



# **HYBRID** LAB NETWORK

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## **Hybrid Lab 1 Mentors Handbook**

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# 01. HYBRID LAB Learning Teaching Training Activity (LTTA1)

## Context

Due to COVID19 pandemic, adjustments to the proposed LTTA - Hybrid Lab 1 had to be transformed into a hands-on face to face collaborative activity into a collaborative educational online hackathon. Hybrid Lab Network adjusted to this model of a wider span of a hackathon (which works better with a larger participation) and the low costs of the online participation aims to extract the potential of larger contribution to the production of guidelines for the first draft of the Intellectual Output 2 - Educational Toolkit.

## Participants Profile

Each partner involved in the development of the project will provide an [open call](#) directed to their institution and partner institutions for staff participants (e.g. Academy Professors, researchers, informal educators and science communicators all from complementary and differing fields), to bring knowledge from their own field and to share peer learning activities.

## Goals and description

The network partners from Finland, Netherlands, Portugal and Slovenia will participate in this Learning, Teaching, Training activity (HYBRID LAB1) related to the i3S/IBMC Portuguese research and training experience in Cell Biology, Ethology, Human Diversity and Biotechnology (such as gene editing), in order to support users of best results to draw from their own practice in the new learning environments. This Hybrid Lab will have an analytical and **reflective part** and a **'heads-on'** collaborative **exploration of themes, subjects** and **practices of science and engineering** supported by i3s laboratories and their scientific researchers. The format of this lab will be a digital hackathon where participants will exchange background knowledge and experience based on the diversity expertise of the Consortium. Aalto University team will provide a module of training in Art & Science & Technology; across biology and technology with a perspective on the merger of technology and natural environment.

## Results of the activity

Completing the Learning Science and Engineering - Biotech approach participants are able to:

- a) Have a better understanding of Cell Biology, Biotechnology (such as molecular biology, gene editing - Crispr-Cas9, microbiology), Human Genetics/ Diversity and Ethology;
- b) Reflect on Art & Science & Technology;
- c) Use digital tools as a way of teaching/learning;
- d) Reflect on the pros and cons of crossing the boundaries of science and art fields;
- e) Understand the basis of STEAM education and work collaboratively to build STEAM like educational toolkits

Design Thinking and other creative strategies will be used as an innovative method to rethink learning/teaching methods and pedagogical approaches, learning spaces or/and the role of educators. This will be useful to establish general guidelines to be used in IO2 production - as this short training staff-event is closely related with the production of the IO2 through the discussion of themes related with STEAM Modules.

## What is the Hybrid Lab - LTTA1?

The first HYBRID LAB - Learning Teaching Training Activity (LTTA1) is inspired in an online hackathon, format where teams, created in the first day, collaborate to have fun, explore, face challenges and reach multiples perspectives and understandings of the proposed scientific themes which should allow each team to develop a proposal for an educational STEAM toolkit prototype and guideline.

We call this meeting the HYBRID LAB LTTA1 - Biotech Approach: Learning Science & Engineering. A hackathon is typically a time-bound competitive event where participants collaborate to build proofs of concept and minimum viable products for a specific pre-defined problem or to innovate. The fact that a hackathon can be a lot of things is part of what makes it great. In this case this hackathon is an online training and sharing opportunity to collaborate and explore a Biotech Approach in order to produce a STEAM like educational toolkit through different perspectives.

So, the HYBRID LAB LTTA1 is a multidisciplinary event where just about anyone involved in education, science and arts research and communication development that are formally staff of HYBRID institutions or partner institutions, gather to work on Higher Education STEAM toolkit projects.

## What is STEAM?

STEAM - is an acronym standing for Science, Technology, Engineering, Arts Mathematics - is the movement that everyone in education is talking about.

For Hybrid Lab Network project STEAM is an approach, a collaborative methodology, an educational toolkit, a Higher Education pilot curriculum, and a mindset. STEAM might be a dream and an ideal.

