


# Tolerance, Sustainability & Circularity

Prof. Carlos Montana PhD.

Program Coordinator New Media Design

Rochester Institute of Technology RIT - Dubai

**R·I·T**  
**Dubai**

The background of the slide is a close-up photograph of a leaf. The leaf's surface is covered in a complex network of veins, with a prominent, thick yellow vein running vertically through the center. The surrounding veins are thinner and form a dense, interconnected pattern. The overall color palette is a mix of light green and pale yellow, with the yellow vein providing a strong contrast.

In this workshop, we will discuss **biomimicry** design principles, to **biologize and discover** ideas for your challenge for the Madar competition

# Your challenge today!

Take the challenge you selected, and start researching inspiration from nature to propose solutions to your challenge!

A microscopic view of plant cells, showing a dense network of light green, polygonal cells. A prominent, thick yellow vein runs diagonally across the image, providing a clear point of reference. The overall appearance is that of a leaf's internal structure.

Our Aim today!

**biologize and discover** ideas for your project!



# Ministry of Tolerance in UAE

# Tolerance

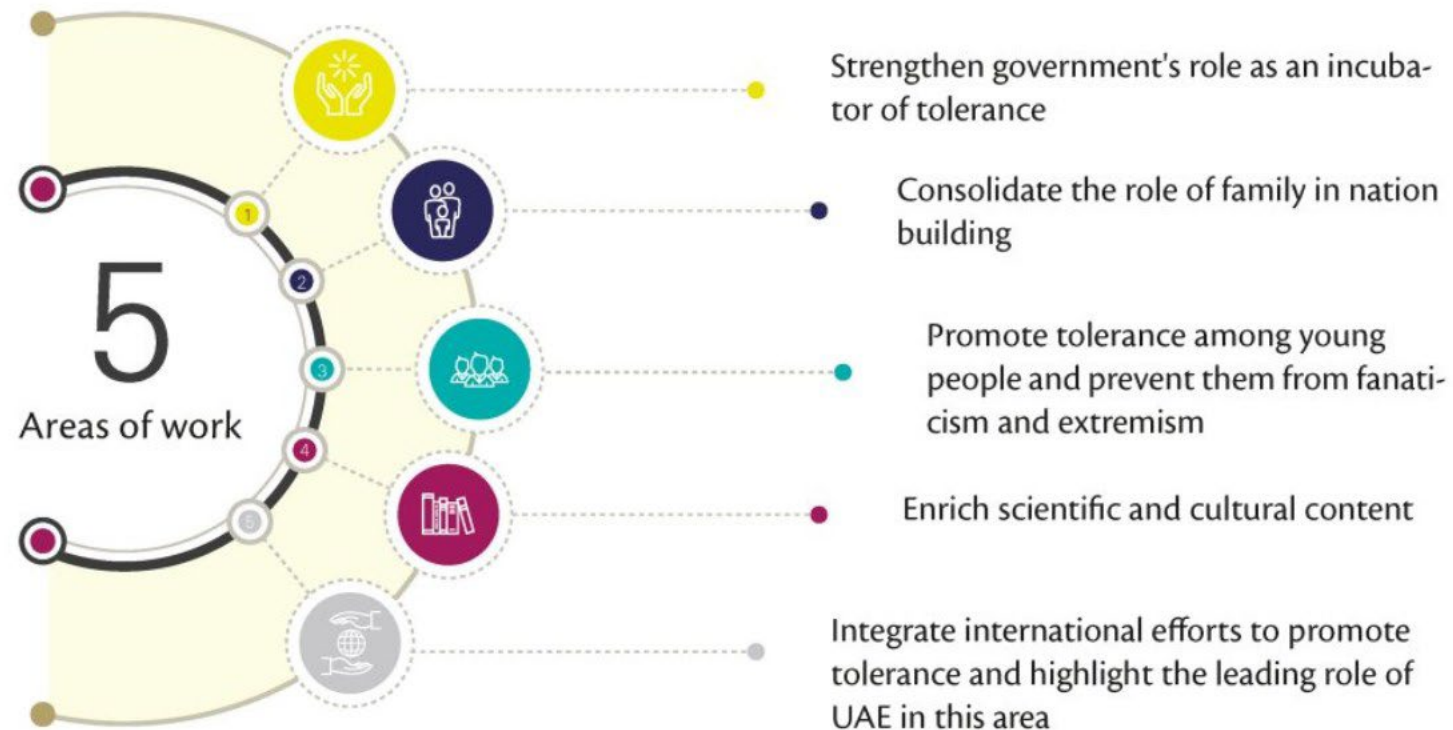
Willingness to [respect and] accept feelings, habits, or beliefs that are different from your own.

Source: Encyclopedia Britannica.



# Tolerance in UAE

# Tolerance in UAE





# Tolerance

Coexistence! Living in peace!  
Is it only about People?

