innovating with biomimicry

innovation inspired by nature

mary vasseur finn
sr. ux designer

biomimicry 1.0

1. **what is biomimicry?**
   - **emulating forms**
   - **emulating processes**
   - **emulating systems**

2. **examples and a case study**

3. **how is biomimicry done?**
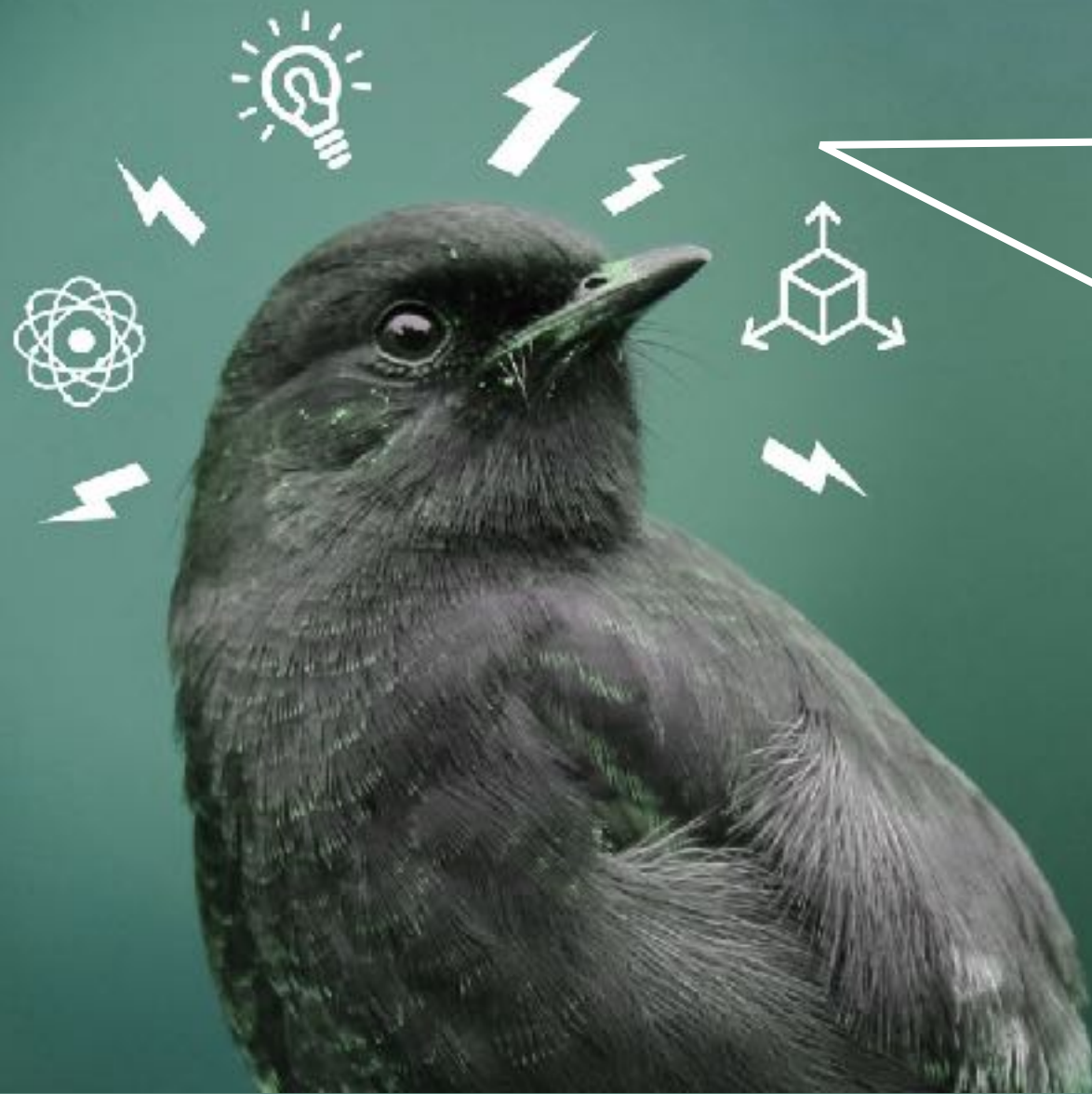
biomimicry in innovation

what is biomimicry?

what is biomimicry?

Biomimicry is … the conscious
emulation of life's genius …
a revolution based not on what
we can extract from nature, but
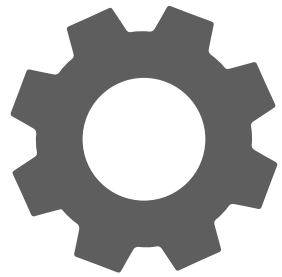on what we can learn from her.
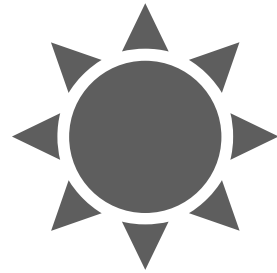
– Janine Benyus
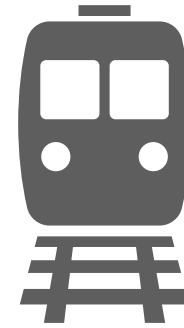
what is biomimicry? (cont'd)
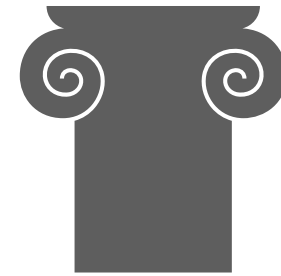
applications