STEAM advocates for the integration of art and design approaches in the learning of STEM subjects. STEAM fosters well-rounded thinking and encourages cross-disciplinary exchange. STEAM gives equal voice to the arts and sciences. STEAM uses the strongest aspects of each discipline to create something new

## The Hybrid Lab - LTTA1

### **This Hybrid Lab themes are:**

Cell Division, Biotechnology, Gene editing, Ethology, and Human Diversity  
Together we will cooperate to find gaps in the educational system and suggestions and strategies to bridge those gaps.

### **Why we want to conduct the Hybrid Lab - LTTA1**

- To surpass the impossibility of a face to face event in Portugal,
- To enhance/promote multidisciplinary collaboration between partners teams,
- To drive disruptive innovation through the creation of innovative environments where the ideas can connect,
- To generate new ideas in order to develop a Higher Education STEAM toolkit,
- To improve partners engagement and accelerate the speed of co-create innovative products to solve educational gaps.

HYBRID LAB NETWORK understands that art/design/health related science shares an interest in experimentation and process as a means to generate new information. Moreover, we perceive value in applying some of the techniques from one field to the others. What it is like to tackle issues in each field and techniques employed to support the investigation of new ideas.

Whom we want to engage

Higher Education STAFF

Higher Education TEACHERS

Higher Education RESEARCHERS

Artists/Designers

Partner institutions researchers, teachers, education and culture decision/ policy makers

How you want to engage (Hackathon Format)

HACKATHON TYPE - Innovation lab: Get a fantastic team of bright creative minds from several institutions to work together on disruptive ideas for HYBRID current challenge - what is an educational toolkit for STEAM and how can we imply Biotech Knowledge to build a STEAM Educational Toolkit for Higher Education.

## Final Output

### **Module for Teachers - Biotech Approach**

### **Output Type Learning teaching training material - Toolkit**

Guideline for module- created for and perfected in the Short-term event of joint training of staff LTTA1 and LTTA2 Intensive Study Program.

The exchange of good practices among partners, researchers and teachers as well as the knowledge produced around Biotech Approach learning Science Technology, Engineering and Arts (in LLTA 1) - will be useful for teachers, researchers and technicians and artists co-designing Learning Teaching and Training materials for higher education. Online and onsite teaching/learning activities will be conducted between partners in order to share experiences and competences that will allow the production of the intellectual outputs.

Using the knowledge in multidisciplinary strategies, practical methodologies and development of tools for the teaching on, in and into STEAM Education, an educational STEAM toolkit will be produced that offers new ways to be intentional and collaborative when both teachers and science communicators are designing new solutions for your classroom university, and community. It empowers participants to create desirable solutions. In this toolkit, we will lay out a series of steps that can help participants to develop new, innovative solutions designed with students/people at the center.

**At the end of the HYBRID LAB LLTA 1 Hackathon teams should deliver four different teaching/learning educational toolkit proposals, one per scientific theme, according to some guidelines and following a path of challenges and small assignments that were strategically conceived to promote collaboration and creative thinking.**

## 02. HYBRID LAB LTTA 1 breakdown

### PURPOSE:

How to assemble multidisciplinary teaching and learning modules for multidisciplinary audiences (HEIs & Citizens & General Public)?

### PROBLEM STATING

Help us bridge the gap which specialized education keeps enlarging!  
Together for inclusion in disciplinary specialization with cross-disciplinary thinking  
From the Biotech approach to a cross-disciplinary dialogue to foster collaboration and creative thinking to support new educational models.  
Educational jump above the Two Cultures!  
What is a Higher Education Toolkit

### PARTICIPANTS

Professionals (teachers and, researchers) from the project partner institutions, and third-party institutions, that are involved in higher education and in non-formal adult teaching (the ones requiring toolkits for moving their disciplinary teaching into newer models approaching a STEAM like format)

### TOPICS AND MENTORS

Building a teaching tool mixing art, technology and humanities with specific scientific topics listed below.