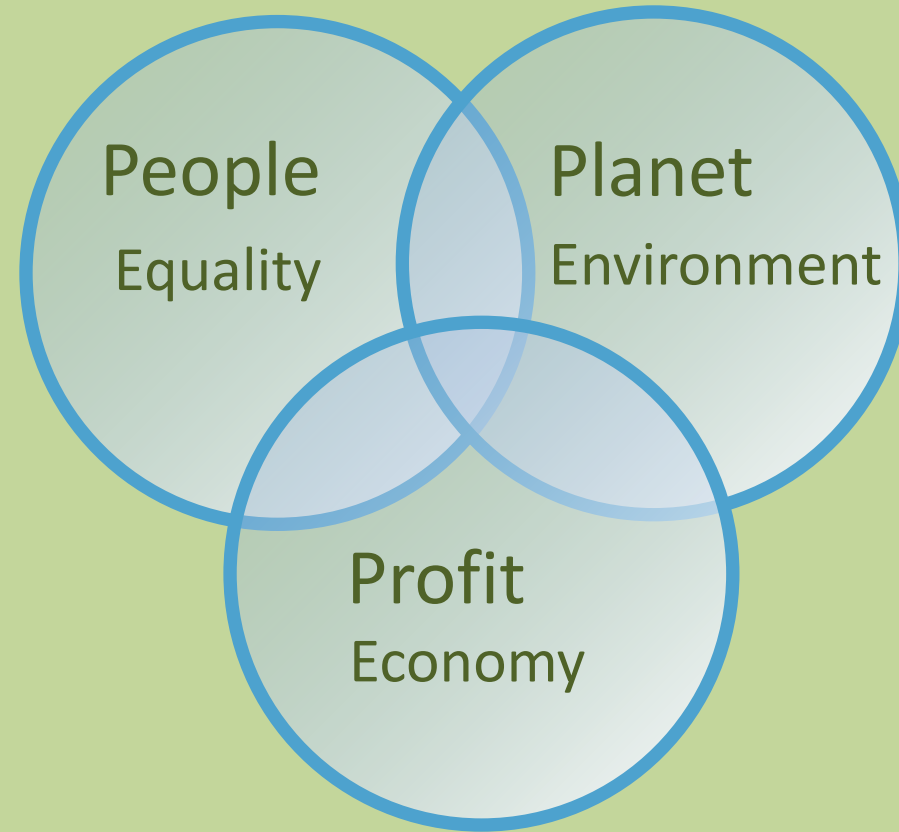
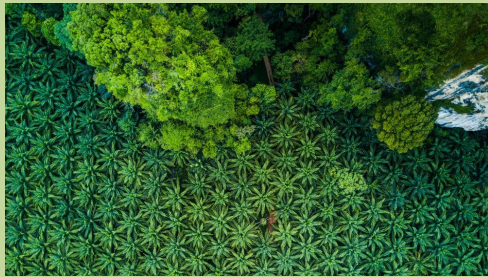
How about Tolerance (coexistence, living in peace) with all forms of life in our planet?

The background of the slide features a detailed, close-up pattern of leaf veins. The veins are a vibrant yellow-green color, set against a slightly darker, muted green background. The pattern is intricate and organic, resembling the natural structure of a leaf's vascular system.

Quick Recap  
sustainability & circularity  
+ possible challenges

# What is Sustainability?

Sustain + Ability



# Circularity – Design for a Circular Economy

**An economy that is restorative and regenerative by design.**

**It is based on three principles:**

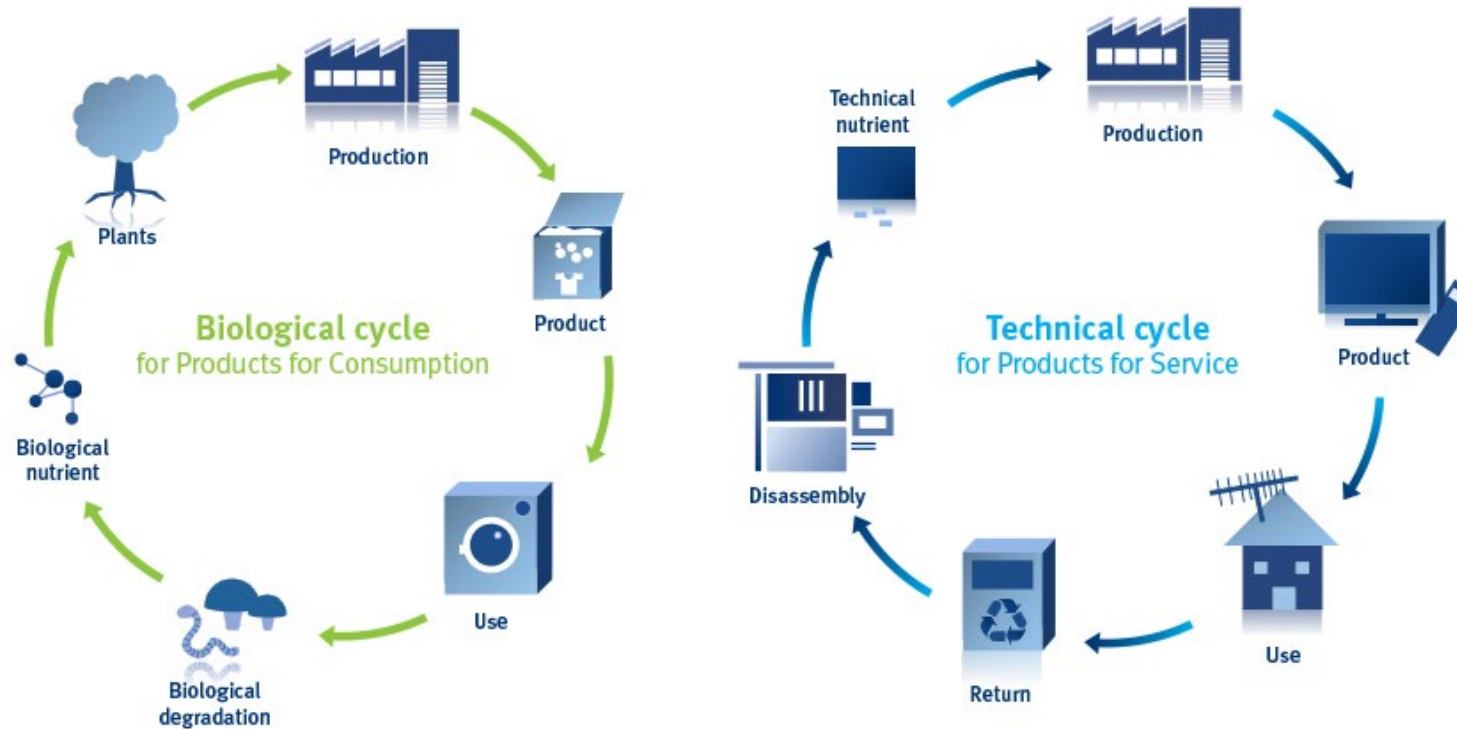
- **Design out waste and pollution**
- **Keep products and materials in use**
- **Regenerate natural systems**