MECHANICAL
ENGINEERING

ENERGY CREATION
AND DISTRIBUTION

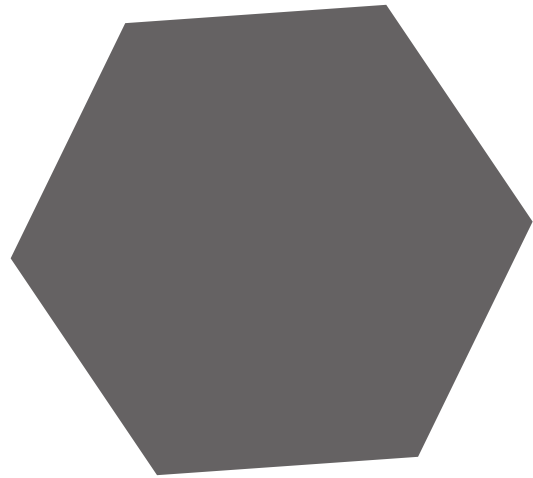TRANSPORTATION
PLANNING

ARCHITECTURE
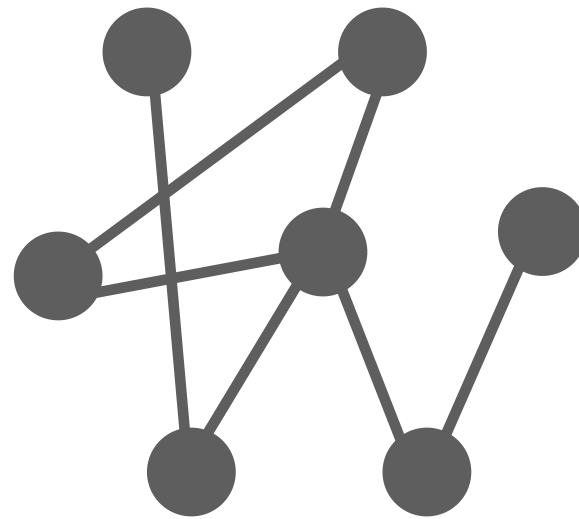
URBAN
PLANNING

MEDICINE

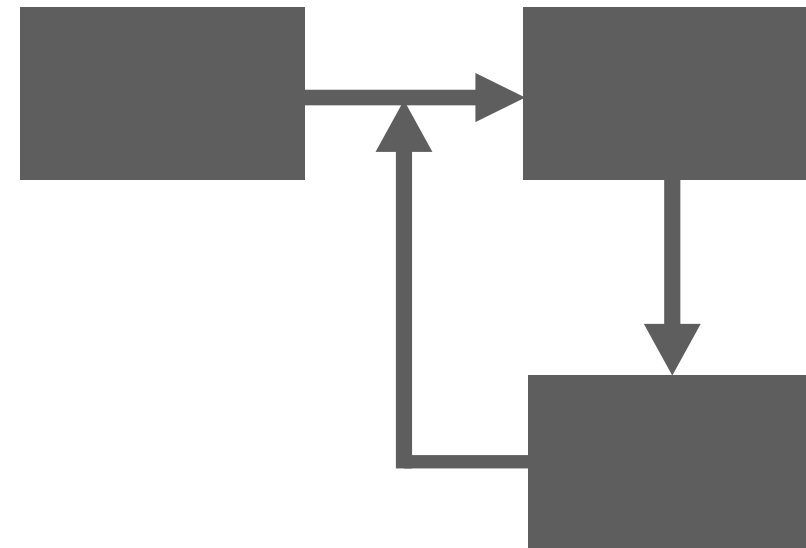FINANCE
AND ECONOMY

innovating with biomimicry
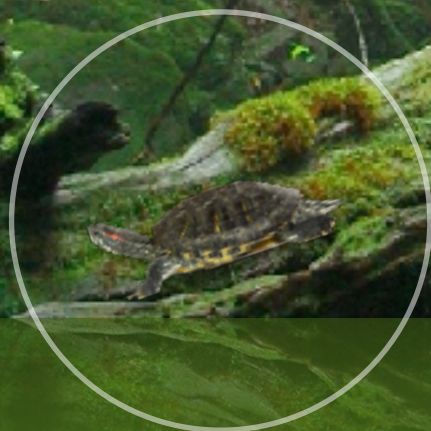
biomimicry basics

FORM

PROCESS

ECOSYSTEM

biomimicry: how it's done

What can turtle shells teach us about making hard structures crack-resistant?

What can ferns teach us about cleaning oil spills?

What can newts teach us about regenerating organs?

