Glossary of Terms

This glossary includes common words and phrases that the Biomimicry Institute often uses when talking about and teaching biomimicry. Most are true to definition, and some have a variation that is specific to their application in biomimicry.

Term	Definition
A	
Abiotic	Not associated with or derived from living organisms. Abiotic factors in an environment include sunlight, temperature, wind patterns, and precipitation, for example. Opposite of "biotic."
Adaptation	A feature of an organism that results from natural selection and by which the organism becomes better fitted to survive and reproduce in its environment.
Analogous	Similar in function and/or appearance but not in origin or development.
B	
Biodiversity	The variety of life and its processes; includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.
Biological	Of or relating to biology or living organisms.
Biologize [a question]	To take a human need or function and rephrase it so that an answer may be found in biology, e.g., "How can I make the fabric red?" becomes, "How does nature create color?"
Biomimicry	The conscious emulation of life's genius. Learning from and then emulating biological forms, processes, and ecosystems to create more sustainable designs.
Biomimicry Taxonomy	A function-based organization scheme cataloging how organisms meet different challenges. Information on AskNature.org is organized by this taxonomy.
Biomorphic	Sometimes confused with biomimicry, biomorphic describes anything resembling or suggesting the forms of living organisms.
Biophilic / Biophilia	Sometimes confused with biomimicry, biophilia is a term popularized by E.O. Wilson to describe the extent to which humans need connection with nature and other forms of life. Biophilic design emphasizes using natural materials, forms, living things, air, sun, and water in a design.
Biotic	Associated with or derived from living organisms. The biotic factors in an environment include the organisms themselves as well as factors such as predation, competition for food resources, and symbiotic relationships. Opposite of "abiotic."

Term	Definition
Bio-utilization	Sometimes confused with biomimicry, bio-utilization entails acquiring or harvesting a product or producer, such as gathering medicinal plants to obtain the medications they produce, or growing algae to make biofuels. Bio-utilization is not biomimicry, but it can be well-adapted if the harvest is sustainable and does no harm to the environment.
C	
Challenge	A specific issue or need that an organism faces. Also, a specific issue or need that humans must address in their designs.
Champion adaptor	A species whose strategies make it particularly adept at surviving in a given habitat.
Chimera	In Greek mythology, the Chimera was a creature composed of body parts from many other creatures. In biomimicry, we talk of a Chimera approach as a combination of different biomimetic designs in one application.
Co-evololution	Evolution involving successive changes in two or more ecologically interdependent species (e.g., an orchid and its hummingbird pollinator) that affect their interactions.
Context	The interrelated conditions in which something exists or occurs; the setting or environment; the conditions in which a strategy is used. See also "operating conditions."
Convergent evolution	The independent evolution of structural or functional similarity in two or more organisms of widely different, unrelated ancestry.
Creating conditions conducive to life	Establishing practices and strategies so that the existence of other species, communities, and systems is not threatened but rather enhanced. A goal of biomimetic design.
Cross-pollination	The transfer of pollen from one flower to another. Cross-pollination is also used metaphorically to refer to the transfer and sharing of ideas and information that results in new ways of thinking and acting.
D	
Design	***noun:*** The way something has been made; the way the parts of something are formed and arranged for a particular use, effect, etc. ***verb:*** To plan and make decisions about (something that is being built or created); to create the plans, drawings, etc., that show how (something) will be made.
Note: The word "design" implies intent and forethought in both its noun and verb uses. For this reason the Institute refrains from using "design" to refer to nature and to biological strategies, except in poetic usage. Biological strategies are not "designed," rather they are a result of evolutionary processes.	

Term	Definition
Design brief	A document that defines the problem that must be solved, provides context, and outlines the goals or outcomes expected from the design process.
Designer	A broad term used to refer to anyone responsible for conceiving of, creating, and/or implementing ideas that affect human cultural, social, technological, scientific, or financial systems at any scale.
Design strategy	In the Biomimicry Toolbox, design strategy refers to a biological strategy that has been abstracted and restated in non-biological terms such that it can be applied to a design solution. (Also sometimes called "design principle.")
E	
Ecosystem	A dynamic complex of plant, animal, fungal, and microorganismal communities and their associated non-living physical environment, interacting as an ecological unit.
Ecosystem services	Benefits people and other organisms obtain from ecosystems, such as food and clean drinking water, decomposition of wastes, raw materials, crop pollination, climate stabilization, and cultural and recreational benefits.
Emergent	In biomimicry, emergent refers to a strategy, property, or relationship that arises as a natural or logical consequence to an action or environmental condition.
Emulate	To mimic patterns or principles rather than directly copy them.
Evolution	Any cumulative genetic change in a population of organisms from generation to generation.
F	
Feedback loop	The flow of information within a system in which outputs influence new inputs according to a set of rules or conditions. A key driver of system behavior.
Food web	The complex network of interactions among species observed in nature that represent food relationships such as herbivory and predation.
Form	Morphology or shape, whether at the macro scale, micro scale, or nano scale. If we mimic the bumps on the surface of a leaf, for example, that's mimicking form.
Function	The purpose or activity of a characteristic, mechanism, or process; what an adaptation does for an organism or what a design does for its users. (e.g., acquiring water, accommodating growth, managing disturbance, etc.).

