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FINAL EVENT

June 4th, 2019

Technasium Room

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We will collect your data: names, email addresses, school addresses and signature.

We will send you an e-mail when the project is complete and you can access all the e-tools in one place.

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Project and Partnership

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PROJECT

Design stems from STEM

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PROJECT INTELLECTUAL OUTPUT

An e-toolkit

- for integrated teaching/learning of design and STEM concepts
- based on real-life problems
- compliant to quality criterias
- available under open licence

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Target group:

- **Primary**: design students aged 15-25
- **Secondary**: STEM students aged 15-18

Core Teams:

- **Pedagogy Team**: innovative STEM educational methods and tools
- **Design Team**: experience and competence of design education
- **STEM & ICT Team:** experience and competence of STEM and ICT education

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Partnership

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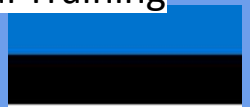
Polytechnic Institute of Braganca

Kuressaare Regional Training Centre



Tartu Art School

University of Piraeus

Gutenberg Schule

Faculty of Information Studies

Middlesbrough College

HMC vocational college

LUMA Centre of Helsinki University

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What is the 5E Instructional Model?

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Engage

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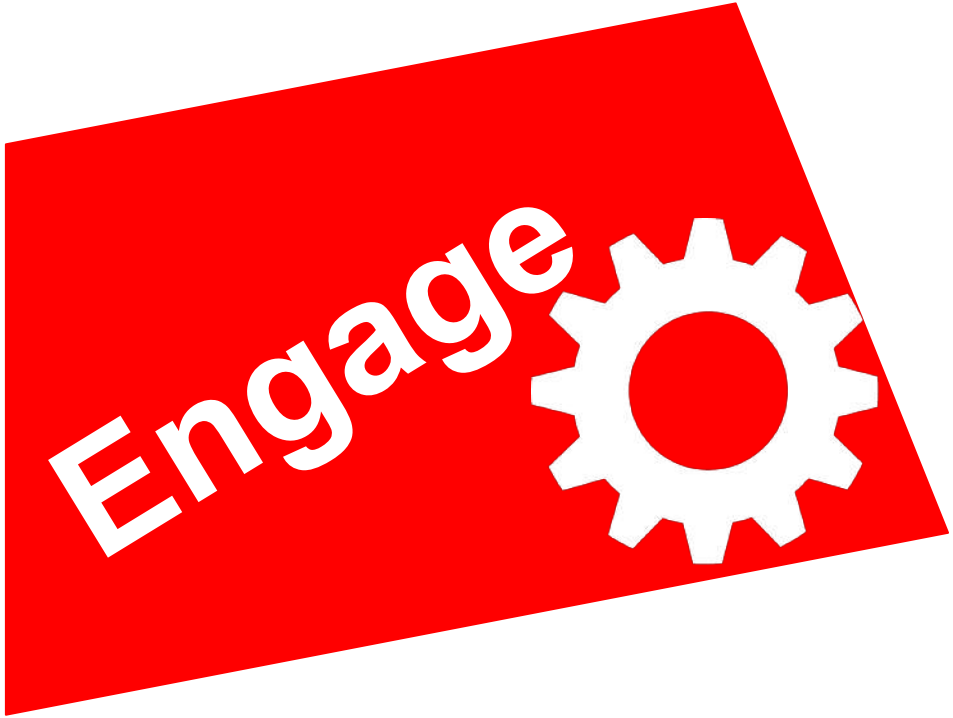
The teacher works to gain an understanding of the students' prior knowledge and identify any knowledge gaps.



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Creates curiosity

Explains concepts prematurely

Raises questions

States conclusions

Uncovers what the students know or think about the concepts

Provides definitions and answers

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“Why did this happen?”

Asks for the "right" answer

Shows interest in the topic

Offers the "right" answer

“What do I already know about this? What can I find out about this?”

Seeks one solution

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Explore

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Students actively explore the new concepts through concrete learning experiences.