The team should be interdisciplinary with members from different backgrounds, with a scientist from the specific field explored by each group, an artist, someone more connected with humanities and a participant with a background more related with technological development. All teams have a mentor on the Scientific field and another from Art/Humanities background, both to conduct the team in the challenge. Everyday there is a presentation of the day's work and at the end of the challenge a presentation of all teams' projects.

List:

**Theme 1- Cell Division | Mentors: Claudio Sunkel and Laura Beloff**

**Theme 2- Gene editing | Mentors: José Bessa and Lucas Evers**

**Theme 3- Human diversity | Mentors: Luisa Pereira and Matej Mertik**

**Theme 4- Ethology | Mentors: Anna Olsson and Polona Tratnik**

### FORMAT

1. The HYBRID LAB LTTA 1 will be performed online. General presentations and day briefings will gather all teams together online at zoom.

2. Group assignments moments will be based on hybrid Slack-platform, other platforms or offline, depending on each group decisions
3. Each group will have two mentors: science and art that are responsible for the group and its deliverables
4. Every day there will be briefing in which each group will make a pitch of their conclusions
5. There will be permanent overseers that will follow every day work of all groups
6. All participants will vote in all team projects outcomes, becoming the judges for the final trophy

## HYBRID LAB LTTA 1 LANDING PAGES ARE:

**hybrid.i3s.up.pt**

SLACK HLN LTTA1

YouTube channel for public presentations

**<https://www.youtube.com/channel/UCKMdrS9wVaU6Tx4CRSG3uJA?>**

## HACKATHON PRIZES

Competition and Online Collaboration in this HYBRID LAB LTTA 1

### **Overseers will decide on award nominations for:**

Least Complaining team

Funnier team

Creative overall proposals

### **All Participants will vote on the**

Best in the competition according to the rubric to review toolkits.

The outputs of this LTT activity will be applied on further ones, particularly the one that is nominated the Best educational toolkit

## BASIC RULES

This HYBRID LAB LTTA 1 is a collaborative process; all participants must give their best for the success of the team

Our rules: Generate as many ideas as possible in a short time by suppressing criticism and building upon each other's input...

- Teams are compulsory; once you accepted to participate you are expected to participate;
- Each team will work on the theme which is based on the expertise of the of its scientific mentor and shall incorporate the wide range of knowledge and skills by the participants and arts /humanities mentor;

- Each team must have at least 5 members, including the mentors;
- Participants are allowed to use any kind of technology; and to recommend any kind of external resources necessary to implement the toolkit;
- All participants are expected to participate in the public parts of the program and be present at daily briefings
- The event is divided into parts that have a specific challenge to be solved/filled; mentors are responsible to present the challenge in each moment.
- To participate you must create (or use one you already have) a slack account (please follow the guidelines in the attached manual)

## PUBLIC SESSIONS

The HYBRID LAB LTTA 1 is a virtual event to enable teams to collaborate online and brainstorm solutions to HYBRID LAB challenges. Nevertheless, there are some public sessions in the program that will be streamed online at **HYBRID LAB social networks (Youtube channels)**. Please invite all your friends and colleagues to join these sessions.

### 18 MAY

6.00 pm - 7.00 pm Public parallel debates: scientific mentors vs art/humanities mentors  
(2 talks simultaneous, 2 themes + 2 themes)

#### PARALLEL 1 - Cells and Genes

WHAT IS Cell Biology, Cell Division | Claudio Sunkel

WHAT IS Biotechnology, Gene editing | José Bessa

QUESTIONS FROM Arts and Humanities | Laura Beloff | Lucas Evers

#### PARALLEL 2- Diversity and Behavior

WHAT IS Human genetics and diversity | Luísa Mesquita Pereira

WHAT IS Ethology | Anna Olsson

QUESTIONS FROM Arts and Humanities | Matej Mertik | Polona Tratnik

### 22 MAY

6 pm KEYNOTE SPEECH (PUBLIC):

**Reflection about Art & Science & Technology**

Laura Beloff

6.45 pm KEYNOTE SPEECH (PUBLIC):

**Reflection on STEAM education**

Maria Manuela Lopes

<https://www.facebook.com/hybridlabnetwork>

<https://twitter.com/home>

<https://www.instagram.com/hybridlabnetwork/>

<https://www.youtube.com/channel/UCKMdrS9wVaU6Tx4CRSG3uJA?>

## ORIENTATION FOR TEAM MENTORS

Please consult the attached information on how to navigate throughout the hackathon and how to use slack and mural.

