

Educator's Guide



Eco 360

Activity 14: Reimagining Economy Using Biomimicry
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Backgrounder: What is Biomimicry?

Biomimicry refers to the practice of looking to nature for inspiration, learning from and mimicking strategies found in nature and applying them to solve human design challenges (Biomimicry Institute, 2021). There are three essential elements to biomimicry—emulate, ethos, and re-connect.

Emulate refers to “the scientific, research-based practice of learning from and then replicating nature’s forms, processes, and ecosystems to create more regenerative designs” (Biomimicry Institute, 2021).

Ethos refers to “the philosophy of understanding how life works and creating designs that continuously support and create conditions conducive to life” (Biomimicry Institute, 2021).

Re-connect refers to “the concept that we are nature and find value in connecting to our place on Earth as part of life’s interconnected systems. (Re)Connect as a practice encourages us to observe and spend time in nature to understand how life works so that we may have a better ethos to emulate biological strategies in our designs” (Biomimicry Institute, 2021).

Natural ecosystems work sustainably, without creating waste that needs to be disposed of in landfills. This is because the waste generated in one organism becomes food for another organism. In this way, the natural ecosystem provides an excellent example of a perfect circular economy, where there is no waste generated and everything gets recycled. In contrast to a linear economy, the natural world follows a circular economic model, where all materials flow within the system following a circular cycle of recycling and reusing materials. Therefore, we need to learn from nature, using biomimicry, to solve the climate crisis that we face today. By taking inspiration from the natural world in designing better systems, we can move towards a circular economy that creates no waste.

More resources on biomimicry:

- Biomimicry Institute: <https://biomimicry.org/>
- Biomimicry toolkit: <https://toolbox.biomimicry.org/introduction/>
- Ask Nature: <https://asknature.org/>
- Biomimicry’s surprising lessons from nature’s engineers. Length of video: 22:58 minutes, suggested 2:00 - 6:15 minutes to learn how engineers solved a complex problem by observing the natural world:

https://www.ted.com/talks/janine_benyus_biomimicry_s_surprising_lessons_from_nature_s_engineers

- The world is poorly designed. But copying nature helps. (Length: 6 minutes)
<https://www.youtube.com/watch?v=iMtXqTmfta0>

Bibliography

Biomimicry Institute. (2021). *What is Biomimicry?* Retrieved from Biomimicry Institute:
<https://biomimicry.org/what-is-biomimicry/>

Curriculum Connections

Activity 14: Reimagining Economy Using Biomimicry

Alberta

- ❖ Biology 30 Unit D: Population & Community Dynamics
 - 30-D2.1sts explain why Canadian society supports scientific research and technological development to facilitate a sustainable society, economy and environment
- ❖ Social 10-1
 - 3.7 explore multiple perspectives regarding the relationship among people, the land and globalization (spirituality, stewardship, sustainability, resource development)

Ontario

- ❖ Grade 9 Bio
 - B1. assess the impact of human activities on the sustainability of terrestrial and/or aquatic ecosystems, and evaluate the effectiveness of courses of action intended to remedy or mitigate negative impacts;
- ❖ Grade 10 Bio (B1.3)

Activity 14: Reimagining Economy Using Biomimicry

Overall Objective

Learners will learn about biomimicry and how it can be used to design better products and systems to eliminate plastic waste.

Materials

- Internet-enabled device
- Topic backgrounder
- Eco 360 notebook (we recommend asking learners to maintain a notebook for this program to write down reflections as they go through the program)

Time Required

60 minutes - 90 minutes

Learning Outcomes

By the end of this activity, learners will:

- identify and describe biomimicry
- understand how biomimicry is used to develop innovative design solutions that eliminate plastic waste
- think critically about a reimagined economy that takes inspiration from nature by adopting biomimicry

Grade Level

Suitable for Grades 9 to 12

Activity Outline

Step One

Begin by introducing learners to the concept of biomimicry by watching this short film:

- a. 'Biomimicry'

https://www.youtube.com/watch?time_continue=51&v=sf4oW8OtaPY&feature=emb_logo (20 minutes)

Step Two

In this activity, explore technologies where the innovators took inspiration from nature to design them using the concept of biomimicry.

- a. Invite learners to take inspiration from nature and think outside the box as they re-imagine a circular economic system that incorporates biomimicry. Have learners take notes in their Eco 360 notebook as they explore the various ways innovators have taken inspiration from nature to design products and solutions:

- i. Ask Nature: <https://asknature.org/innovations/>

Step Three

Invite learners to take a walk outside their home or school into their backyard or just around the community and observe the natural world around them. Ask learners to bring their Eco 360 notebooks with them. If a green space is not accessible to learners, we recommend some of these virtual resources below to rekindle connection with nature for this activity:

- a. Exploratorium exhibits:

<https://www.exploratorium.edu/exhibits/all?name=&subject=560&collection=All&phenom=All>

- b. Wall of Birds, the Cornell Lab:

<https://academy.allaboutbirds.org/features/wallofbirds/>

- c. 30 Days of Reconnection, Biomimicry Institute

<https://biomimicry.org/30days/> - extensive resource, but

learners can pick and choose any particular day activity that inspires them the most



Learner Assessment

Consolidation: Have learners reflect on the following questions as they reconnect with nature, observing systems and design elements in the natural world that we can learn from. Learners can record their observations in their Eco 360 notebooks.

- a. What did you observe? Describe it.
- b. Define any natural system that you observed in your exploration?
- c. Did you find any waste generated by the system? What is the nature of that waste? Where does it go?
- d. Did you observe any animals in your exploration? If yes, which ones? What struck you the most about them?
- e. Can we learn anything useful from the natural world that you explored and observed during this exercise to eliminate plastic waste? How can any of the system and design elements be applied to our economy to make it free of plastic waste?