examples in industry

Drone technology

innovating with biomimicry

FORM

Surfaces that inhibit bacterial growth

innovating with biomimicry
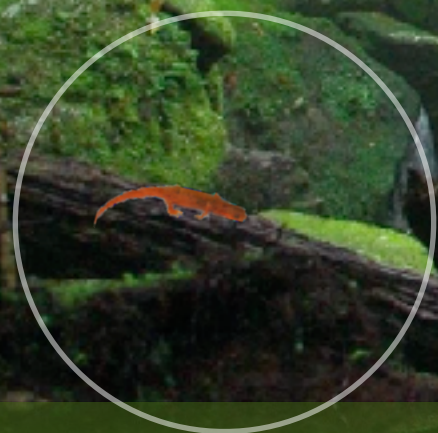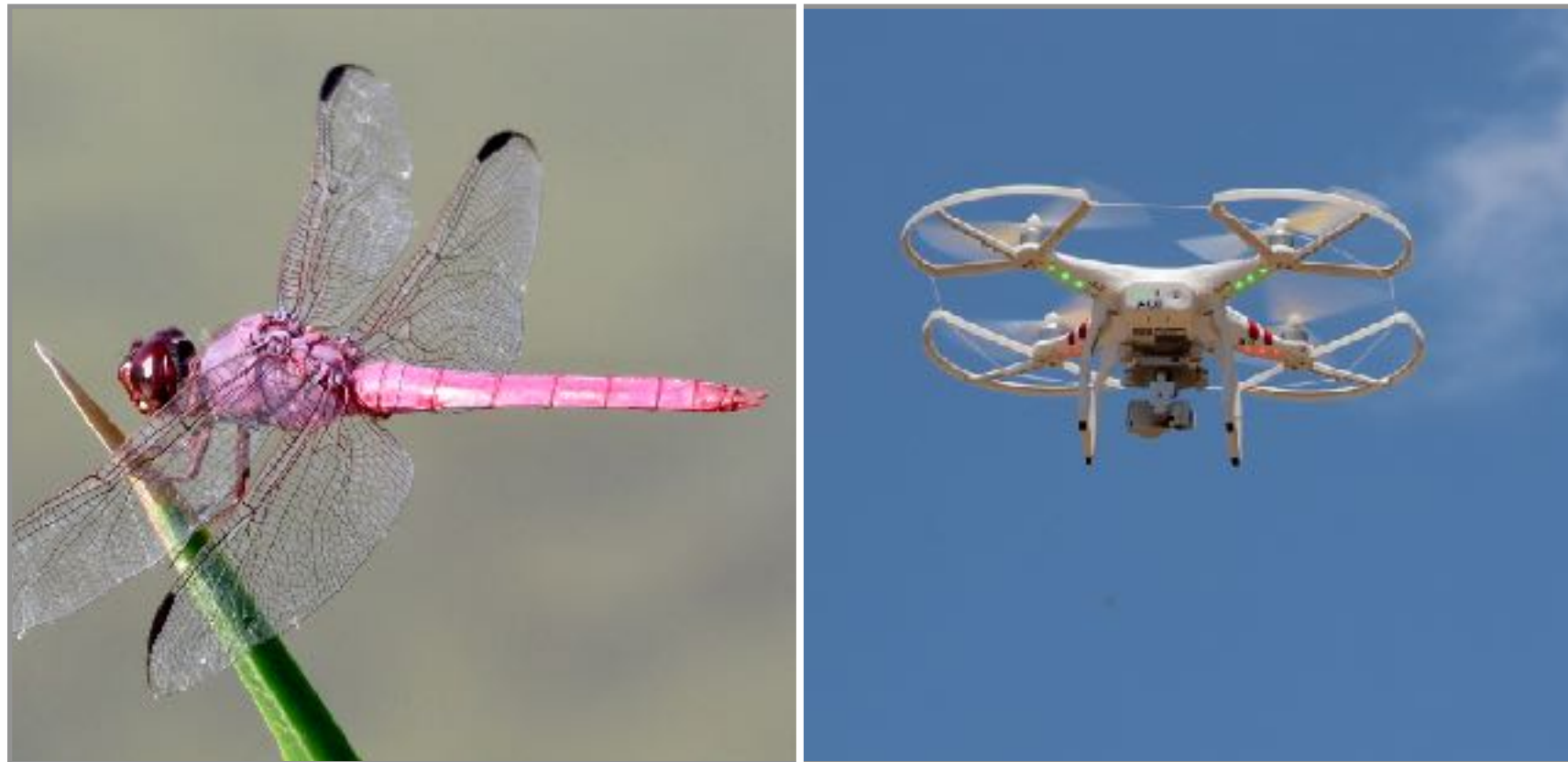
examples in industry
FORM

Fluid and aero-dynamics

innovating with biomimicry

examples in industry

Converting sunlight to other forms of energy

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examples in industry

Additive manufacturing

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examples in industry

Swarm intelligence

innovating with biomimicry
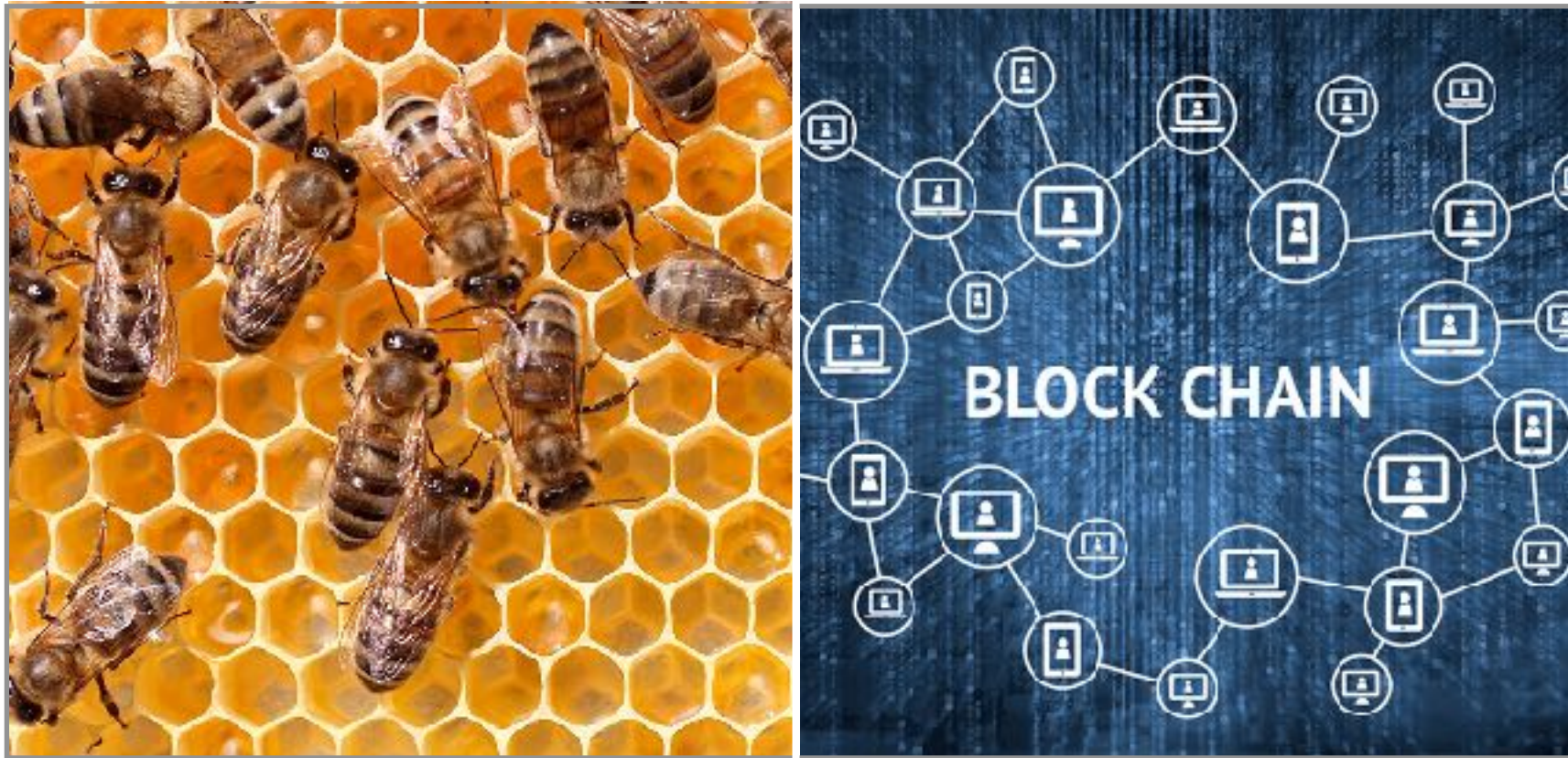
examples in industry
ECOSYSTEM