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Encourages students to work together without direct instruction

Provides answers and closure

Observes and listens to students' interactions

Informs students about mistakes

Acts as consultant for students

Acts as the sole source of information

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Thinks freely but within limits of the activity

Shows passive involvement

Suspends judgment

Stops with one solution

Tests and forms new predictions and hypotheses

"Plays around" indiscriminately with no goal in mind

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Explain

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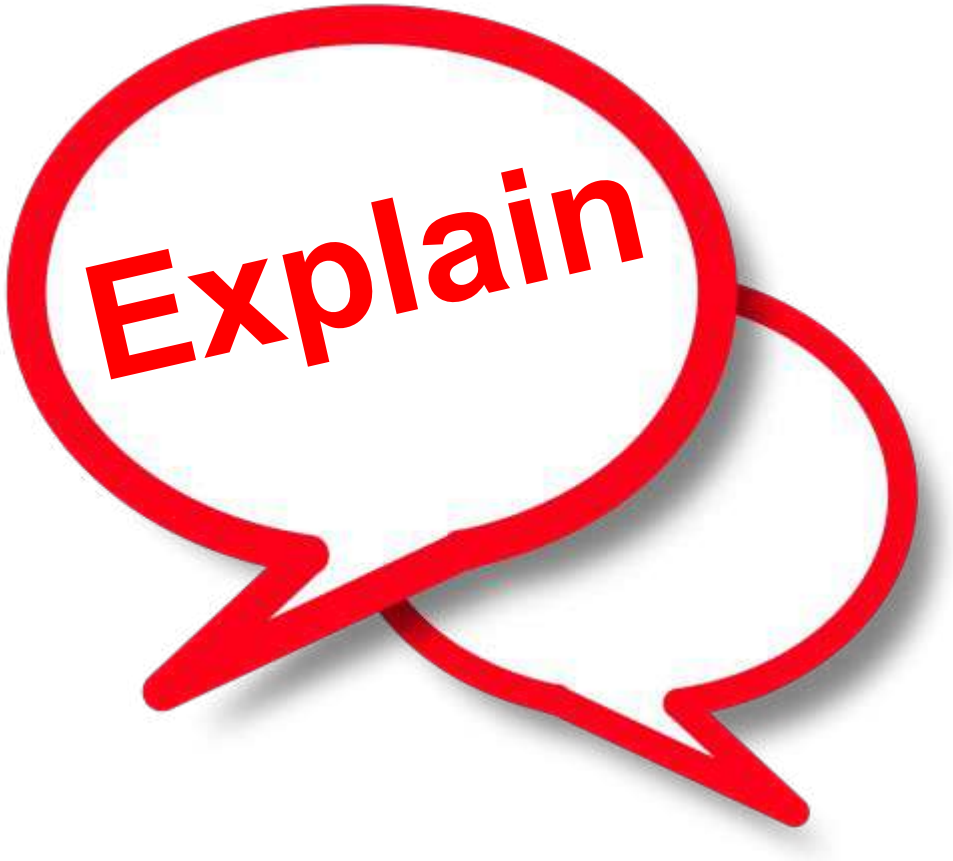
A teacher-led phase that helps students synthesize new knowledge and ask questions if they need further clarification.



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Encourages students to explain concepts and definitions in their own words

Accepts explanations that have no justification

Asks for justification (evidence) and clarification from students

Introduces unrelated concepts or skills.

Uses students' previous experiences as basis for explaining concepts

"Plays around" with no goal in mind

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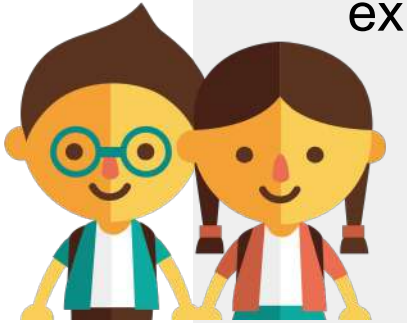
Explains possible solutions or answers to others

Brings up irrelevant experiences and examples



Listens critically to others' explanations

Does not attend to other plausible explanations

Listens to and tries to comprehend explanations offered by teacher

Accepts explanations without justification

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Elaborate

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The phase focuses on giving students space to apply what they've learned. This helps them to develop a deeper understanding.