Term	Definition
G - H	
Green chemistry	The utilization of a set of principles that reduces or eliminates the use or generation of hazardous substances in the design, manufacture, and application of chemical processes.
Habitat	The natural environment or place where an organism, population, or species lives.
Heat, beat, and treat	The way that humans have tended to create products, using high temperatures and pressures, and using chemical processes.
I - J - K - L	
Interdependent	Relationships between or among two or more organisms on which they are dependent in order to survive or thrive.
Interdisciplinary	Involving two or more academic, scientific, or artistic disciplines. (Also multidisciplinary, cross-disciplinary)
Leverage point	Places in a complex system where a small shift in one thing can produce big changes in everything. For more information, see Donella Meadows' essay "Leverage Points: Places To Intervene in a System."
Life	The condition that distinguishes animals and plants from inorganic matter, including the capacity for growth, reproduction, functional activity, and continual change preceding death.
Life's Principles	A list of persistent patterns exhibited by organisms and living systems which contribute to life's ability to survive and thrive. The prototype for these principles was first drafted by Janine Benyus in her book *Biomimicry: Innovation Inspired by Nature.* The current version is published by Biomimicry 3.8 (formerly the Biomimicry Guild). See also "Nature's Unifying Patterns."
M - N	
Modular	Construction or design with standardized parts or units that allow for flexibility, variety in use, and/or expansion.
Natural selection	The process by which only the organisms best adapted to their environment succeed; a key mechanism of evolution.
Nature	The phenomena of the physical world collectively, including plants, animals, the landscape, and other features and products of the earth. *Note: Sometimes 'nature' is used poetically as a synonym for "life;" however, technically 'nature' includes non-living elements.*
Nature as model, measure, mentor	Three ways that biomimicry values nature. Model – applying, imitating or taking inspiration from nature's designs and processes in order to solve human problems; Measure – using an ecological standard to judge the "rightness" of our innovations; and Mentor – valuing nature for what we can learn from it and not what we can extract from it.

Term	Definition
Nature's unifying patterns	A simplified list of patterns exhibited by living systems that have profound implications for what and how humans design.
Niche	The position or functional role of a species within a community; dependent on the organism's structural adaptations, physiological responses, and behavior.
Niche differentiation	The process by which natural selection drives an organism to associate with a new niche in order to avoid direct competition.
O	
Operating parameters or conditions	Non-negotiable factors that influence the success of a design (e.g. climate, resource availability, etc). Also used in biomimicry to describe the common contextual factors that have defined the ways that life persists on Earth (e.g. sunlight, water, gravity, etc).
Optimize	Plan or carry out a design that makes the most efficient use of energy and materials.
Organism	An individual plant, animal, or other life form.
P-Q-R-S	
Pattern	A reoccurring form, strategy, or principle; often an indicator of especially effective solutions.
Principle	A fundamental quality or attribute determining the nature of something; a primary element, force, or law which produces or determines particular results.
Process	A series of actions or steps taken in order to achieve a particular end. Mimicking a biological process means mimicking how something is made or the series of steps taken to achieve a particular end.
Recycle	To treat or process (used or waste materials) so as to make suitable for reuse.
Regenerate	Restore to a better, higher, or more worthy state than the existing one.
Regenerative	Of, relating to, or marked by regeneration; tending to regenerate.
Resilient	Able to withstand or recover quickly from difficult conditions.
Self-organize	A process by which order arises from interactions between the components of an initially disordered system; often governed by simple rules and feedback loops (e.g. flocking formation by birds).
Strategy	A characteristic, mechanism, or process; "how" a function is accomplished.
Sustainability	Creating and maintaining the conditions under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations. Sustainability is based on the principle that everything we need for our survival and well-being depends, either directly or indirectly, on the natural environment.

Term	Definition
Symbiosis	An intimate relationship between two or more organisms of different species. Symbiotic relationship take three forms: mutualistic (in which each organism benefits from the relationship), commensal (in which one organism benefits from the relationship but the other organism neither benefits nor is harmed), or parasitic (in which one organism benefits at the expense of the other).
System	An interconnected set of elements that is coherently organized in a way that acheives something (function).
T-U-V-W-X-Y-Z	
Taxonomy	A system of classification.