the polar ends of these molecules (which look like a collection of balls in an artist's rendition of the model) (Figure 3.18) are in contact with aqueous fluid both inside and outside the cell. Thus, both surfaces of the plasma membrane are hydrophilic. In contrast, the interior of the membrane, between its two surfaces, is a hydrophobic or nonpolar region because of the fatty acid tails. This region has no attraction for water or other polar molecules.

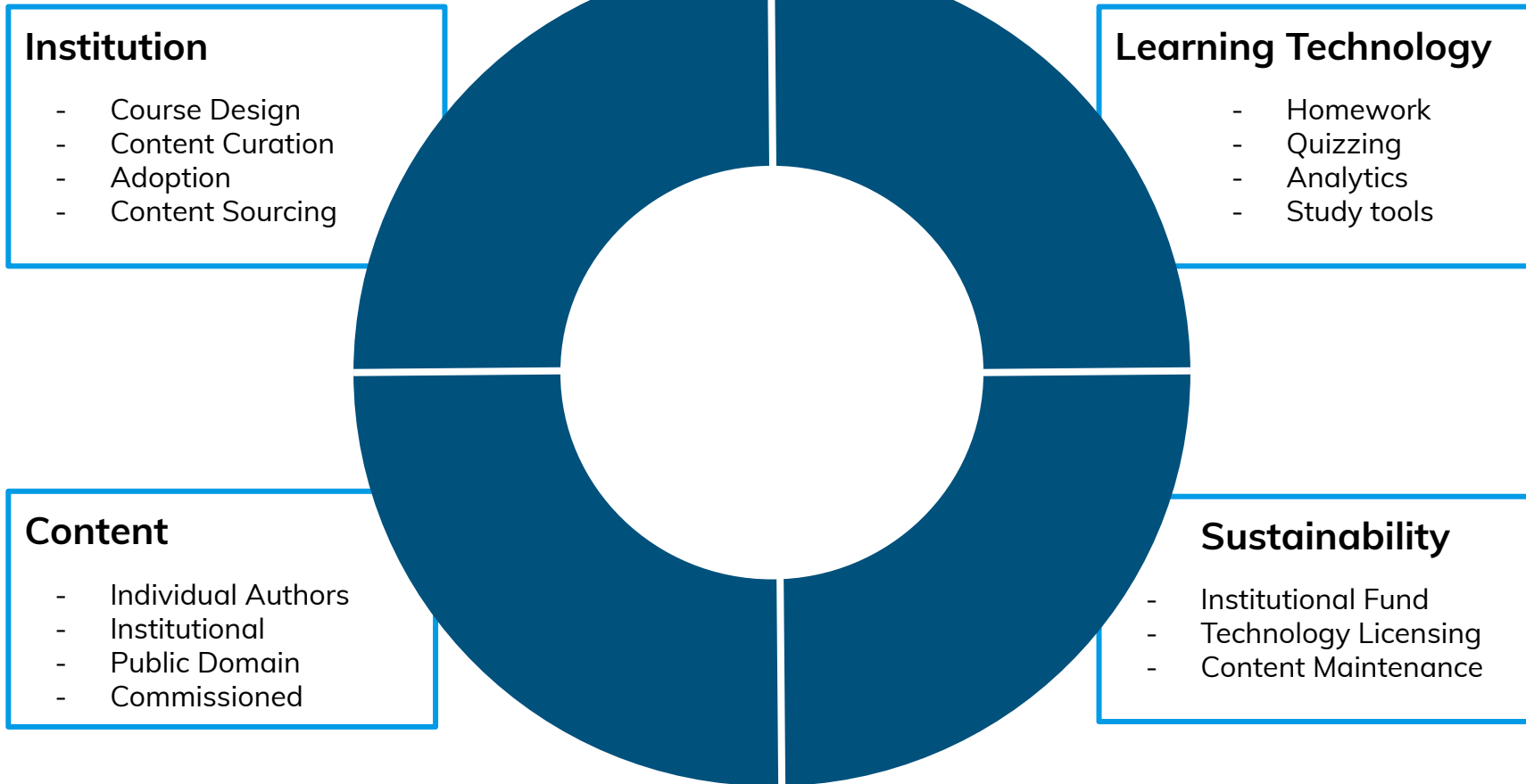
Proteins make up the second major chemical component of plasma membranes. Integral proteins are embedded in the plasma membrane and may span all or part of the membrane. Integral proteins may serve as channels or pumps to move materials into or out of the cell. Peripheral proteins are found on the exterior or interior surfaces of membranes, attached either to integral proteins or to phospholipid molecules. Both integral and peripheral proteins may serve as enzymes, as structural attachments for the fibers of the cytoskeleton, or as part of the cell's