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Expects students to use formal definitions and explanations provided previously

Provides definitive answers tells students that they are wrong

Refers students to existing data

Leads students step by step to a solution

Encourages students to apply or extend concepts and skills in new situations

Explains how to work through problems

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Records observations and explanations

"Plays around" with no goal in mind

Checks for understanding among peers

Ignores previous information or evidence

Uses previous information to ask questions, propose solutions, make decisions and design experiments

In discussion, uses only labels provided by teacher

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Evaluate

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During this phase, teachers can observe their students and see whether they have a complete understanding of the core concepts.

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Observes students as they apply new concepts and skills

Tests vocabulary words, terms, and isolated facts

Assesses students' knowledge and skills

Introduces new ideas or concepts

Provides students with formative feedback to enhance their thinking or behaviours

Only provides summative feedback

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Answers open-ended questions by using observations, evidence, and previously accepted explanations

Draws conclusions without using evidence or previously accepted explanation

Is able to evaluate his or her own progress and knowledge

Fails to express satisfactory explanations in his or her own words

Asks related questions that would encourage future investigations

Introduces new, irrelevant topics

Explore

Present the Content – Help learner understand concepts, process/procedures, facts or principles

Elaborate

Construct New Learning – Help learner apply prior learning and acquire new

Engage

Establish Relevancy – Help learner determine need of learning new concepts

Explain

Improve Understanding – Help learner to express new learning and provide guidance

Evaluate

Assess Learning – Help learner measure learning against its corresponding goals

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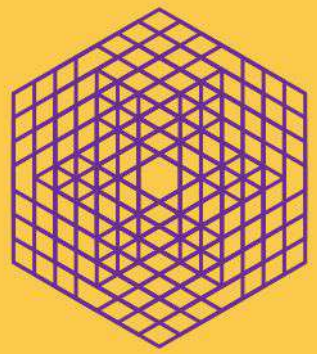

Fachwerk

A **VueJS** and **Markdown** based framework for creating interactive learning materials.

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DesignSTEM Projects

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ITT M. Buonarroti-Pozzo Trento

Official web site

https://designstem.github.io/scenarios/

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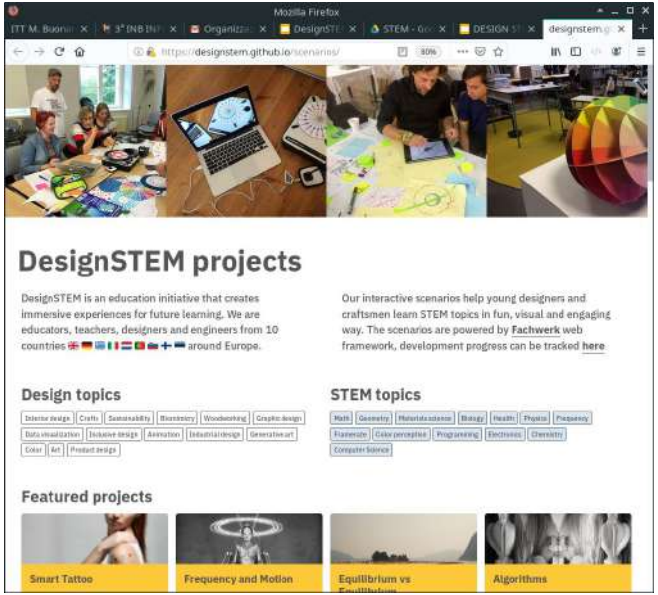
- All code is licenced under MIT licence.