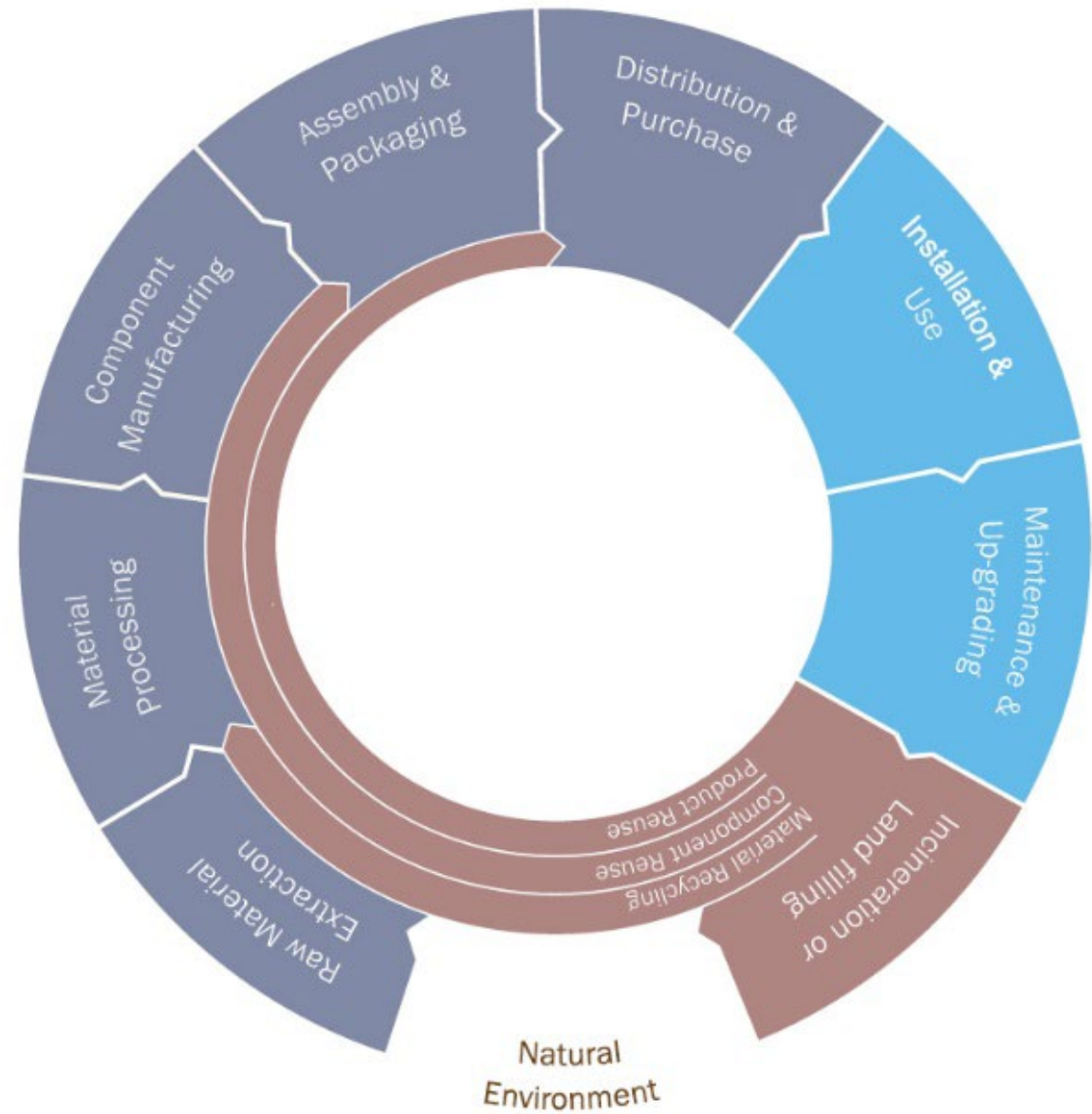
# Why circular and cyclic?

