

BIOMIMICRY/BIO-INSPIRATION WORKSHOP

PRE-WORKSHOP HOMEWORK

The purpose of this assignment is to familiarize you with the alternative mental approach that biomimicry represents. If you're completely new to what biomimicry is, then explore the [Biomimicry Guild](#) and [Biomimicry Institute](#) to get some foundation before beginning. By turning your design mindset to biology and asking questions in a new way you will activate the 'muscles' that we hope to explore over the course of the workshop. This assignment is purely voluntary, but spending an hour or two to jump-start the exploration will increase your return on investment for participating in the workshop. Make sure to take note of areas that you find puzzling, frustrating, contradictory, etc. these questions will be valuable to yourself and your peers. Most of all though, have fun learning about a new life form!

INSTRUCTIONS

Find a living organism that intrigues you, and make sure to avoid fossils and inanimate objects. Pick a plant, animal, bacteria, or fungi that you've encountered before but perhaps haven't really understood. When doing this exercise challenge yourself to explore organisms and functions which are less familiar to you and that broaden your horizons. Try one of the methods below to source your inspiration:

- Go for a walk and look for something interesting. Calm your thinking and quietly observe for half an hour the workings of the natural world. In particular focus on the functional aspects of what you see happening around you.
- Look at a natural artifact (from something formerly alive) from your own collection or that you find outdoors.
- Consider browsing media outlets such as [National Geographic](#), [Discovery Channel](#), [Wikipedia](#), [Encyclopedia of Life](#), or [AskNature](#) to find your selection.

Once you've settled on your organism of choice, you're going to explore it. Spend some time researching each of the following sections and their questions. This will likely be a new process, so consult resources that explain what you're seeking (we'll provide more of these at the conclusion of the workshop as well). It is fine not to be able to answer each question, but don't give up too quickly.

CONTEXT

Consider where your organism lives and what key factors affect its survival and success. Context is the medium through which life adapts and evolves to generate the wide array of life that informs bio-inspiration. Understanding context is a powerful explanatory tool for you.

- What sort of physical habitat constraints does your organism face (temperature, seasons, water availability, pressure, UV, etc.)?
- What are the nutrient conditions (rich/poor, food, etc.)?
- Are there other key organisms that interact with yours (predator, prey, cooperative, etc.)?
- Are there temporal factors that affect your organism (rhythms daily/seasonally, lifespan, etc.)?
- What could these aspects of context influence about your organism?

FUNCTION

Look at your organism through a functional lens and be childish. Ask *what, why, and how*; the biological explanation of your selection is important. Especially focus on what is unique. The challenges and requirements that you identified above could have resulted in functional adaptations. In researching your organism some of these may have been identified by others. Dig into them. Select a few different functional adaptations of your organism.

- What does your organism do particularly well or uniquely to address its context?
- How/where does it build its home, protect itself, acquire its vital nutrients, communicate, move, etc.?
- What specific functional adaptations of different types are there (shape, material, etc.)?
- What adaptations are more macroscopic and about the interactions and life-cycle of your organism?
- What other organisms might perform similar functions or might accomplish the same function in a different way?

ABSTRACTION

The goal of biomimicry is to take inspiration from nature, abstract, and then apply to a human solution. Brainstorm areas in which the knowledge you gained about your organism could be helpful. It's ok to bear this in mind during your whole exploration, but don't start with a solution in mind. When identifying a human need it is important to dig down to the root functional challenge in much the same way that you explored your organism's functional adaptations.

- What human designs and challenges share similar constraints (material, process, product, structure)?
- What design could be augmented by considering your organism?
- What would be a disruptively novel innovation inspired by your organism?
- What industries would be receptive to such a solution?

OBSTACLES

Circle back and be critical of what you discovered and recommended. Just as your organism adapted and evolved to suit its context so must a human solution fit in context. Understanding obstacles from the outset is critical to all design pursuits, and especially biomimicry. The obstacles you identify here will be important to address in the workshop.

- What else is at play in your organisms *beside* the function you have selected (mating, incidental adaptations, etc)?
- What kind of information do you need to take this further (biologically, chemically, etc.)?
- What could prevent inspiration from your organism from being realized (R&D, radical redesign, etc.)?
- How could other factors undermine your inspiration even if you were able to implement it (marketing, other product components, user behavior, etc.)?