Biomimicry

Principles: Example 2

by Mark Chamberlain and Megan Graham (2017)

Comments:

Good work. You clearly identified what principles you used; you clearly described a resulting design for each principle; and you illustrated each design. Good presentation, also: a clean consistent format.

The first idea isn't very convincing--I don't see how water-retaining crystals would help clean or reduce washing energy or water consumption (if anything, they'd probably increase water use slightly and increase drying energy significantly). The life-friendly chemistry is a good idea, though, and definitely buildable. And the locally attuned and responsive idea is one that could be both a sustainability and usability benefit--it might save users from needing multiple jackets, and as you describe it, would improve user comfort / convenience on days when conditions vary greatly. Sounds like a good idea to move forward with.

thenorthface.com

BIOMIMICRY FROM PRINCIPLES //

The North Face Women's Crescent Full Zip Fleece

Mark Chamberlain and Megan Graham

BIOLOGY QUESTION

HOW DOES NATURE CONSERVE HEAT AND MANAGE WEAR EFFICIENTLY?

OVERVIEW

LIFE'S PRINCIPLES

Biomimicry is about finding design inspiration from nature and asking questions, such as "how would nature solve this problem?" It's also possible to look at general strategies used by nature. [1]

» **EVOLVE TO SURVIVE**

» **ADAPT TO CHANGING CONDITIONS**

» **BE LOCALLY ATTUNED AND RESPONSIVE**

» **USE LIFE-FRIENDLY CHEMISTRY**

» **BE RESOURCE EFFICIENT** (MATERIAL AND ENERGY)

» **INTEGRATE DEVELOPMENT WITH GROWTH**

More at sustainabilityworkshop.autodesk.com/products/doing-biomimicry-natural-principles

Evolve to Survive

- Replicate strategies that work
- Integrate the unexpected
- Reshuffle information

cotton exterior fabric view | water soaking | expanded crystals | spot wash | hang dry

CURRENT PRODUCT

The Crescent Full Zip Jacket does not meet the Evolve to Survive principle as the jacket is dependent on conventional laundering methods. If the owner lived in an environment that did not have electricity, how would the garment be cleaned without damaging the fibers? Cleaning is part of the care regimen that would allow for the garment to meet its expected life. If the cleaning component is not satisfied the garment may not be able to achieve the expected use life.

STRATEGY IMPLEMENTATION

To combat the reliance on energy and traditional laundering machines, the product could be redesigned to incorporate technology that absorbs water for short periods of time. The water would then evaporate, drying the fabric in the process. The technology incorporates a proprietary crystal that, when soaked in a cold water, expands by absorbing the water and leaving the exterior fabric damp enough to hand wash. The added benefit is that the crystals are designed to maintain the cooled temperature until the water evaporates. This reduces the stress on the fibers and extends the life of the garment.

www.frioinsulincoolingcase.com/how-the-frio-insulin-cooling-case-works.html

thenorthface.com

BIOMIMICRY FROM PRINCIPLES //

The North Face Women's Crescent Full Zip Fleece

Mark Chamberlain and Megan Graham

BIOLOGY QUESTION

HOW DOES NATURE CONSERVE HEAT AND MANAGE WEAR EFFICIENTLY?

OVERVIEW

LIFE'S PRINCIPLES

Biomimicry is about finding design inspiration from nature and asking questions, such as "how would nature solve this problem?" It's also possible to look at general strategies used by nature. [1]

- » **EVOLVE TO SURVIVE**
- » **ADAPT TO CHANGING CONDITIONS**
- » **BE LOCALLY ATTUNED AND RESPONSIVE**
- » **USE LIFE-FRIENDLY CHEMISTRY**
- » **BE RESOURCE EFFICIENT** (MATERIAL AND ENERGY)
- » **INTEGRATE DEVELOPMENT WITH GROWTH**

More at sustainabilityworkshop.autodesk.com/products/doing-biomimicry-natural-principles

Use Life-Friendly Chemistry

- Break down products into benign constituents
- Build selectively with a small subset of elements
- Do chemistry in water

pine needles

fiber yarn

forest wool

garment

compster

CURRENT PRODUCT

The polyester that most of the Crescent Full Zip Fleece is made with is a comparatively low impact material. However, in the fabrics current state, the polyester would not be able to be integrated back into the natural world. Polyester, made from several materials, requires multiple processes to enter the state at which it is delivered to the end user.