## Cradle to Cradle® Basis of a circular economy

Source: EPEA GmbH 2010



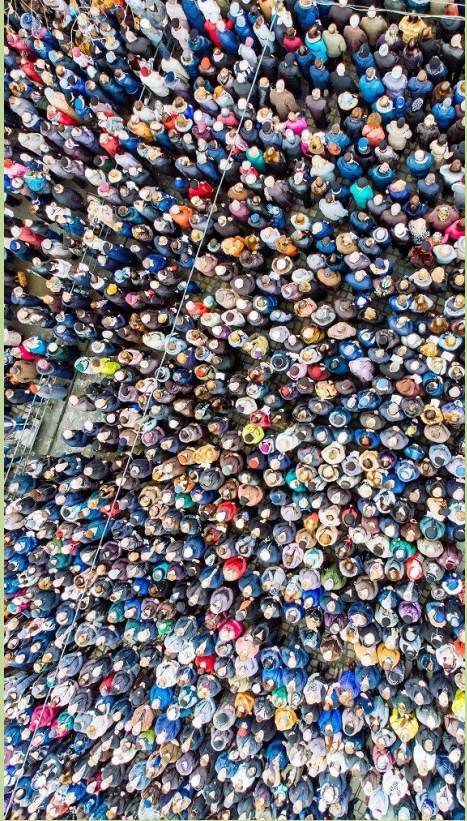
Biomimicry, Industrial Ecology, Cradle to Cradle and Life Cycle Thinking are all tools which imitate cycles and systems in nature.



# Life cyclic thinking

Biomimicry, Industrial Ecology, Cradle to Cradle and Life Cycle Thinking are all tools which imitate cycles and systems in nature.

# Challenges: water, food, wellbeing



Water



Food



Wellbeing

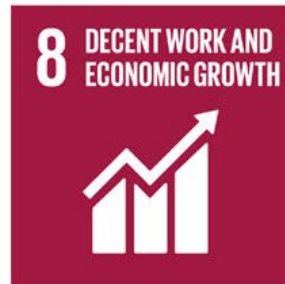
Tolerance, Sustainability & Biomimicry

# Tolerance & Sustainable Development Goals



**SUSTAINABLE DEVELOPMENT GOALS**

17 GOALS TO TRANSFORM OUR WORLD



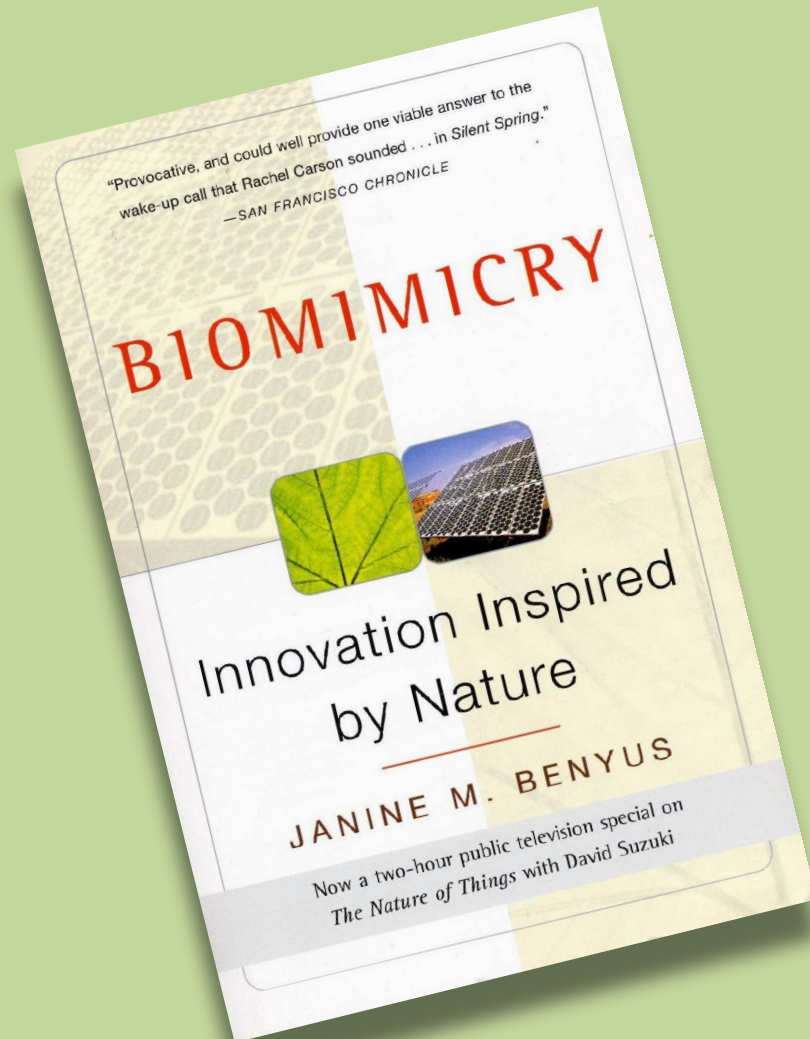


The background of the slide is a close-up photograph of a leaf. The leaf's surface is covered in a dense, intricate network of veins, creating a complex, honeycomb-like pattern. A single, thick, light-colored vein runs diagonally from the top left towards the bottom right, standing out prominently against the darker green of the surrounding leaf tissue. The overall color palette is various shades of green, from light lime to deep forest green.