Zero-waste systems

innovating with biomimicry

examples in industry

Office

Water

Grains

WASTEWATER

SOLID FRACTION

Solid spent grain

LIQUID FRACTION

SEWAGE

COOKING GAS

Digester

MANURE

EFFLUENT

ALGAE

Pig farm

GRASS

WATER

Mushrooms

Fish pond

Algae basin
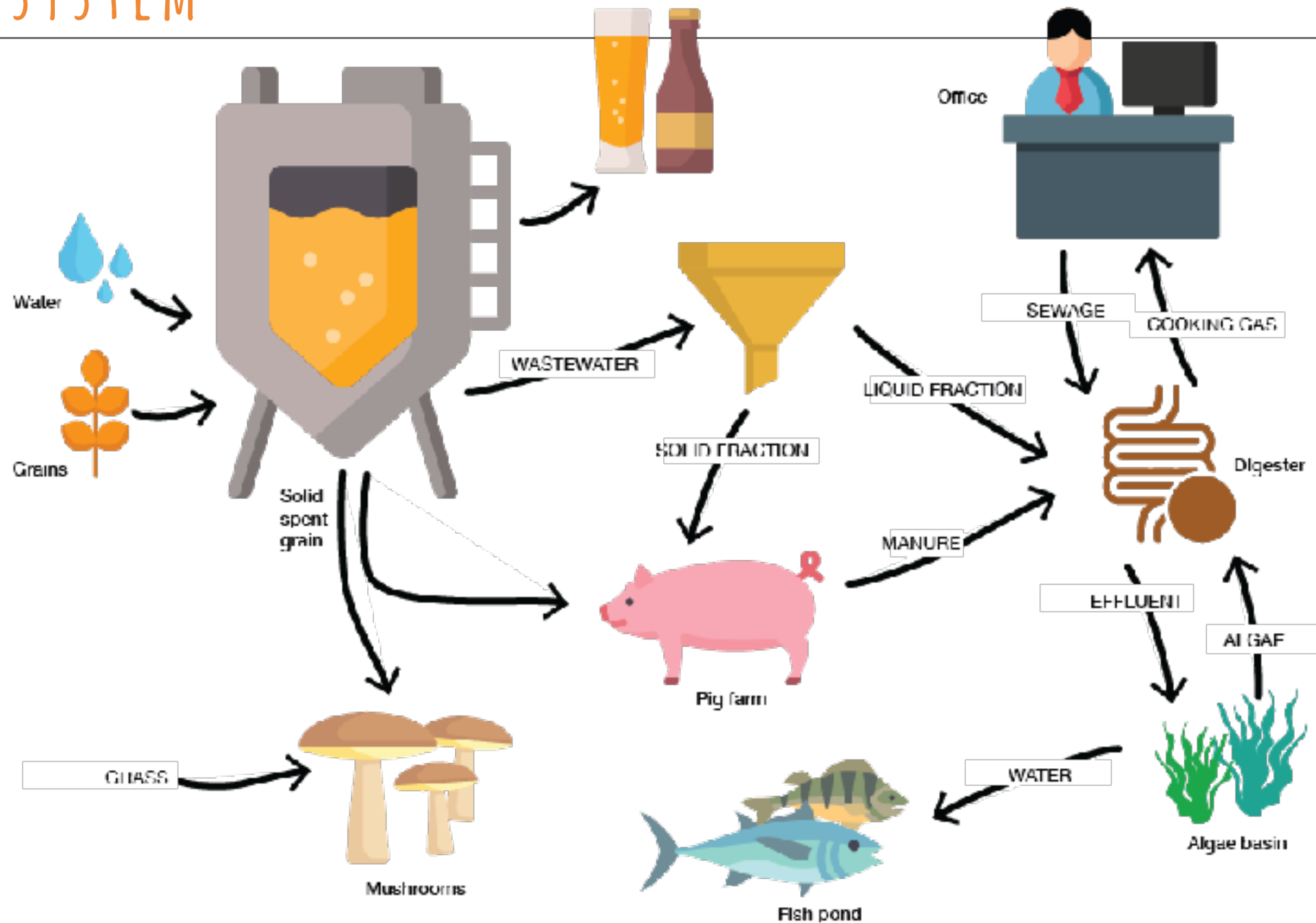
Tunweni Sorghum Brewery, Tsumeb, Namibia Bio-System

examples in industry

Source: http://www.symbiosis.dk/en/

examples in industry

ECOSYSTEM

Adapted from: https://en.wikipedia.org/wiki/Kalundborg_Eco-industrial_Park

how is biomimicry done?