For the owner to maintain product cleanliness, the traditional washer and dryer require the use of a complex electrical energy component that is not reclaimed or recaptured.

STRATEGY IMPLEMENTATION

Reintroducing technical nutrients from textiles to the natural world is a constant challenge. If the product is made to reduce water and energy consumption during the manufacturing phase, the product is often a virgin synthetic material or blended with one. If the product is a natural fiber, the raw material process likely can be attributed to soil degradation, high-energy consumption, and water usage. By finding a natural source of fiber that can be made into a textile and then, when the use phase is complete, the jacket could be added to the composter in the backyard after the hardware is removed. Using the waste material from timber processing, "Forest Wool," could replace the polyester fabric of the garment creating a jacket that is naturally antibacterial and antiseptic (and smells fresh) as a result of the pine oil naturally occurring in the raw material.

inhabitat.com/this-biodegradable-furniture-is-made-entirely-out-of-pine-needles
en.wikipedia.org/wiki/Pine_oil
www.huffingtonpost.com

thenorthface.com

BIOMIMICRY FROM PRINCIPLES //

The North Face Women's Crescent Full Zip Fleece

Mark Chamberlain and Megan Graham

BIOLOGY QUESTION

HOW DOES NATURE CONSERVE HEAT AND MANAGE WEAR EFFICIENTLY?

OVERVIEW

LIFE'S PRINCIPLES

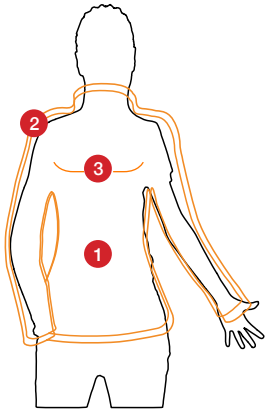
Biomimicry is about finding design inspiration from nature and asking questions, such as "how would nature solve this problem?" It's also possible to look at general strategies used by nature. [1]

- » **EVOLVE TO SURVIVE**
- » **ADAPT TO CHANGING CONDITIONS**
- » **BE LOCALLY ATTUNED AND RESPONSIVE**
- » **USE LIFE-FRIENDLY CHEMISTRY**
- » **BE RESOURCE EFFICIENT** (MATERIAL AND ENERGY)
- » **INTEGRATE DEVELOPMENT WITH GROWTH**

More at sustainabilityworkshop.autodesk.com/products/doing-biomimicry-natural-principles

Be locally attuned and responsive

- Leverage cyclic processes
- Use readily available materials and energy
- Use feedback loops
- Cultivate cooperative relationships



Local weather

Local conditions

Flexible design ideas

1. White and dark removable coverings to absorb and reflect sunlight.
2. Thin outer layer with no insulation but added waterproofing
3. Added venting for days that start cold, but quickly become hot

CURRENT PRODUCT

The manufacturing of the Crescent Full Zip Fleece is global. The raw material travels thousands of miles from to manufacturing to distribution to retail and, finally, the customer. During the design phase, even though specific outdoor conditions are defined for each product, the fleece isn't produced with a particular location in mind and how it might adapt to those conditions.

STRATEGY IMPLEMENTATION

How can the fleece garment use the "be locally attuned and responsive" strategy?

Just as trees and animals change depending on the season, the fleece design could have a modular design to allow for adaptations to colder weather or for wetter weather.

sustainabilityworkshop.autodesk.com/products/doing-biomimicry-natural-principles