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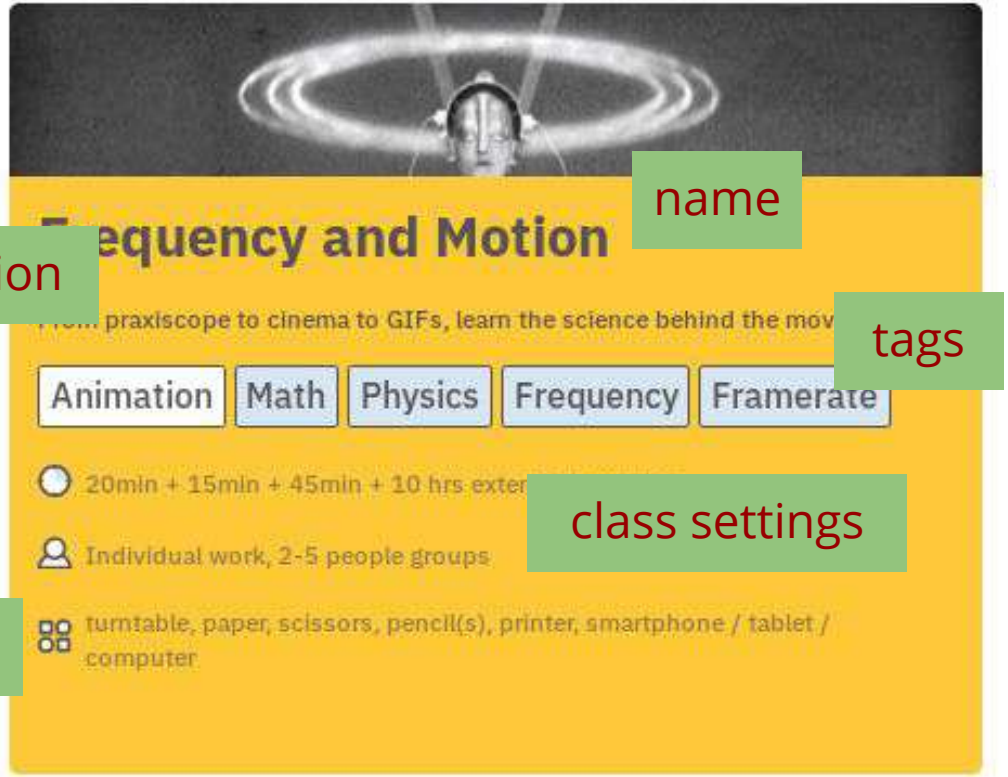
Featured projects

- Smart Tattoos
- Frequency & Motion
- Equilibrium vs Equilibrium
- Become an Algorist!
- Design for colour blindness
- Metamerism



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In-progress projects

England	1	Natural Dyes
Germany	2	Colorblindness Metamerism
Greece	1	Spirals
Italy	3	Of Bees and Packages RGB lamp Equilibrium vs Equilibrium
Kuressaare	5	Frequency and Motion Pottery Simulator Easing Moiré Bits and colors
Netherlands	8	2D and 3D Patterns Waste is a Design Mistake Waste is a Design M Mistake II Waste is a Design Mistake III Looking for Triangles Sun
Portugal	4	Structures Lightness AVAColor Biomimicry
Slovenia	3	Algorithms Decision tree Software Engineering
Tartu	3	Scaling From Geometry to Design Interactive robotics
Finland	1	Smart Tattoo

