



# Biomimicry as a design tool

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CREATING YOUR OWN DESIGNPROJECT

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# Introduction

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- Biology Teacher
- Assesor at HU University, faculty Education
- Artistic Dynamic Coach



## Hans Bezemer

- Physics and Chemistry Teacher
- Currently conducting an intervention research on design education didactics
- Musician



# Tree levels of Biomimicry

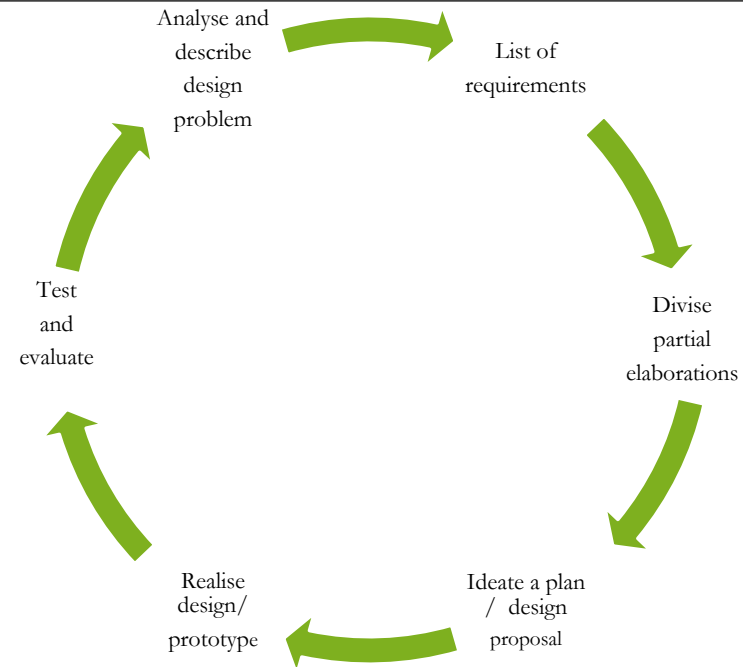
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1. Organism, behavior and ecosystem level.
2. The designer can choose to mimic a part or the organism as a whole.
3. To build a structure that can fit in without resistance in its surrounding environment.

# Best of both worlds

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Design education



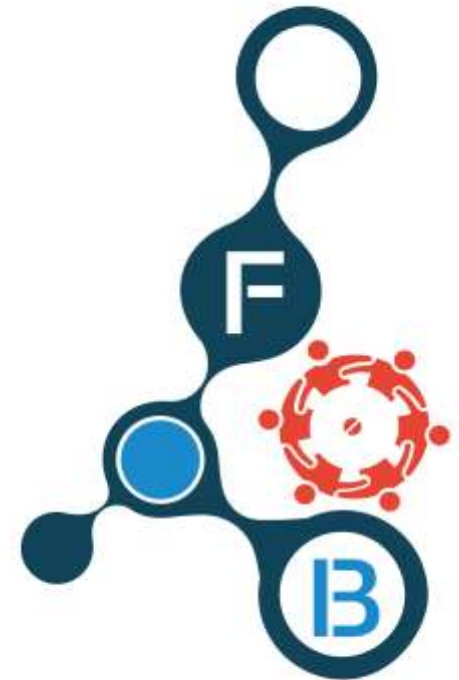
Biomimicry



# Designproject

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- Secondgraders (14-15yrs)
- 6 x 1.5hr lessons
- Three options to choose:
  - Climate regulation of public building
  - Influencing human behaviour
  - Open design
- Using life principles



# Goals of workshop

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- Learning by doing!
- Co-create
- What practical, simple things can you do with Biomimicry in the classroom (secondary education)?
- What materials do you need for this?
- What is the situation at schools (what is there, what facilities do you have)?
- ...