# Inspiration in Nature for Sustainability & Circularity

# What is Biomimicry?

## Innovation Inspired by Nature

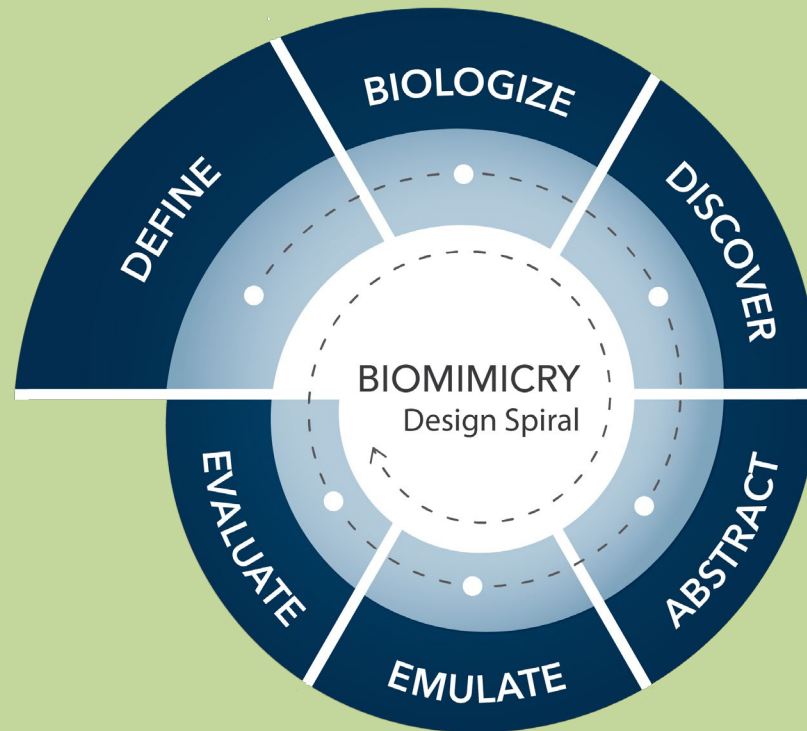


from the Greek *bios*, life & *mimesis*, imitation. Janine Benyus, 1997.

# Tolerance, Nature and Sustainability

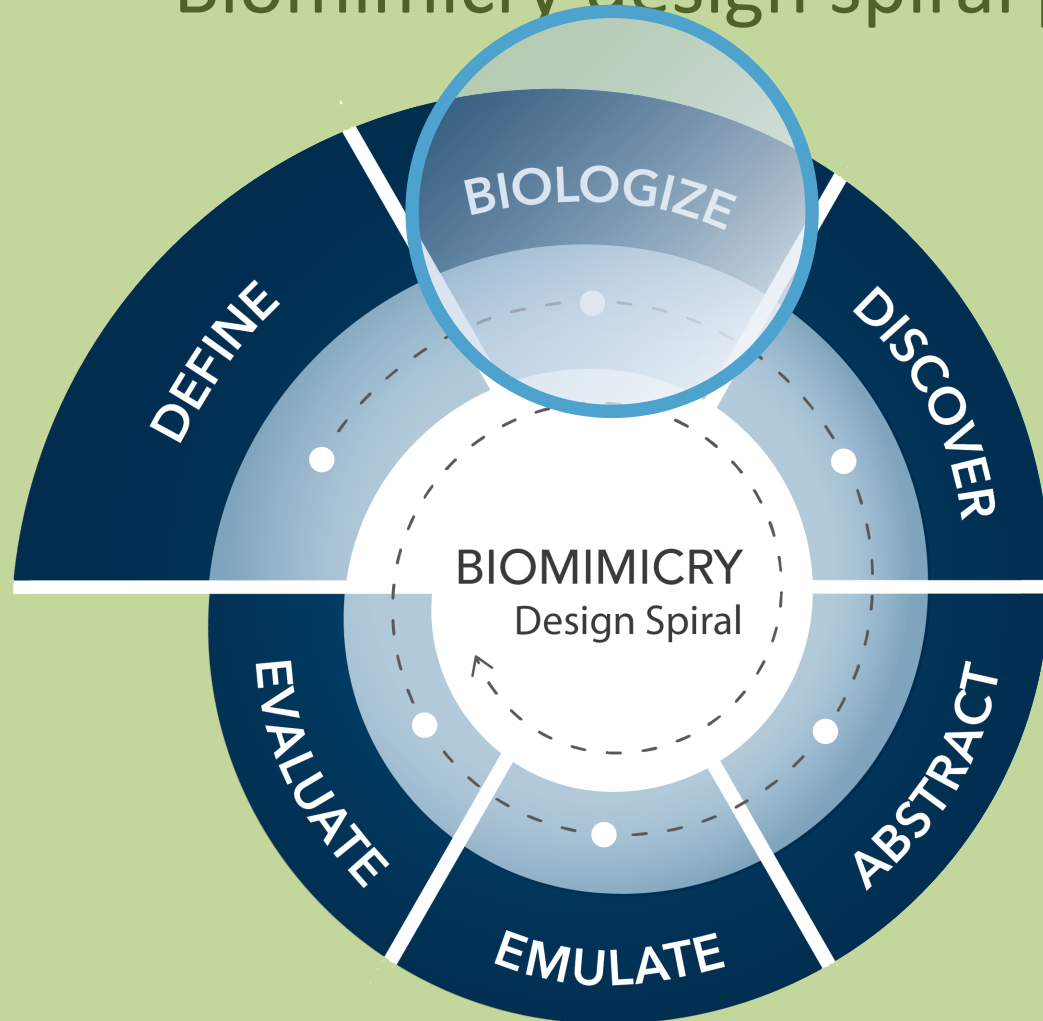
## Biomimicry design spiral process

Following a design process can be extremely helpful when setting out to solve a design challenge. The Biomimicry Design Spiral provides a succinct description of the essential elements of a design process that uses nature as a guide for creating solutions.