## ROLES & RESPONSIBILITIES

- keep your spirits up
- have fun
- keep your team on track
- deliver the outputs

EXPECTED OUTPUTS (that mentors should deliver with their teams)

## LIST OF THE OUTPUTS as RESULTS of LTTA 1

TIME   ACTIVITY	OUTCOMES Send to LTTA 1 SLACK - google Drive
<b>18 JUNE</b>	
<b>10.15 am   Break out groups: Group assemble</b>	
<b>10.30 am Icebreaker moment   group members presentation and start of Group assignment</b>	<p>Results from Object / Team Association Exercise   1 per each group/team (estimated 4 results)</p> <p>4 Conclusions from the free debate about the general theme and first assignments - 1/ each group</p> <p><b>Each Group (4):</b>            Register of the strategies of each group and meeting schedules for autonomous work;            Register of the general scheme of the first pitch.            Results of the guided tools /each team:            Oriented debate - Register of the most relevant comments and conclusions related to the questions asked (4):            What is your favorite example of a product or thing which required cross-disciplinary collaboration in order to create, and why?            What was the most challenging/ difficult thing from the 18th evening presentations?            What thrilled your team from what you all heard/saw on the 18th evening presentations?</p>

The hexagrams model (4) - Each team should present a diagram filled in by the participants of each group  
Visual thinking exercise (4) - each team should present a collection of their individual replies and a final answer

### BETWEEN 18 AND 21 OF JUNE

(starts at 10.30 am 18 June and teams should work independently other times until 22 - 9.0 am presentation)

### 22 JUNE 2020

**9.00 am | Group Assignment  
Pitch and debate**

**Each Group (4):**

Pitch presentation of each group replies on assignment 1 and the work done on the following days:

Presenting the Team

Approach to the Theme

First impression on the Educational jump above the Two Cultures

Each group should provide to the organizers: the power points and written/drawing materials developed.

Zoom presentation and debate will be recorded.

**10.15 am | Group assignment:  
Divergent thinking**

**Each Group (4):**

Results from the Divergent thinking task

**1.00 pm | Group  
assignment: Exploring the  
translation of a scientific field  
into an arts/Humanities field**

**Each Group (4):**

register of the answer to the question:

*"What should an educational toolkit include?"*

each group should present the team strategies used in tools for group assignments

**4.30 pm | Day briefing: group  
pitch and discussion (all  
together)**

Topic: Evolution of the proposal for the Educational jump above the Two Cultures

**Each Group (4):**

group pitch presentation about the topic: "Evolution of the proposal for the Educational jump above the Two Cultures";

Each group should provide:

the power points and written/drawing materials developed.

Zoom presentation and debate will be recorded.

### 23 JUNE 2020

**11.00 am | Scientific and  
Pedagogical Briefing on Group  
assignment: Make your own  
toolkit I**

Each Group with the overseers:

Register of the final multidisciplinary teaching learning proposal I (toolkit I):  
hypothesis 1 or hypothesis 2 or hypothesis 3

**3.00 pm | Final presentations  
and debate**  
(30 mins each team)

Each Group (4):

final presentation - the four different teaching/learning proposals (one per scientific theme, according to some guidelines) and debate

Each group should provide:

the power points and their final toolkit

Zoom presentation and debate will be recorded.

## 03. Agenda/ Program

### GENERAL QUESTION

How to assemble multidisciplinary teaching and learning modules for multidisciplinary audiences (HEIs & Citizens & General Public)?