UDL, OER + panOpen

Action and Expression: Allowing students alternatives to express or demonstrate their learning.

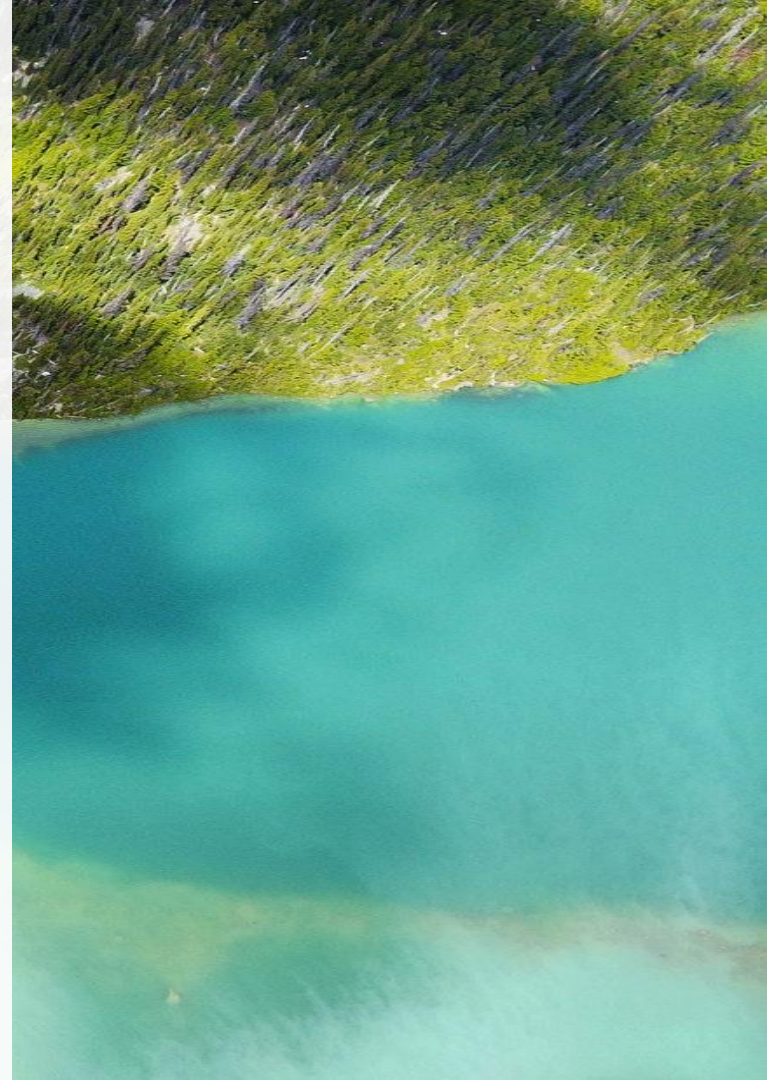
- **Summative assessment:** essays, worksheets, discussion boards, quizzes, exams, group and individual presentations, debates, etc.
- **Formative assessment:** matching, fill in the blank, multiple choice, sequence, order list, categorize, classification, etc.