# Tolerance, Nature and Sustainability

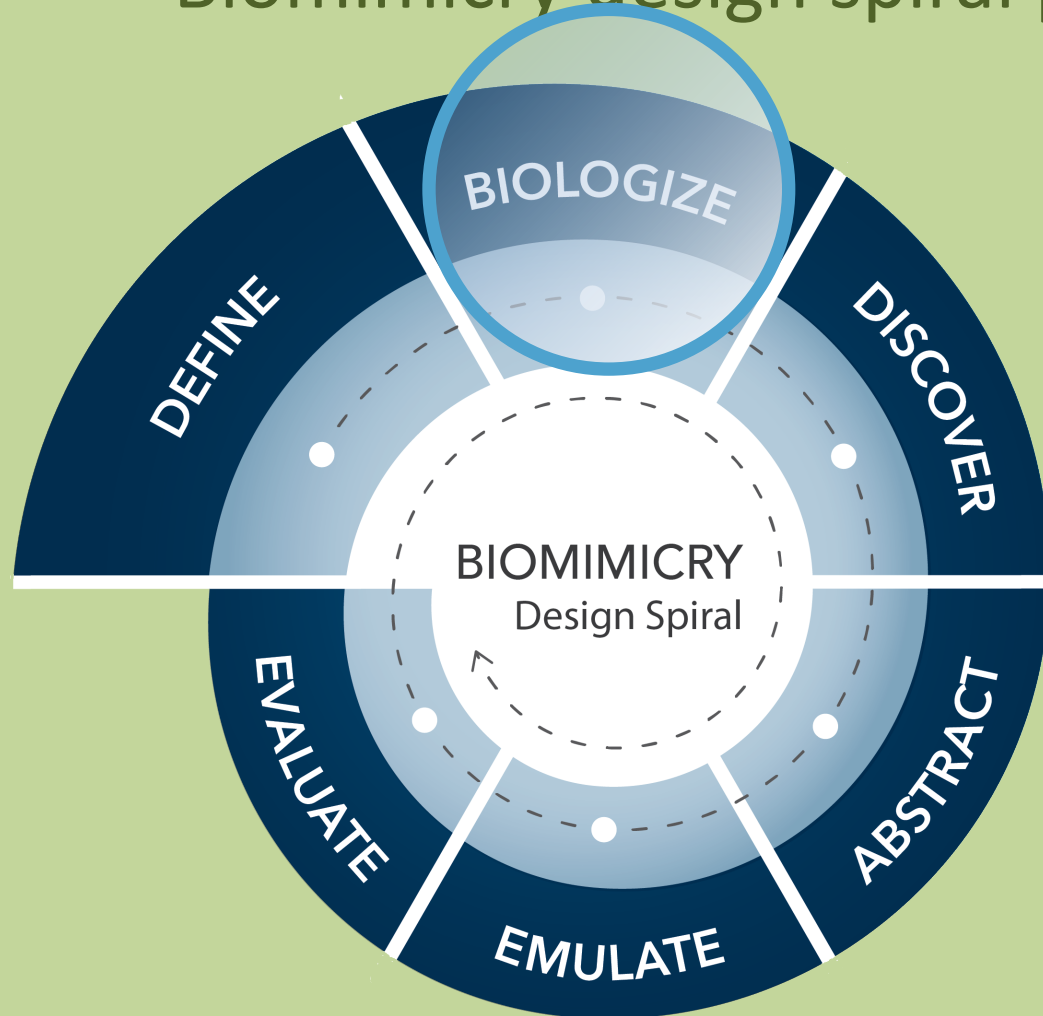
## Biomimicry design spiral process: Step 2: Biologize



Analyze the essential functions and context your design solution must address. Reframe them in biological terms, so that you can “ask nature” for advice.

# Tolerance, Nature and Sustainability

## Biomimicry design spiral process: Step 2: Biologize



Ask “How does nature?” questions.  
Think about analogous life functions  
and contexts in nature.  
Consider multiple possibilities.  
Flip the question.  
Don’t rush!

# Tolerance, Nature and Sustainability

## Biomimicry design spiral process: Step 2: Biologize

### Biologize Function and Context

"Biologizing" translates a design question into search terms that can be used to look for biological models. Use this worksheet to help you extract or translate the function(s) your design needs to accomplish, and the context in which those functions occur, into biology-relevant terms.

#### **Design question:**

Write down the design question your team developed using the Define the Challenge worksheet:

*How might we* \_\_\_\_\_?

#### **Identify related biological functions:**

Think critically about the functions at the heart of the outcome/impact your design question is getting at. Consider including relevant opposites or tangential functions that may be worth exploring. Hint: Refer to the [Biomimicry Taxonomy](#) for more examples of biological functions.

#### **Define relevant contextual factors:**

How can you use biologically-relevant terms to describe the context in which your design must function?

# Tolerance, Nature and Sustainability

## Biomimicry design process



Source: <https://www.youtube.com/watch?v=6WjBvFwQpYU>

# Tolerance, Nature and Sustainability

## Biomimicry design spiral process: Step 2: Biologize

### Sample biologized questions

“Biologizing” translates a design question into search terms that can be used to look for biological models. Consider these examples:



**Design Question:**

How might we keep buildings cool in the summer?

**Biologized Question:**

How does nature regulate temperature in hot climates?



**Design Question:**

How might we reduce stormwater runoff and flooding in cities?