innovating with biomimicry
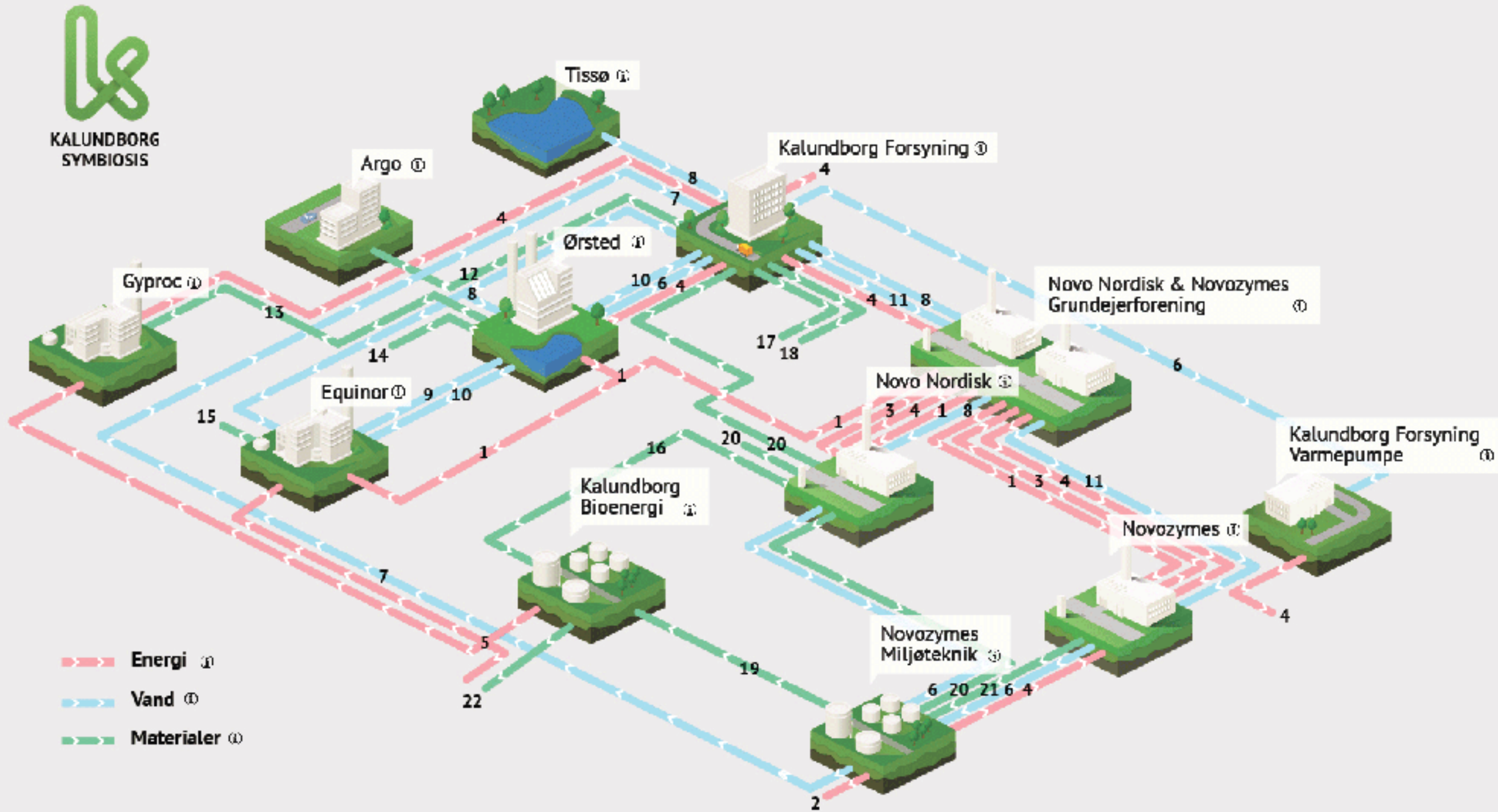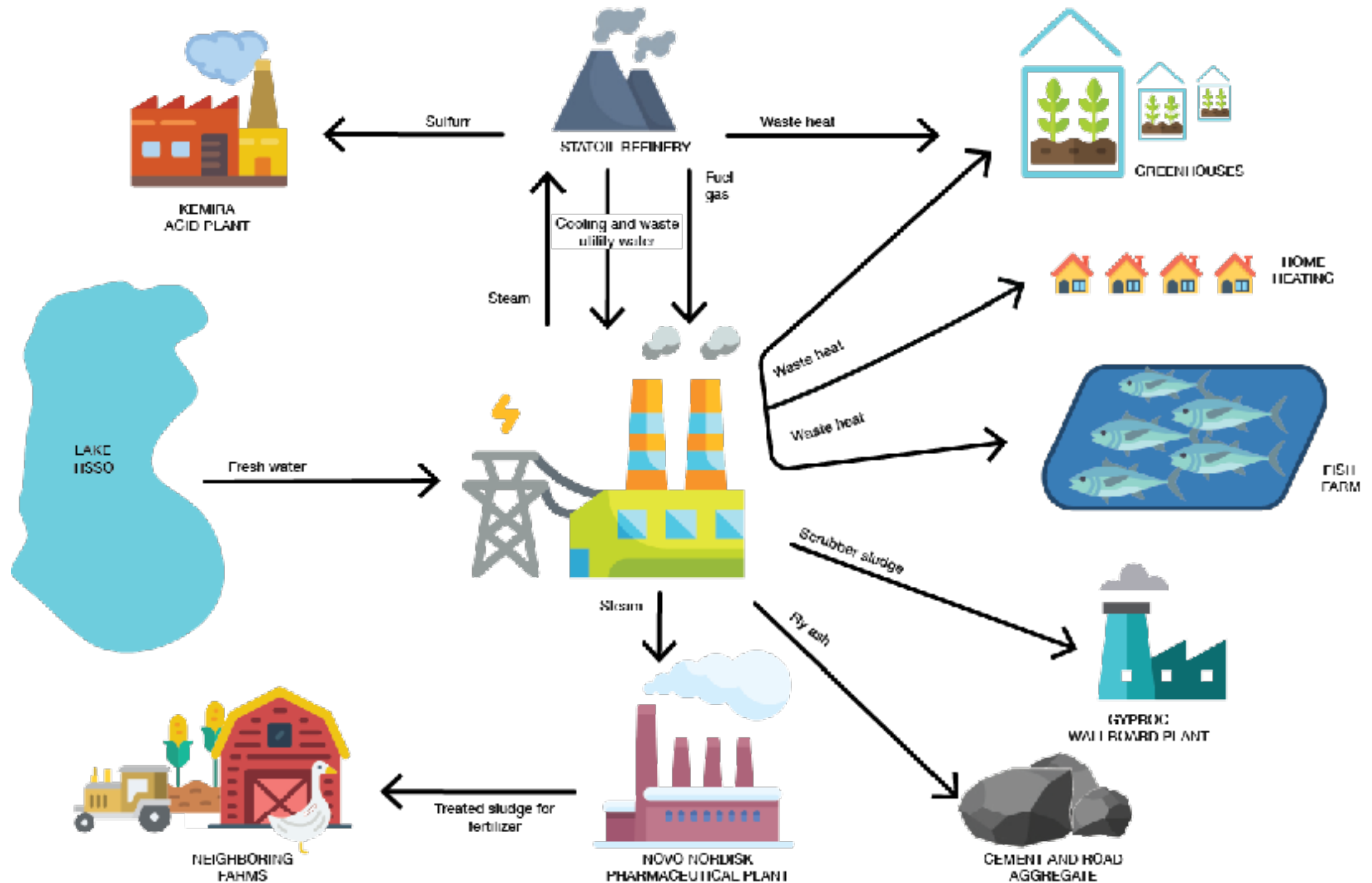
biomimicry in the design ecosystem
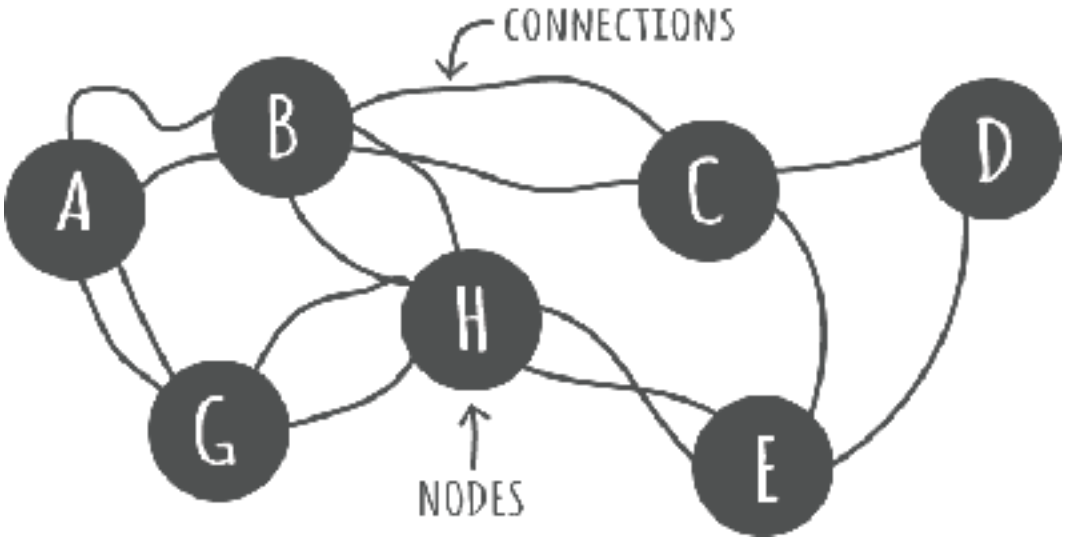
SYSTEMS THINKING