Working with panOpen

- **Created:** Chapter Outlines
- **Revised:** Learning Objectives
- **Sourced:** Videos (with framing questions/description)
- **Designed:** Interactive Formative Assessments
- **Created:** APPLY IT! Assignments, with AAC&U Rubrics
- **Designed:** End of Chapter Quizzes
- **Created:** Objective-aligned Teaching Slides
- **Added:** Essential Questions
- **Created:** Test Banks
- **Designed:** Student Study Guides (including: chapter reviews, "explore and apply" questions, practice essay questions, and flashcards)





Principles of Sustainability: Videos



Video

What is Sustainability?

What is sustainability? Turns out defining sustainability is actually difficult. Figure out what sustainability actually is, how we achieve it, and why it matters - with the help of Hank Green!

Before watching the video answer these questions.

- How would *you* define sustainability?
- What are the essential needs of humans beings?
- Will a complete ban of fossil fuels support sustainability?

After watching the video consider these questions.

- After watching the video, did your definition of sustainability change?
- What is the difference between micro- and macro-sustainability?
- Is sustainability even possible?

Video





Principles of Sustainability: Formative Assessments



Check Your Understanding: Human Consumption | Fill in the Blank

Drag and drop your answers into the blanks.

The Jevons paradox is the principle that as technological progress _____ the efficiency of resource utilization, consumption of that resource will _____.

decreases

stabilize

increases

increase

remain unchanged

decrease

< Previous Question

1

Next Question >

Submit

Check Your Understanding: How Does it Affect Albedo? | Classification

Decide whether the following conditions would increase or decrease albedo. Then drag and drop them into the correct boxes.

Decreases albedo

Increases albedo

Snow-covered surface

Desertification of tropical rainforests

Paving large areas of city landscapes with black asphalt

Volcanic eruption

An increase in global temperature

Melting of the polar ice caps

Melting of Antarctica's sea ice

Covering soil with grass

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1

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Submit



Principles of Sustainability: Summative Assessments



Quiz | Introduction to Sustainability: Humanity and the Environment

Attempt 1 of 2

In the IPAT equation, the "T" represents:

- the impact of the population and economy on technology use per person.
- the technology used per person in affluent nations.
- the technology used per person in developing nations.
- the destructive technology used per person.

< Previous Question

1 of 20

Next Question >

Quiz | Introduction to Sustainability: Humanity and the Environment

Attempt 1 of 2

Ecosystem services:

- provide humans with systems for economic, social, and environmental trade-offs.
- are economically-valuable services and benefits provided by the natural environment.
- shift the costs of degradation from one group of people to another or defer costs to future generations.
- are required to restore the natural systems depleted by human activity.

< Previous Question

2 of 20

Next Question >

Quiz | Introduction to Sustainability: Humanity and the Environment

Attempt 1 of 2

Ecosystems are:

- only living organisms, and do not include nonliving environments.
- more functional and sustainable when increased in size.
- composed of independently functioning units.
- systems of interacting human, plant, animal, microorganism, and nonliving communities.