**Biologized Question:**

How does nature manage excess water?



**Design Question:**

How might we reduce the use of toxic substances in paints?

**Biologized Question:**

How does nature create color?



# Tolerance, Nature and Sustainability

## Biomimicry design spiral process: Step 2: Biologize

### Biologize Function and Context

"Biologizing" translates a design question into search terms that can be used to look for biological models. Use this worksheet to help you extract or translate the function(s) your design needs to accomplish, and the context in which those functions occur, into biology-relevant terms.

#### **Design question:**

Write down the design question your team developed using the Define the Challenge worksheet:

How might we \_\_\_\_\_?

#### **Identify related biological functions:**

Think critically about the functions at the heart of the outcome/impact your design question is getting at. Consider including relevant opposites or tangential functions that may be worth exploring. Hint: Refer to the [Biomimicry Taxonomy](#) for more examples of biological functions.

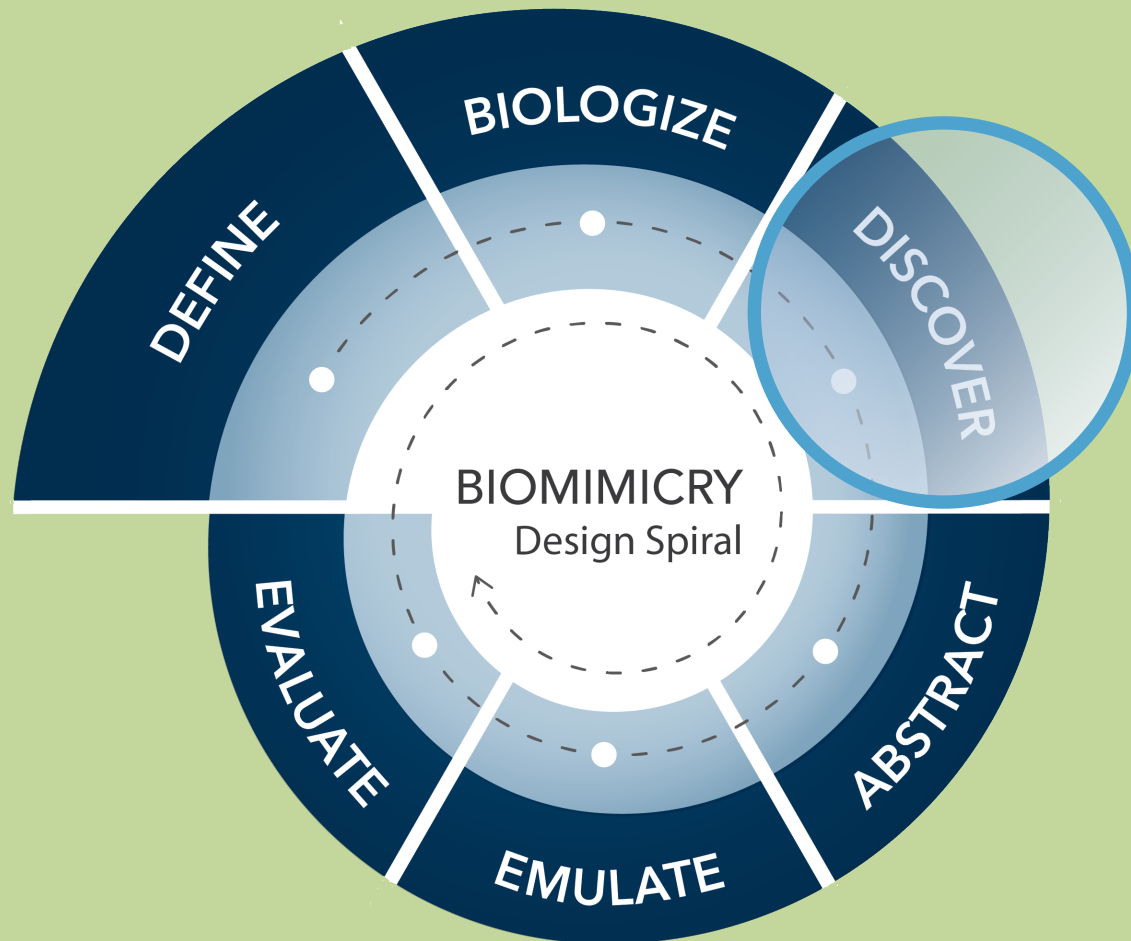
#### **Define relevant contextual factors:**

How can you use biologically-relevant terms to describe the context in which your design must function?

Now you further refine your challenge using the worksheet.