DESIGN THINKING

CONNECTIONS

NODES

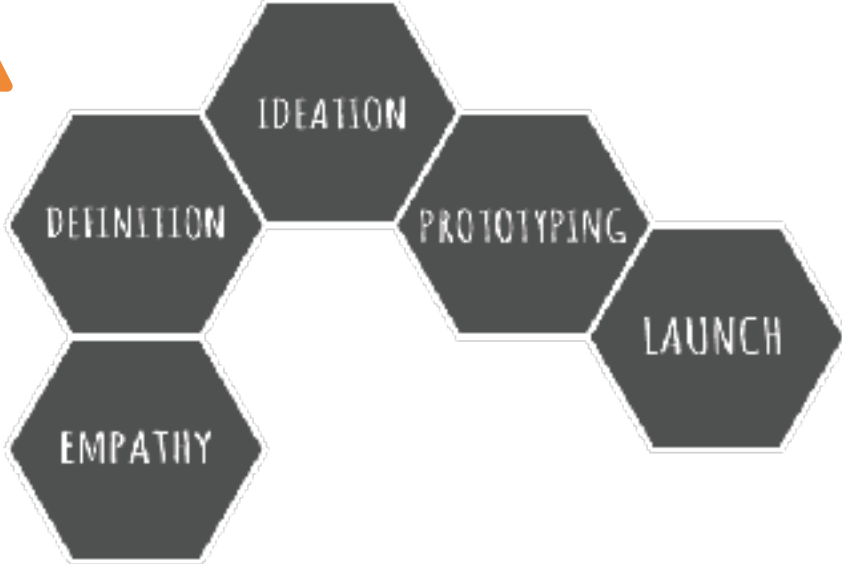A B C D G H E

IDEATION
DEFINITION
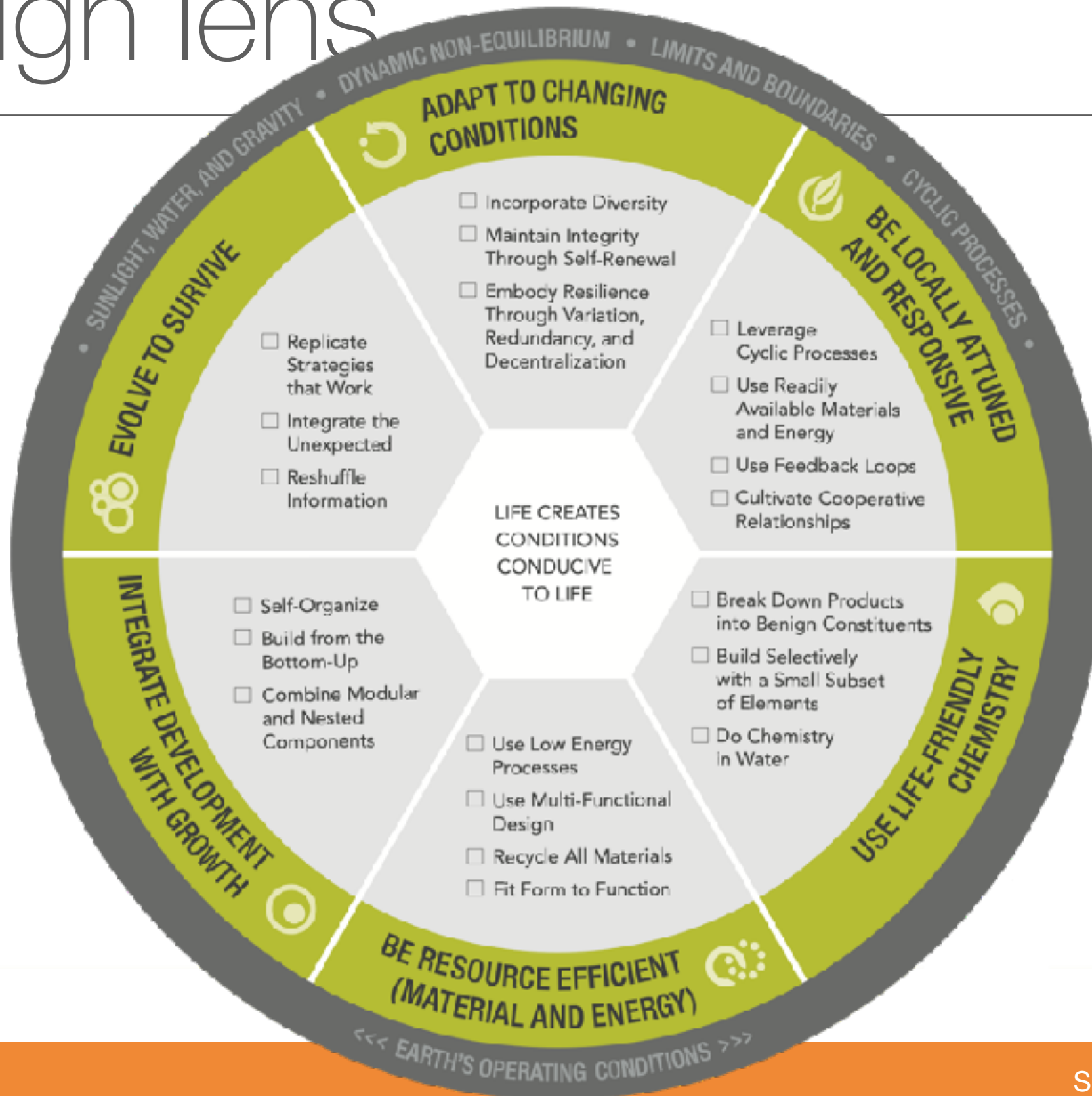PROTOTYPING
LAUNCH
EMPATHY
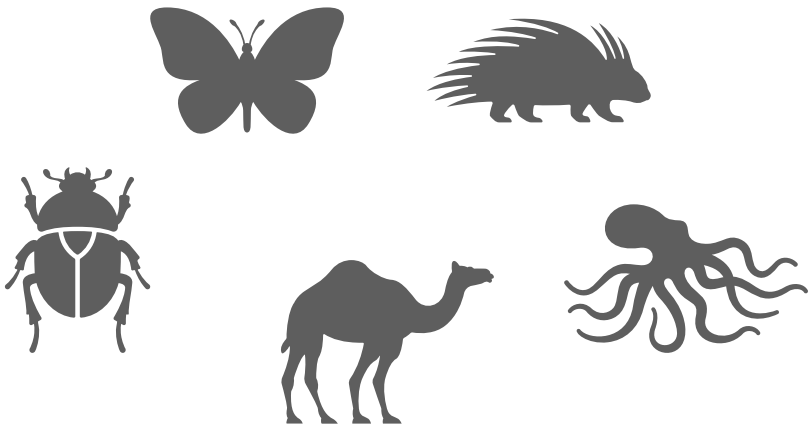
