BIOMIMICRY IN-CLASS ACTIVITY #2

From Nature to Application

Instructor Notes on Lesson

Expected Time: 20-25 minutes

When to Implement: Biomimicry, being an ideation methodology, should be introduced as a way to come up with possible design solutions (after painstorming is covered, if it is). This method lends itself especially well to design challenges that may benefit from a nature-inspired design or relate to environment or sustainability (however, it can be used for design challenges of any topic). The Biomimicry video should be shown first and this would be an appropriate in-class activity to follow. If other prepared activities are being used, this should be follow Biomimicry In-Class Activity #1.

Class Set-Up: Teams of approximately 4.

Materials Needed:

- Scrap paper for students
- White board or chart paper for tracking class ideas
- Students should have access to the internet via computers or phones

Learning Outcomes:

At the completion of this activity, students will be able to:

- Describe connections between natural phenomena and application of these phenomenon in human-created design

Instructor Guide:

After watching the Biomimicry video, put the class in teams of 4 asking students to get out their own note sheet:

INTRODUCTORY DIALOGUE:

Explain to the class that you are going to continue to practice the technique of biomimicry. Here you will see some examples of nature-inspired design and think of others too.

Part 1. Introduce the Natural Process [10 minutes]

- Instructors should choose a natural phenomenon of their preference. The suggested one for this activity is "echolocation"
- Have students spend time individually researching and discussing in teams what echolocation is, how it works, and which animals use it and why.

Part 2. Consider Applications [5+ minutes]

- Now have students work in teams to brainstorm and list all of the possible human-driven applications of this technology. Students should list ones that they already know, ones that they find through research, and ones that don't necessarily exist but are imaginable/desirable.

Part 3. Share Out and [5 minutes]

- Have each team share some of the things that they had listed, encouraging them to share the most interesting or lesser known applications they had come up with. Wrap-up by sharing (through paper copies) or verbally summarizing some latest research developments in this area, such as:
    - **http://www.pbs.org/wgbh/nova/next/body/bioinspired-assistive-devices/**
    - **http://www.popsci.com/ultrasonic-helmet-lets-anyone-see-bat**
    - **http://www.natureworldnews.com/articles/2515/20130618/new-echolocation-technique-map-room-snap-finger.htm**

Part 5. (Optional) Wrap Up [5 minutes]

To wrap up this activity, instructors may wish to have students individually or in pairs or teams complete the attached wrap-up assignment.

Name: _____

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WRAP-UP

1. Echolocation was presented in this activity as a natural phenomenon that could be used for nature-inspired, human-made design. What is another example of a natural phenomonen or process that has been applied to a human-created design?

2. Someone wishing to utilize biomimicry must develop a fairly expert level of knowledge about the natural phenomenon. How do you think an engineer wanting to use biomimicry could best develop this knowledge?

3. If in our next class you were told that you were tasked with coming up with a new product, service, or process that would make family car travel more enjoyable:

a. How likely would you be to (without receiving any additional instruction or practice) use biomimicry?

      1. Extremely unlikely

      2. Unlikely

      3. Neutral

      4. Likely

      5. Extremely likely

b. If you were told you had to use bisociation, how confident would you be that you could do so effectively (without receiving any additional instruction or practice) use biomimicry?

      1. Not at all confident

      2. Not very confident

      3. Somewhat confident

4. Confident

5. Extremely confident

4. If in our next class you were told that you were tasked with coming up with a new product, service, or process that would benefit your local sustainable agricultural farm:

a. How likely would you be to (without receiving any additional instruction or practice) use biomimicry?

1. Extremely unlikely

2. Unlikely

3. Neutral

4. Likely

5. Extremely likely

b. If you were told you had to use bisociation, how confident would you be that you could do so effectively (without receiving any additional instruction or practice) use biomimicry?

1. Not at all confident

2. Not very confident

3. Somewhat confident

4. Confident

5. Extremely confident