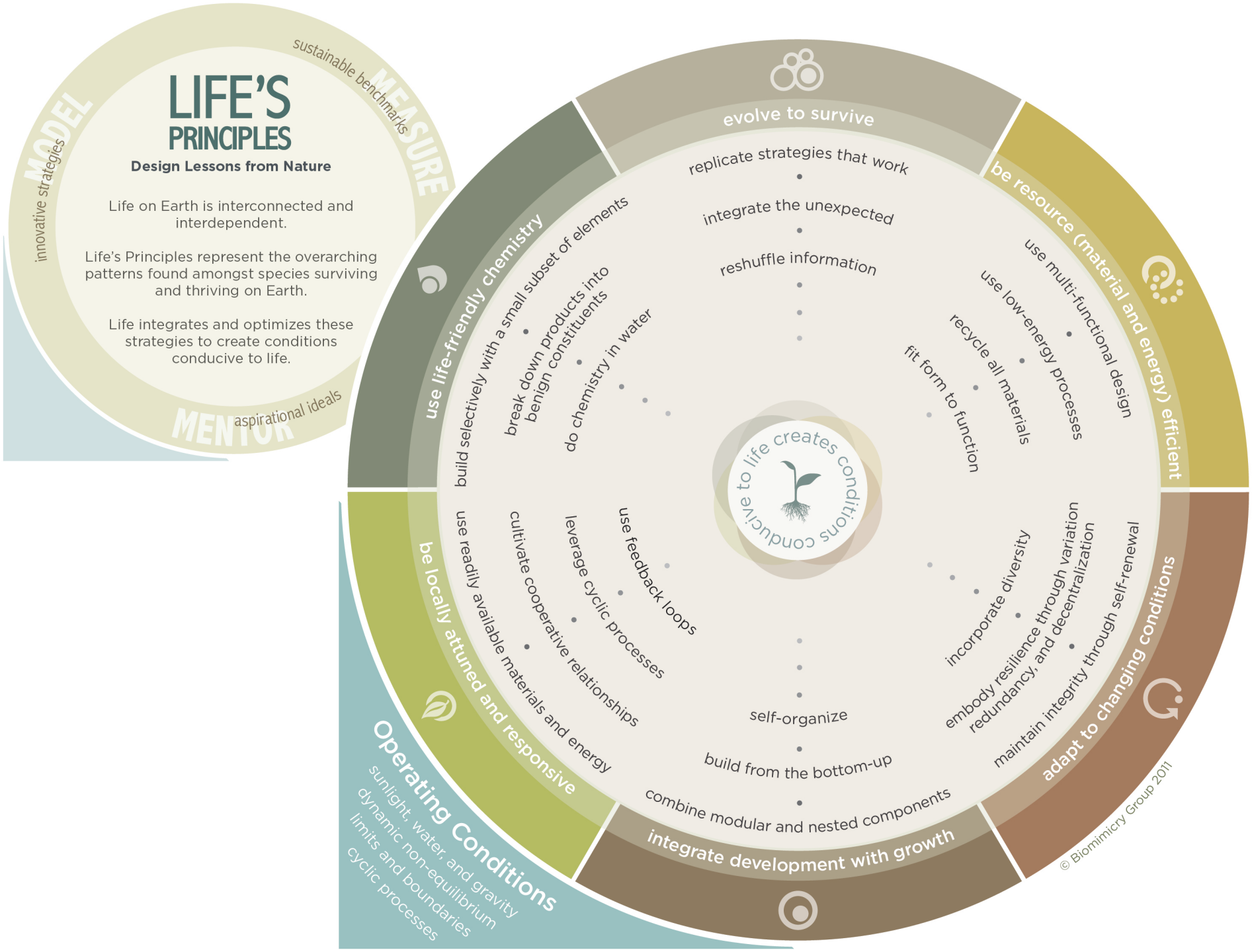
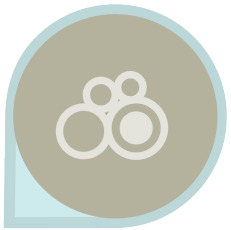

LIFE'S
PRINCIPLES
Design Lessons from Nature
Life on Earth is interconnected and interdependent.
Life's Principles represent the overarching patterns found amongst species surviving and thriving on Earth.
Life integrates and optimizes these strategies to create conditions conducive to life.
MODEL
innovative strategies
MEASURE
sustainable benchmarks
MENTOR
aspirational ideals
evolve to survive
replicate strategies that work
integrate the unexpected
reshuffle information
be resource (material and energy) efficient
use multi-functional design
use low-energy processes
recycle all materials
fit form to function
adapt to changing conditions
incorporate diversity
embody resilience through variation redundancy, and decentralization
maintain integrity through self-renewal
integrate development with growth
self-organize
build from the bottom-up
combine modular and nested components
be locally attuned and responsive
use readily available materials and energy
cultivate cooperative relationships
leverage cyclic processes
use feedback loops
use life-friendly chemistry
build selectively with a small subset of elements
break down products into benign constituents
do chemistry in water
life creates conditions conducive to life
Operating Conditions
sunlight, water, and gravity
dynamic non-equilibrium
limits and boundaries
cyclic processes
© Biomimicry Group 2011



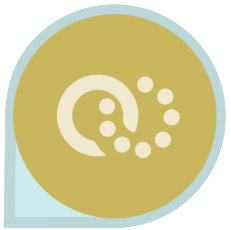
Evolve to Survive

Continually incorporate and embody information to ensure enduring performance.

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.



Be Resource (Material and Energy) Efficient

Skillfully & conservatively take advantage of local resources & opportunities.

Use Multi-functional Design
Meet multiple needs with one elegant solution.

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

Recycle All Materials
Keep all materials in a closed loop.

Fit Form to Function
Select for shape or pattern based on need.

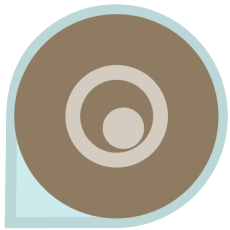
Adapt to Changing Conditions

Appropriately respond to dynamic contexts.

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.

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



Integrate Development with Growth

Invest optimally in strategies that promote both development and growth.

Combine Modular and Nested Components
Fit multiple units within each other progressively from simple to complex.

Build from the Bottom Up
Assemble components one unit at a time.

Self-organize
Create conditions to allow components to interact in concert to move towards an enriched system.

Be Locally Attuned and Responsive

Fit into and integrate with the surrounding environment.

Use Readily Available Materials and Energy
Build with abundant, accessible materials while harnessing freely available energy.

Cultivate Cooperative Relationships
Find value through win-win interactions.

Leverage Cyclic Processes
Take advantage of phenomena that repeat themselves.

Use Feedback Loops
Engage in cyclic information flows to modify a reaction appropriately.

Use Life-friendly Chemistry

Use chemistry that supports life processes.

Build Selectively with a Small Subset of Elements
Assemble relatively few elements in elegant ways.

Break Down Products into Benign Constituents
Use chemistry in which decomposition results in no harmful by-products.

Do Chemistry in Water
Use water as solvent.