

LIFE'S PRINCIPLES

Biomimicry DesignLens

Life's Principles are design lessons from nature. Based on the recognition that Life on Earth is interconnected and interdependent, and subject to the same set of operating conditions, Life has evolved a set of strategies that have sustained over 3.8 billion years. Life's Principles represent these overarching patterns found amongst the species surviving and thriving on Earth. Life integrates and optimizes these strategies to create conditions conducive to life. By learning from these deep design lessons, we can model innovative strategies, measure our designs against these sustainable benchmarks, and allow ourselves to be mentored by nature's genius using Life's Principles as our aspirational ideals.





EVOLVE TO SURVIVE

Continually incorporate and embody information to ensure enduring performance.



ADAPT TO CHANGING CONDITIONS

Appropriately respond to dynamic contexts.



BE LOCALLY ATTUNED AND RESPONSIVE

Fit into and integrate with the surrounding environment.



INTEGRATE DEVELOPMENT WITH GROWTH

Invest optimally in strategies that promote both development and growth.



BE RESOURCE EFFICIENT (MATERIAL AND ENERGY)

Skillfully and conservatively take advantage of resources and opportunities.



USE LIFE-FRIENDLY CHEMISTRY

Use chemistry that supports life processes.

Replicate Strategies that Work

Repeat successful approaches.

Integrate the Unexpected

Incorporate mistakes in ways that can lead to new forms and functions.

Reshuffle Information

Exchange and alter information to create new options.

Incorporate Diversity

Include multiple forms, processes, or systems to meet a functional need.

Maintain Integrity through Self-Renewal

Persist by constantly adding energy and matter to heal and improve the system.

Embody Resilience through Variation, Redundancy, and Decentralization

Maintain function following disturbance by incorporating a variety of duplicate forms, processes, or systems that are not located exclusively together.

Leverage Cyclic Processes

Take advantage of phenomena that repeat themselves.

Use Readily Available Materials and Energy

Build with abundant, accessible materials while harnessing freely available energy.

Use Feedback Loops

Engage in cyclic information flows to modify a reaction appropriately.

Cultivate Cooperative Relationships

Find value through win-win interactions.

Self-Organize

Create conditions to allow components to interact in concert to move toward an enriched system.

Build from the Bottom Up

Assemble components one unit at a time.

Combine Modular and Nested Components

Fit multiple units within each other progressively from simple to complex.

Use Low Energy Processes

Minimize energy consumption by reducing requisite temperatures, pressures, and/or time for reactions.

Use Multi-Functional Design

Meet multiple needs with one elegant solution.

Recycle All Materials

Keep all materials in a closed loop.

Fit Form to Function

Select for shape or pattern based on need.

Break Down Products into Benign Constituents

Use chemistry in which decomposition results in no harmful by-products.

Build Selectively with a Small Subset of Elements

Assemble relatively few elements in elegant ways.

Do Chemistry in Water

Use water as solvent.