BIOMIMICRY THINKING

design lens

nature's unifying patterns

1 Nature uses only the energy it needs and relies on freely available energy.

innovating with biomimicry
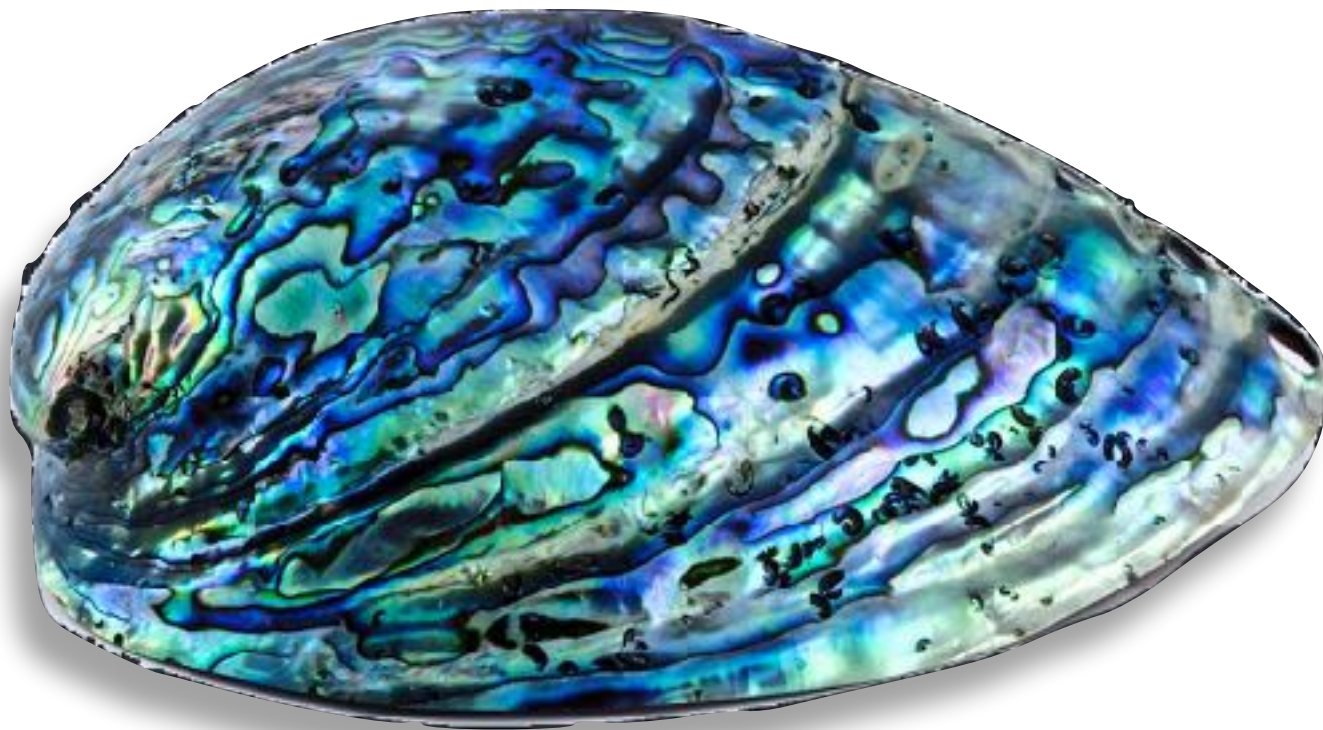
nature's unifying patterns