# Design didactics

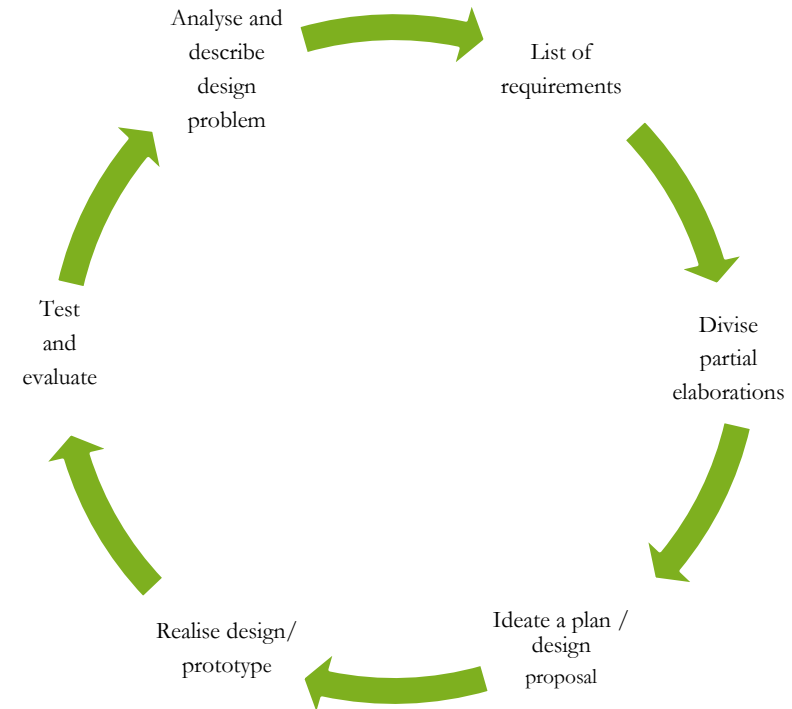
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- See one, do one, teach one
- Get more out of your lessons, by taking more out of your lessons
  - Let students prepare simple tasks outside of the lessons
    - 'Flipping the classroom'
  - Focus on complex tasks
- Facilitate peerfeedback
- Facilitate individual feedback

# Design cycle

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1. Analyse and describe design problem
2. List of requirements
3. Create sketches / rapid prototypes
4. Ideate a plan / design proposal
5. Realise design / prototype
6. Test and evaluate





# Analyse and describe design problem

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## SEE ONE

Climate change can make it rain much heavier than we used to. This sometimes causes flooding in cities.

What can we learn from nature to prevent flooding?

## DO ONE

Maple seed as inspiration for design

# List of requirements

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## SEE ONE

- Houses that are built below sea level (NAP) are flooded.
- People and animals that do not get to safety on time drown.
- There is a good chance that gas, water and lighting facilities are no longer available.
- Drinking water will be polluted which can lead to diseases.

## DO ONE

Choose one of the ideas and create a first list of requirements

# Sketches / rapid prototyping

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## SEE ONE

- Rainwater storage in the cities.
- Storages of riverwater.
- Keep seawater out.
- Flood risk = chance x consequence

## DO ONE

Create first sketches

# Design proposal

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## SEE ONE

- Sponge city
- Green roofs or roof gardens.
- Floodplains of rivers.
- Separate rainwater from the sewer.
- Underground rainwater buffer and infiltration systems

## DO ONE

- 1 minute presentation of design idea
- Peerfeedback

# Realise design

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## SEE ONE

- Irrigation of gardens and urban farms, charging depleted aquifers in the subsurface (aquifers), replacing or replenishing water used for flushing toilets and - if it is clean enough - even for drinking water.
- Green roofs are roofs covered with vegetation. These roofs absorb rainwater and reduce flooding.
- Underground buffering or infiltration, as well as retention (in surface facilities such as ponds) to rainwater management.

## DO ONE

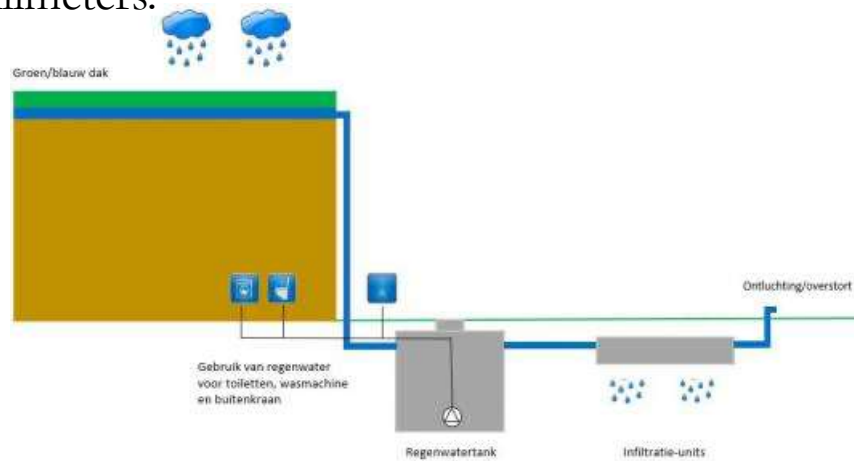
- You can do a lot with little!
  - Which idea –from the presentations of your colleagues- is doable for your situation?

# Test and evaluate

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## SEE ONE

With an annual rainfall of 1,000 millimeters, a normal roof has to drain 850 millimeters, a overgrown roof only has to drain 150 to 380 millimeters.



## DO ONE

- Important step!
- Springboard for further design!
- Keep design `in stock`!

# Evaluating the workshop

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- Questions?
- Tops and Tips