### OBJECTIVES:

- a) Better understanding of Cell Biology, Biotechnology (such as molecular biology, gene editing - Crispr-Cas9, microbiology), Human Genetics/ Diversity and Ethology;
- b) To reflect on Art & Science & Technology; across biology and technology and on Merging of technology and natural environment.
- c) To use digital tools as a way of teaching/learning;
- d) To reflect on the pros and cons of crossing the boundaries of science and art fields;
- e) Understand the basis of STEAM education and work collaboratively to build STEAM like educational toolkits

# 18 JUNE 2020

## I. MORNING

### 9.30 am The Project Hybrid Lab Network

Júlio Borlido Santos

### 9.45 am Bureaucratic moment | online tools clarification

### 10.15 am Group assemble

10.30 am Icebreaker moment

### 10.45 am Group members presentation

### 11.30 am Group assignment: free debate about the general theme and first assignments

**Theme** - From the Biotech approach to a cross-disciplinary dialogue to foster collaboration and creative thinking to support new educational models. Educational jump above the Two Cultures.

#### **First assignment - group:**

Groups discuss and define their own strategies and meeting schedules for autonomous work and prepare for first pitch. To fulfil the first assignment groups will be provided with guided tools such as:

- oriented debate,
- the hexagram model and
- visual thinking

12.00 am Lunchtime

## II - EVENING

6.00 pm - 7.00 pm Public parallel debates: scientific mentors vs art/ humanities mentors  
(2 talks simultaneous, 2 themes + 2 themes)

### **PARALLEL 1: Cells and Genes**

WHAT IS Cell Biology, Cell Division | Claudio Sunkel

WHAT IS Biotechnology, Gene editing | José Bessa

QUESTIONS FROM Arts and Humanities | Laura Beloff | Lucas Evers

### **PARALLEL 2: Diversity and Behavior**

WHAT IS Human genetics and diversity | Luísa Mesquita Pereira

WHAT IS Ethology | Anna Olsson

QUESTIONS FROM Arts and Humanities | Matej Mertik | Polona Tratnik

## Between 18 (afternoon) and 21 of JUNE

Groups should find 4 hours to make some autonomous group assignments

## 22 JUNE 2020

### I - MORNING

#### 9.00 am Group Assignment Pitch and debate

(each team should present their conclusions on assignments 1 done on the 4 hours of group work between 18 and 22nd - 5m presentation + 10m debate each team); all together

Topics: Team | Theme | Proposal for the Educational jump above the Two Cultures

10.00 am break

#### 10.15 am Group assignment: Divergent thinking

#### 10.45 am Group assignment: What should an educational toolkit include?

12.00 am Lunchtime

### II AFTERNOON

1.00 pm **Group assignment: Exploring the translation of a scientific field into an art/ humanities field**

#### 4.30 pm Day briefing: group pitch and discussion

(all together) (5 presentation each group; 10 mins discussion

Topic: Evolution of the proposal for the Educational jump above the Two Cultures

5.00 pm break

### III - EVENING

#### 6 pm KEYNOTE SPEECH (PUBLIC):

#### Reflection about Art & Science & Technology

Laura Beloff

#### 6.45 pm KEYNOTE SPEECH (PUBLIC):

#### Reflection on STEAM education

Maria Manuela Lopes

## 23 JUNE 2020

### I - MORNING

**9.00 am 10.45 am Group assignment: Make your own toolkit I**

10.45 am break

**11.00 am Scientific and Pedagogical Briefing** (overseers visit and 15m checkpoint to each team)

12.00 am Lunchtime

### II AFTERNOON

**1.00 pm Group assignment: Make your own toolkit II**

**3.00 pm Final presentations and debate (30 mins each team)**

**5.00 pm Evaluation**

Participants - fill participant feedback,

Jury meeting + analysis of participants votes + assessing

5.30 pm Farewell Session

## 04. Tools for group assignments

All tools are explained in this handbook for mentors and shall be implemented to participants using the attached documents

### D-Day Ice breaker moment (divergent thinking)

#### 18 JUNE 2020 MORNING

This is implemented directed by the overseers, through slack, to all participants, already assembled as a group but yet potentially unknown to each other.