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Let's Play

https://designstem.github.io/scenarios/

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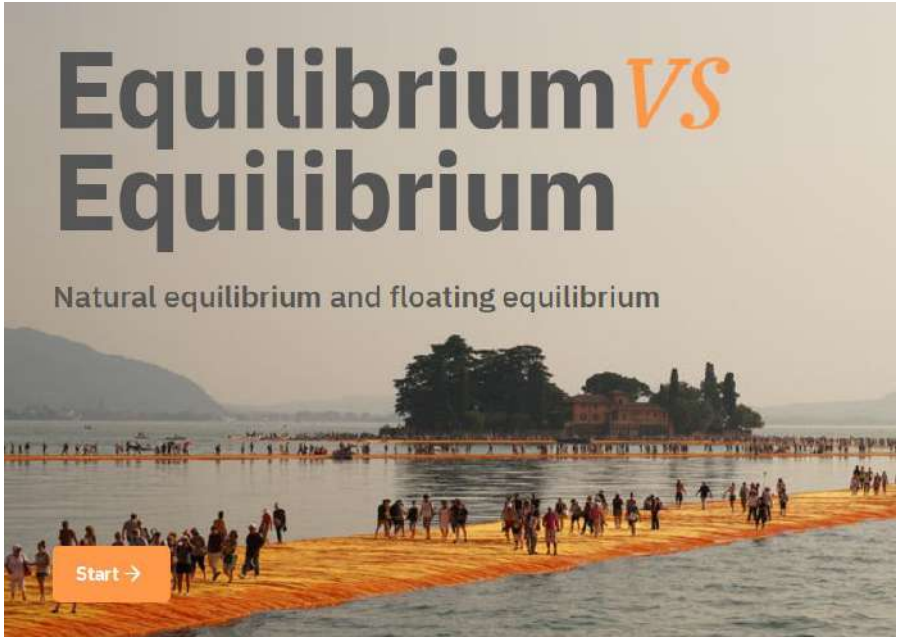
Equilibrium vs Equilibrium



Floating structures recycling plastic

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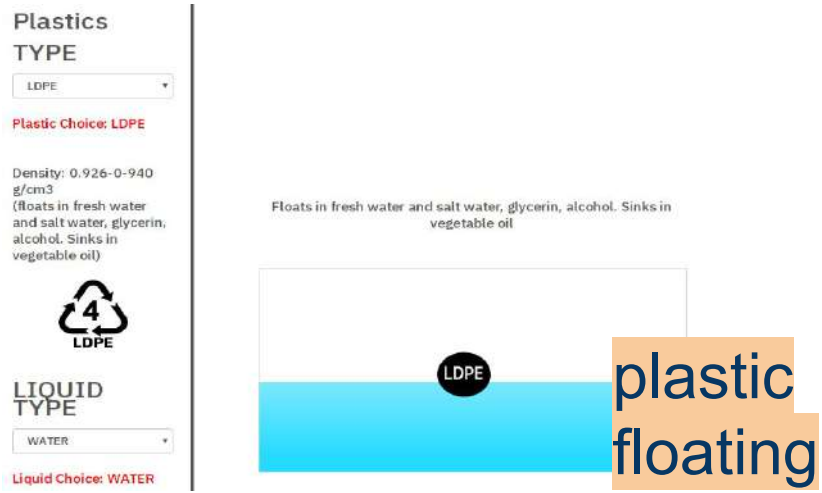
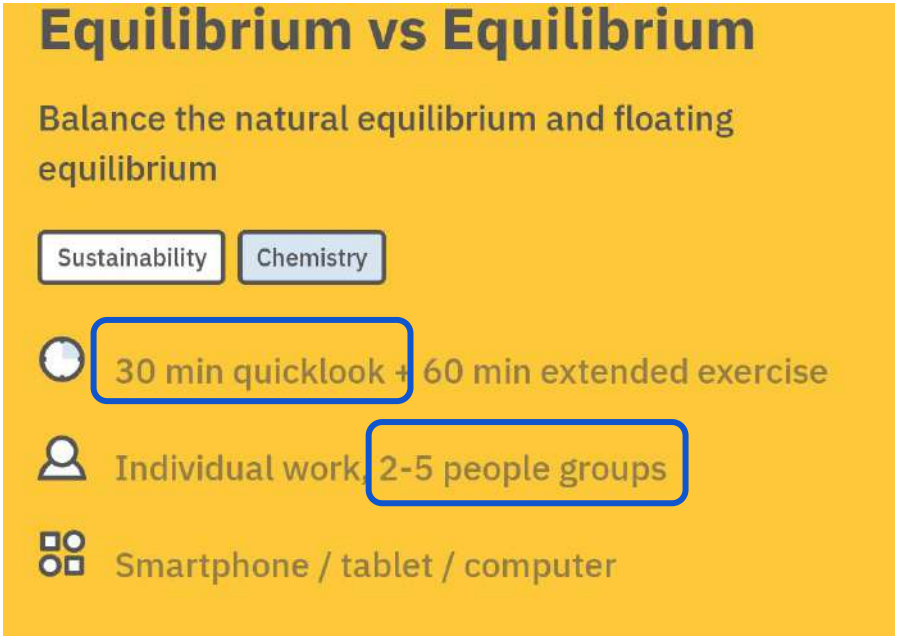
Equilibrium vs Equilibrium