2 Nature recycles all materials.

nature's unifying patterns

3 Nature is resilient to disturbances.

nature's unifying patterns

4 Nature optimizes rather than maximizes.

nature's unifying patterns

5 Nature rewards cooperation.

nature's unifying patterns

6 Nature runs on information.

nature's unifying patterns

7 Nature uses chemistry and materials that are safe for living beings.

nature's unifying patterns

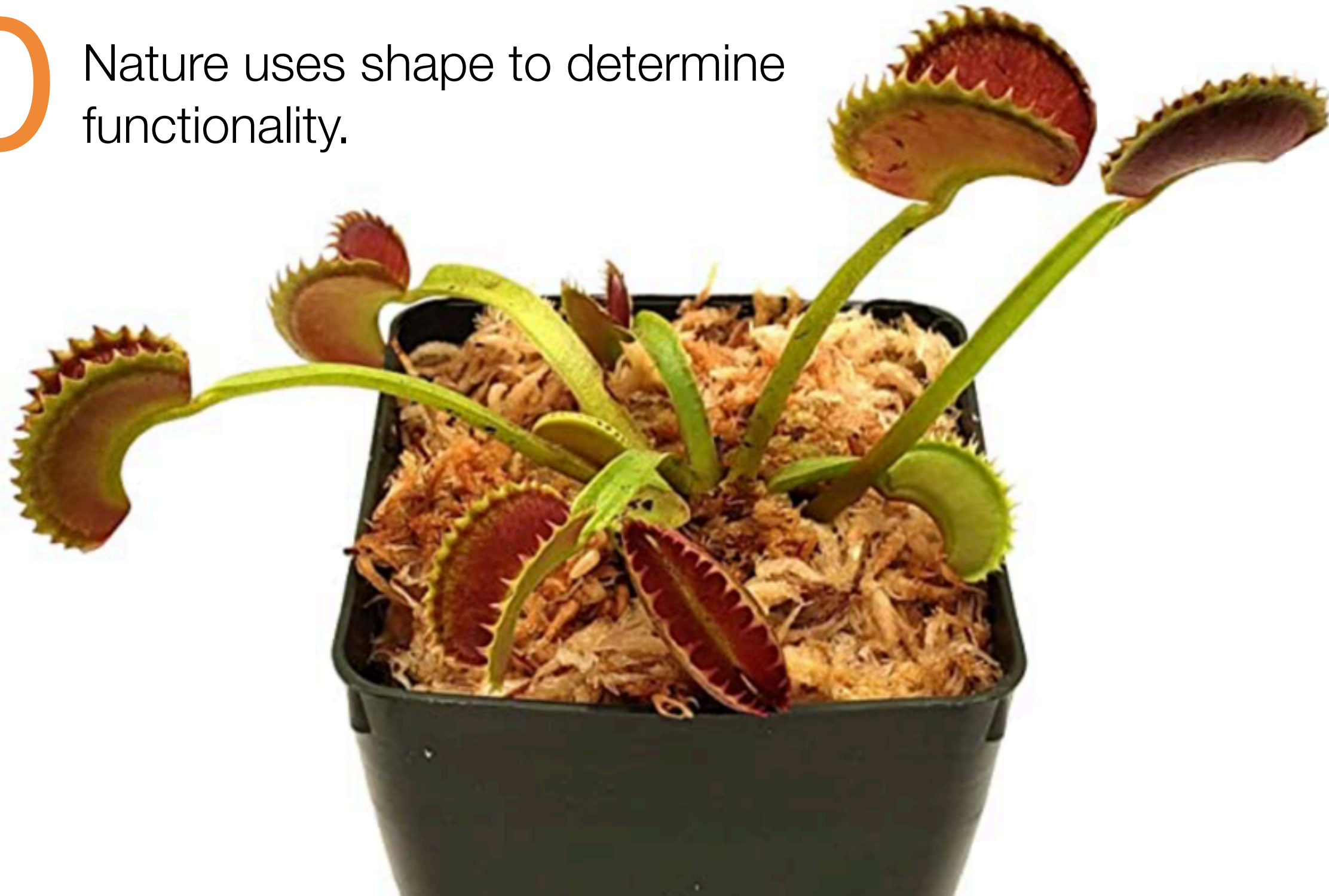**8** Nature builds using abundant resources, incorporating rare resources only sparingly.

innovating with biomimicry

nature's unifying patterns

9 Nature is locally attuned and responsive.

nature's unifying patterns

10 Nature uses shape to determine functionality.

nature's unifying patterns

10 Nature uses shape to determine functionality.

innovating with biomimicry

biomimicry tools

Source: Biomimicry 3.8

innovating with biomimicry

biomimicry tools

Life on earth presents elegant solutions to many of the challenges that designers and innovators face every day. Explore AskNature to find biological strategies, inspired ideas, and resources relative to your own innovation challenges, so you can begin to emulate the time-tested forms, processes, and systems that already thrive in balance with Earth's complex systems.

for further study

1. biomimicryinstitue.org

2. asknature.org

3. *Biomimicry: Innovation Inspired by Nature*
   by Janine Benyus