

WHAT IS BIOMIMICRY?

Students view two videos to introduce the topic of biomimicry and how plant adaptations to desert life might be applied to sustainable design ideas.

OBJECTIVES

Students will be able to:

- Define biomimicry.
- Explain how engineers use biomimicry to design new products.
- List examples of engineered products that were inspired by nature.

MATERIALS

- Computer and projector to show online videos.

VOCABULARY

- Biomimicry
- Design
- Engineer
- Mimic
- Sustainable

ARIZONA SCIENCE STANDARDS

- S - 3, C - 1, P.O. 2
- S - 3, C - 2, P.O. 3
- S - 4, C - 3, P.O. 4
- S - 4, C - 4, P.O. 2

INTRODUCTION

Biomimicry is an approach to design that uses nature's inspiration to develop sustainable solutions to human challenges. Nature's prototypes have been tested over millennia. Those organisms that had adaptations that promoted their survival have persisted; those that didn't are no longer around. Nature's systems and processes are sustainable for the same reason—creating pollution or depletion would be contrary to long term survival. By looking to nature, humans can develop technologies and innovations that help us live in more balanced, sustainable ways that protect our planet and promote long-term survival of our own and other species.

DOING THE ACTIVITY

Setting the Stage:

Write the word “biomimicry” on the board. Has anyone heard the term? What about its parts: *bio*, meaning life, and *mimicry*, meaning to imitate or copy? Biomimicry is a way to look to nature for ideas to help us create products or solve problems to help people. For example, people designed airplane wings by copying the shape of bird wings, and they created radar and sonar by mimicking the echolocation ability of bats.

Show the video **Intro to Biomimicry** (2:02): <https://www.youtube.com/watch?v=FBUpnG1G4yQ>. What example from nature does the presenter discuss that we could use as inspiration for human innovation? (Leaf water-conducting tissues.) How might this be applied to a human invention? (The branching patterns could be used to design more efficient water or

electricity conducting structures for buildings.)

Ask the students what the presenter means by “sustainable.” Explain that a key goal in biomimicry is to create products or solutions to human problems that are sustainable. It means using natural resources in an environmentally friendly way. We know that human practices and production don't always operate this way. Think of a factory or a power plant. Are these clean images? No. Many of our modern practices produce toxic by-products and pollution that are harmful to life. What biomimicry hopes to do is look to nature's examples and inspiration to solve human problems sustainably.

Show the video **AskNature Nugget Ep. 14: Saguaro and Barrel Cacti** at <https://www.youtube.com/watch?v=aYkICNRVrNg> Can they think of any applications or creations that can be made from the adaptations of saguaros and barrel cacti? That is what engineers do. This is what the class will be doing when they do a Desert Museum program on biomimicry and see examples of the desert's inspirations to help them create their own sustainable design idea.

ASSESSMENT

Have the students define biomimicry and list two examples of products that were inspired by nature.

EXTENSION

Have students research two products or engineering designs that were inspired by nature on the Biomimicry Institute website <http://biomimicry.org/>. What were the inspirations, their useful qualities, and resulting products?