Physics, Chemistry and Maths





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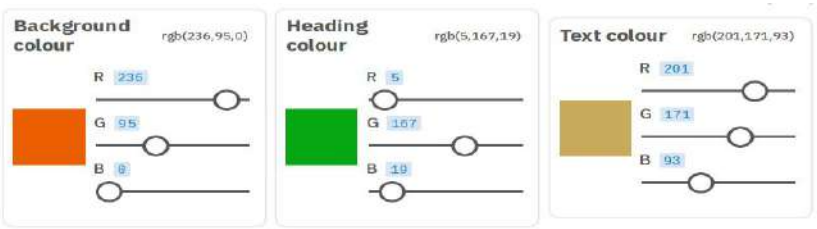
Colorblindness

Working color palette



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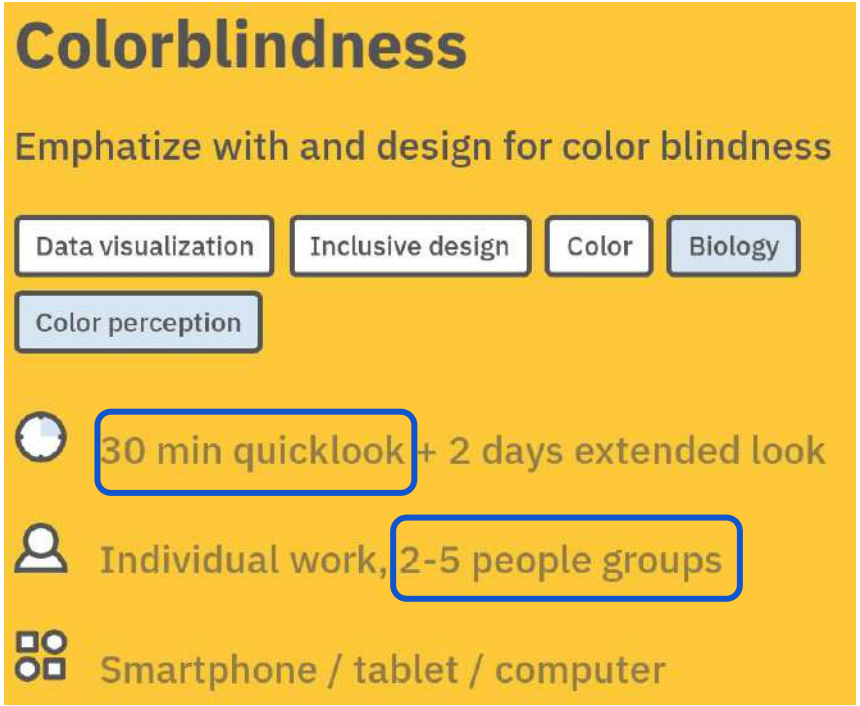
Colorblindness