# Tolerance, Nature and Sustainability

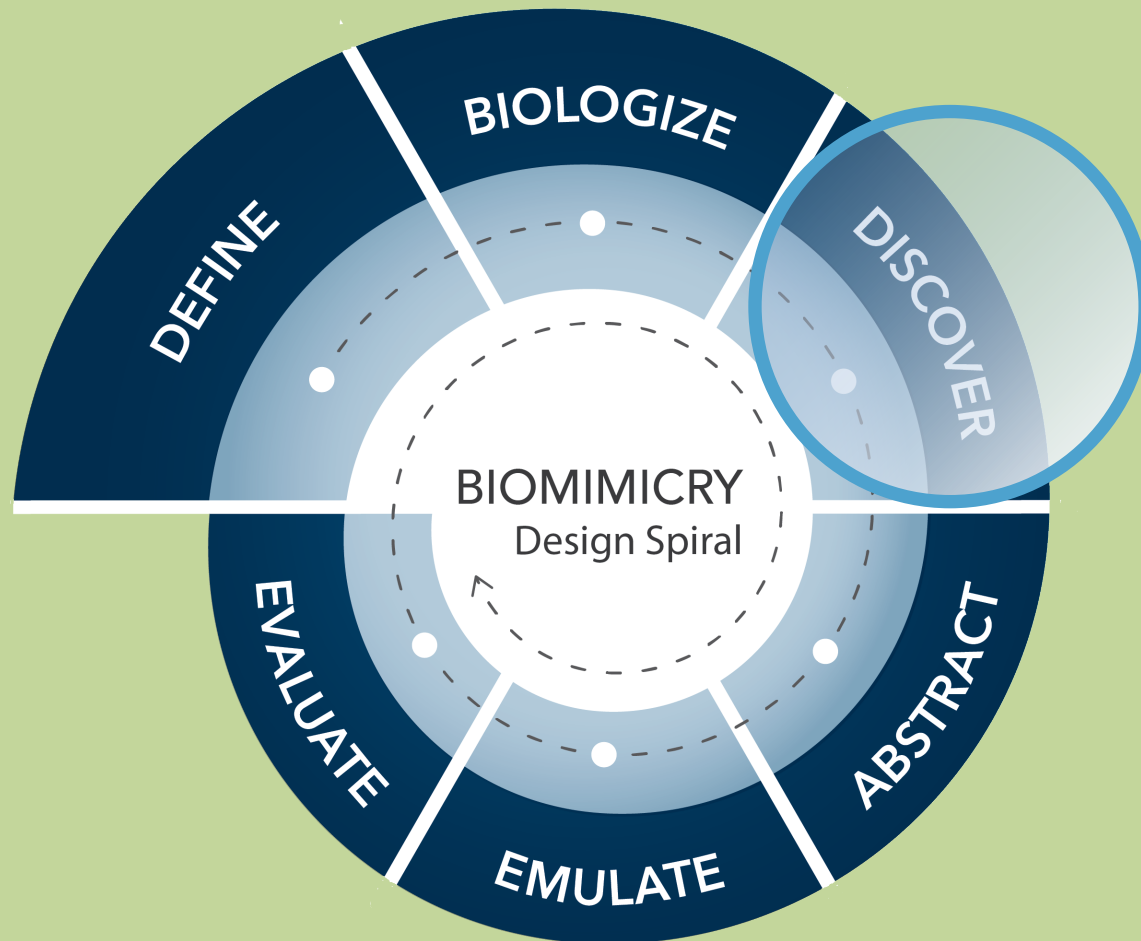
## Biomimicry design spiral process: Step 3: Discover



Look for natural models (organisms and ecosystems) that need to address the same functions and context as your design solution. Identify the strategies used that support their survival and success.

# Tolerance, Nature and Sustainability

## Biomimicry design spiral process: Step 3: Discover



Go outside and look around.  
Keep a nature journal.  
Explore Ask Nature.  
Read scientific literature.  
Talk to biologists, naturalists and ecologists.  
Track your sources.

# Task for next session

## Bring biological inspirations and start developing ideas

### Biologize Function and Context

"Biologizing" translates a design question into search terms that can be used to look for biological models. Use this worksheet to help you extract or translate the function(s) your design needs to accomplish, and the context in which those functions occur, into biology-relevant terms.

#### Design question:

Write down the design question your team developed using the Define the Challenge worksheet:

How might we \_\_\_\_\_?

#### Identify related biological functions:

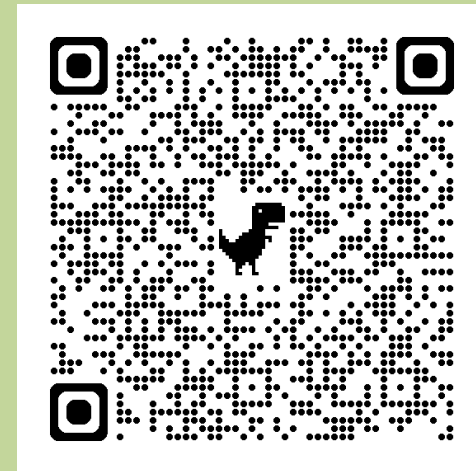
Think critically about the functions at the heart of the outcome/impact your design question is getting at. Consider including relevant opposites or tangential functions that may be worth exploring. Hint: Refer to the [Biomimicry Taxonomy](#) for more examples of biological functions.

#### Define relevant contextual factors:

How can you use biologically-relevant terms to describe the context in which your design must function?

Upload your worksheet, and in groups, create a one-minute video of a real-life exploration of a natural element, and what you can learn from it.

Upload in youtube or vimeo, and place link in Figjam.



A landscape of rolling green hills under a sunset sky. The hills are covered in lush green grass, and the sky transitions from a warm orange near the horizon to a lighter yellow at the top. The text is overlaid on the upper portion of the image.

May the values of **tolerance**  
allow us to coexist, in peace,  
with all forms of life.

# Resources

<https://www.ellenmacarthurfoundation.org/our-work/activities/circular-economy-in-cities>

<https://www.circulardesignguide.com/methods>

<https://www.ellenmacarthurfoundation.org/circular-economy/concept/infographic>

[http://www.conservationeconomy.net/pattern\\_map/noflash/index.html](http://www.conservationeconomy.net/pattern_map/noflash/index.html)

<https://toolbox.biomimicry.org/methods/process/>