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3 of 20

Next Question >



Principles of Sustainability: Teaching Slides



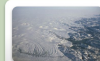
PRINCIPLES OF SUSTAINABILITY

Chapter 6 Climate Change

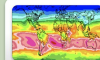
PowerPoint Slideshow



Outline



**6.1 | Climate Change and
Global Change - Introduction**



**6.2 | Climate Processes;
External & Internal Controls**



**6.3 | Milankovitch Cycle & the
Climate of the Quaternary**

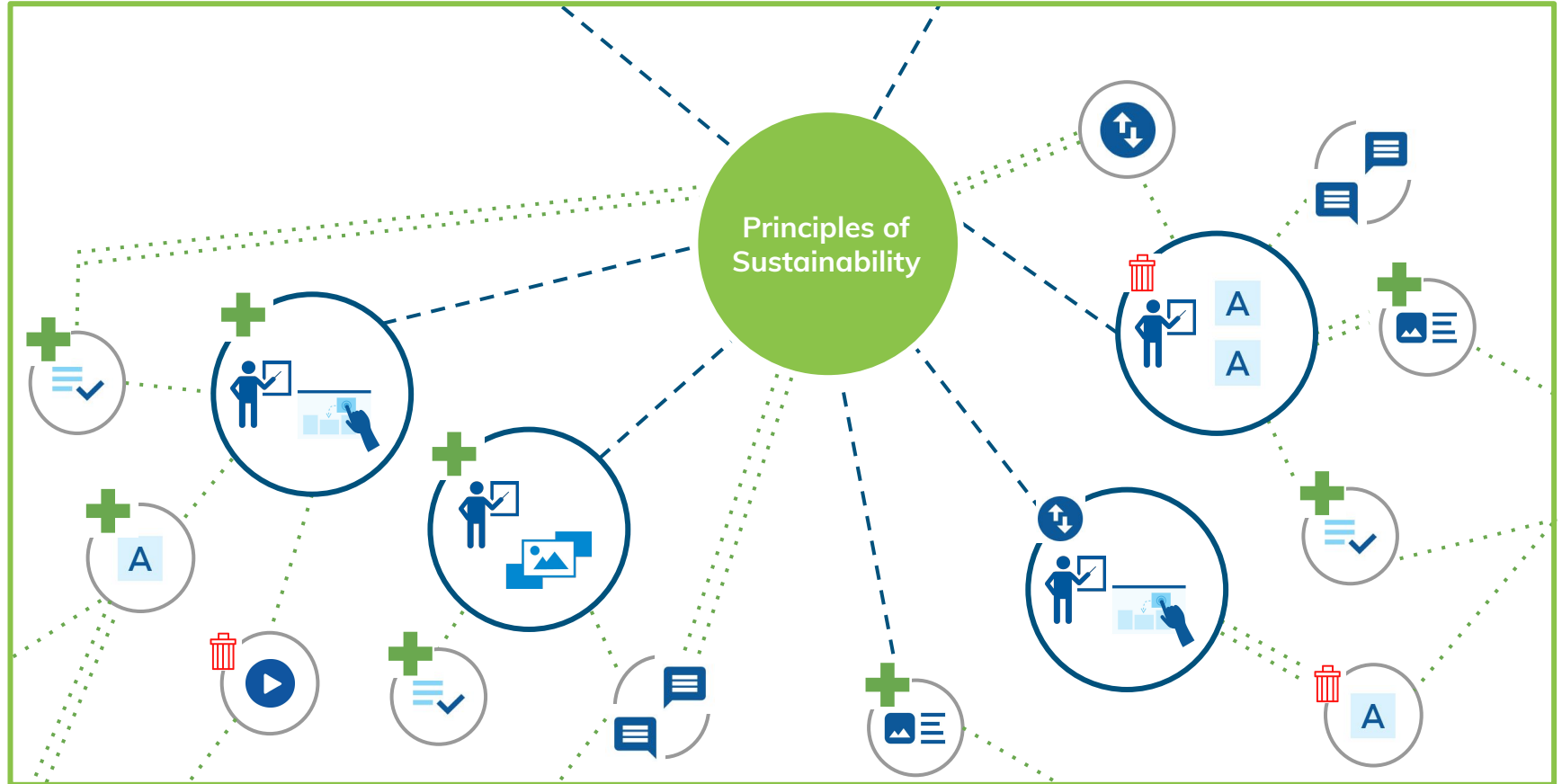


6.4 | Modern Climate Change



6.5 | Climate Projections

Next Phase of OER: Open Collaboration



Student Responses

"I love both the interaction with peers and the professor as well as the individual work in this course. The video questions felt just as interactive as the discussions, and the videos themselves are always very interesting. The online textbook was a clever way to introduce us to sustainability by not buying a massive paper textbook, and instead using one online. It also made navigation of the textbook much easier. This class has a layout where I am learning a lot without the stress of reading and studying 50 pages of notes."

"The topics covered by the textbook covered a wide range of information relating to sustainability."

"I enjoyed watching the videos to answer questions. They were very interesting and I benefited a lot from them."

Thank You



Juliette Goulet, Ph.D.

jgoulet@brookdalecc.edu



Brian Jacobs, Ph.D.

bjacobs@panopen.com