Maths and Biology

color perception



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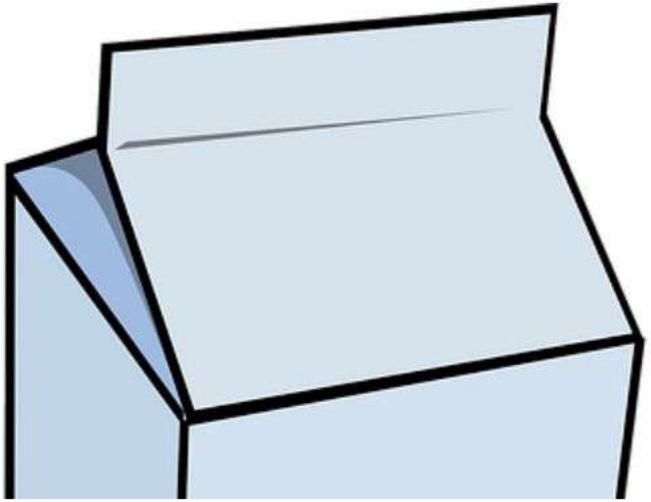
Of Bees and Packages

Package



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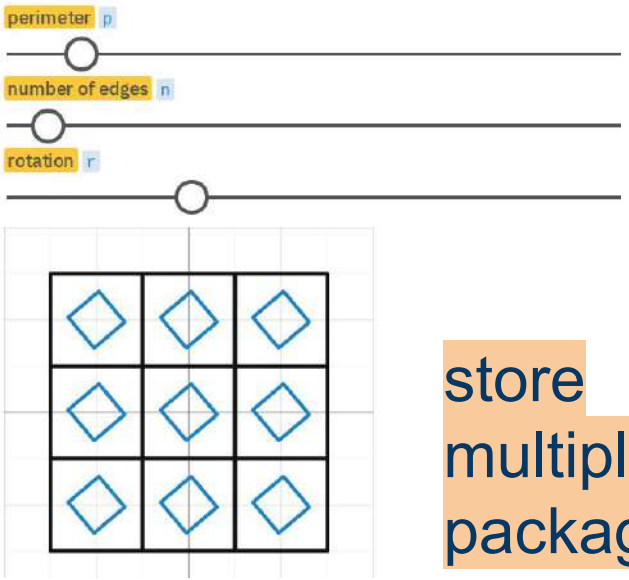
Of Bees and Packages

