



Quarrybrook

EXPERIENTIAL EDUCATION CENTER

Program Title: Begin with Biomimicry

Audience: 1st grade students

Program Theme: Animals and plants have parts adapted to meet all of their needs. We can look to Nature to find efficient designs to help us meet our needs and take care of our Earth.

Program Goals: Students will understand that the body parts of animals and plants serve specific, essential functions, and we can mimic those adaptations to invent efficient, sustainable objects and processes to solve human challenges. Students will design their own invention to meet one of their winter needs.

Next Generation/Common Core Connections:

Topic: 1-LS1 From Molecules to Organisms: Structures and Processes

Dimensions: Patterns, Structure and Function

Program Outline:

Activity 1: BODY PARTS TO THE RESCUE (30 min.)

Objective: Students will know that different animals have distinctive body parts that they use to meet all their needs.

Steps: Students will suggest ideas for how animals use their body parts, such as to see, hear, grasp objects, protect themselves, move from place to place, and to seek, find, and take in the food, water, and air they must have to survive and grow. Students will match images of animals with descriptions of their species' needs, then with images of the specific body parts perfect for meeting those needs. We'll discuss how the shapes of natural objects are related to their function, and how Earth and its species have been functioning efficiently since their beginning.

Intended Outcome: Students will be able to group an animal with the description of one of its survival needs and with its specific body part used to meet that need.

Activity 2: BIOMIMICRY CONNECTIONS (30 min.)

Objectives: Students will understand that humans can invent efficient and sustainable objects and processes by mimicking a natural design. Students will know examples of what humans have invented based on a design they noticed in Nature.

Steps: Through a discussion of how all living things face the same basic survival needs, students will understand that examples from how animals and plants survive can be useful to humans. Students will then investigate physical samples and/or image cards of familiar objects designed by humans. Students will propose ideas of what natural object inspired the human invention. For example, man-made Velcro was inspired by the hooked burrs that stick to our pants!

Intended Outcome: Students will be able to propose the natural object whose design or function inspired the man-made object.

Activity 3: DESIGN OBSERVATION AND CREATIVE INVENTION (60 min.)

Objectives: Students will observe Nature’s designs and processes during a forest investigation. Students will design their own invention to meet one of their winter needs.

Steps: Students will walk on the Quarrybrook trails, to observe examples of useful natural designs and processes. After the outdoor investigation, students will think of a need they will have in the coming or current winter season. Students will then invent a solution to their challenge, based on a design or a process that is used in Nature. Students will draw their creative solution, and have the opportunity to share it with the group.

Intended Outcome: Students will be able to propose a solution to a winter weather challenge, using biomimicry to apply a natural design or process to the need.

Conclusion/Wrap-up: We’ll review how every human-made object is designed by applying some knowledge of the natural world. And every human-made object is built using materials derived from the natural world. Nature influences engineering and technology! Let’s keep looking at Nature for ideas of inventions we can make, to survive on and take care of our Earth.

Successful completion of this program will help support your students’ proficiency in NGSS

Performance Expectations:

1-LS1-1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.