Maths and Geometry



store multiple packages

Of Bees and Packages

Packaging optimization for environmental sustainability

Graphic design | Geometry | Math

30 min quicklook + 180 min extended exercise

Individual work, 2-3 people groups

Smartphone / tablet / computer

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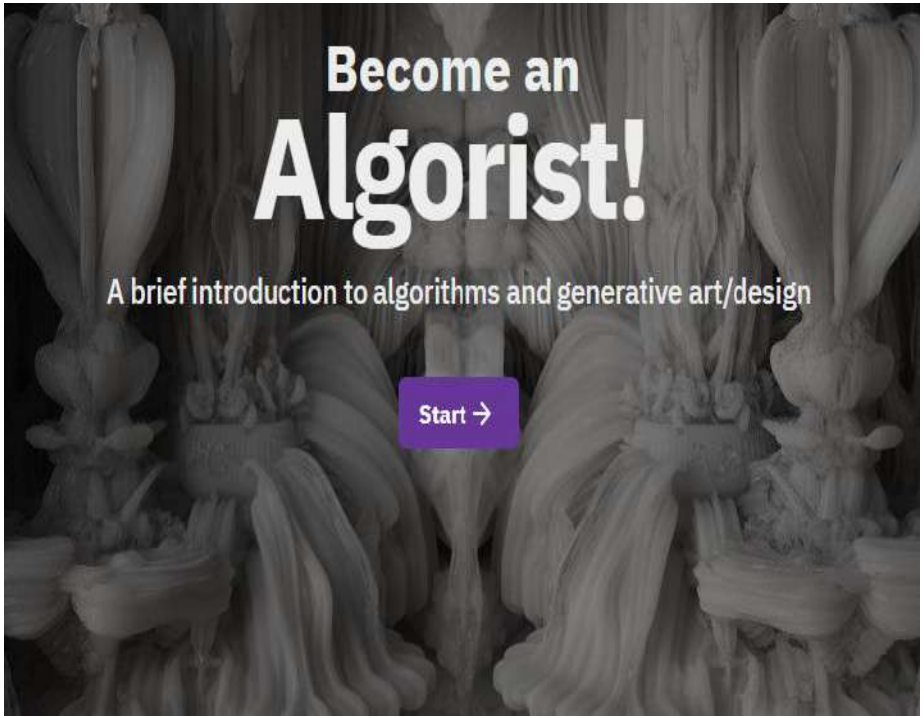
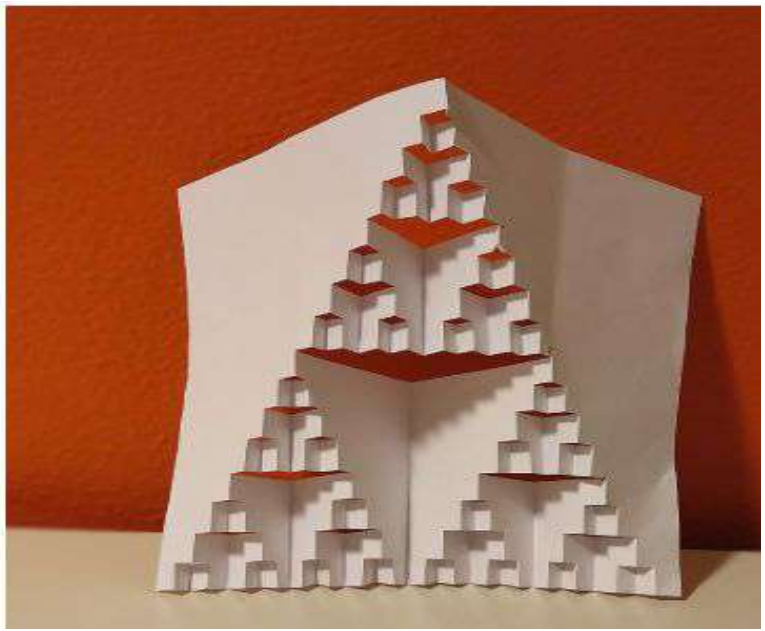
Algorithms



Algorithm with paper and scissors



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Algorithms

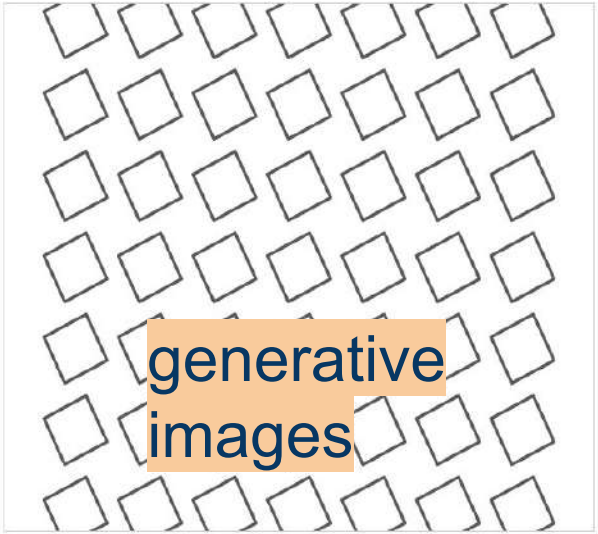
Maths and Geometry

Grid size 0.76

Box size 0.48

Rotation 26.4

HINT: *Try to make the grid size smaller than 0.5, box bigger than 1 and rotation higher than 45*



Algorithms

From simple workflow steps to generative design

Generative art | Computer Science

45 min

Individual work, 2-5 people groups

Paper, scissors, smartphone / tablet / computer

Assessment (for a single scenario)

https://tinyurl.com/design-final-trento

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GRAZIE PER L'ATTENZIONE!