**Duration:** 15 min (including presentation of the task and presentation of each team results)

**Moderator:** overseers

**Challenge:** Object / Team Association Exercise

**Strategy/ instructions:** All together;

Break participants into groups of 8 to 12 people in zoom private rooms (team rooms!)

Provide each group with a random object as a drawing (overseers will send the objects to the groups through slack)

Ask the group to make a list of all the attributes they can assign to the object and pair associations between the participants and the object (what does each participant have in common with the given object)

Have each group share their top 5 associations and the categories on the selection basis.  
(object examples: pen, table, chair, book)

## Oriented debate

### Between 18 (morning) and 21 of JUNE

**Duration:** 30 min

**Moderator:** (write down the name of this tool moderator)

**Challenges:**

1. What is your favorite example of a product or thing which required cross-disciplinary collaboration in order to create, and why?
2. What is apparently the most challenging/difficult thing considering the theme?
3. This question is to be answered after the 18th evening parallel public debates) What thrilled your team from what you all heard/saw on the 18th evening presentations?

**Strategy/instructions:**

Debate. Each group should register most relevant comments and conclusions.

**Our suggestion to mentors:**

Use zoom to do a synchronous debate to reply to questions 1 and 2 and use asynchronous replies to question 3 on slack. Then compile the answers in a simple doc and place it in the team google drive.

## The Hexagram

Between 18 (morning) and 21 of JUNE

**Duration:** 30 min

**Moderator:** (write down the name of this tool moderator)

**Challenge:**

Collaborative definition of target publics and identification of other components for the course/module or educational toolkit.

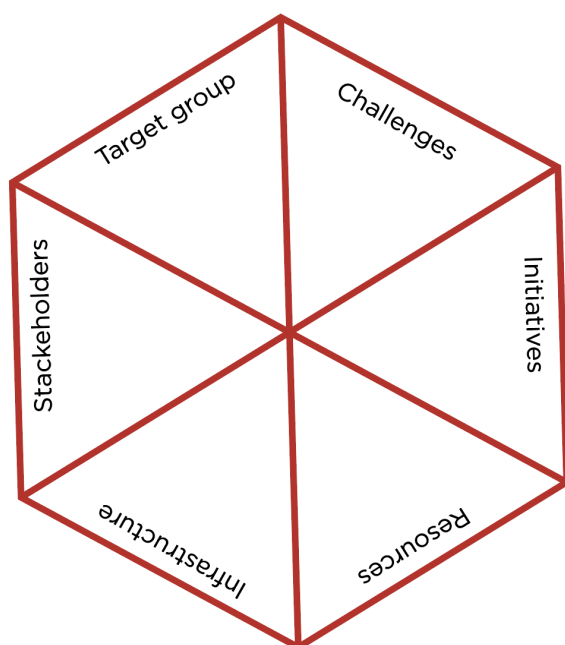
**Strategy/instructions:**

Filling the diagram by posting participants opinions in the different sector; prepare a summary for the pitch

**Our suggestion to mentors:** Use zoom to do a synchronous debate and/or use mural to co-construct a collaborative hexagram. <https://www.mural.co/>

Then compile the answers in a simple doc and place it in the team google drive.

Each team will be provided with a MURAL layout and account by overseers.



## Visual thinking

### Between 18 (morning) and 21 of JUNE

#### Trigger:

Surprise team challenge to allow all the team members to realize everybody thinks visually, even if in different formats and with different drawing skills.

Visual thinking develops from your unique experience. No two people ever see, imagine, or draw the same; no two people ever think the same thoughts.

The most obvious and at the same time most important observation about thinking is that thinking is extremely difficult to observe. Only thinkers themselves can know what they are thinking, and not even they can fully know.

A fascinating way to learn about thinking is to watch your own thinking in action. In the following experience, you will find that observing your own thinking is a demanding task: while thinking, you must also somehow step to one side and watch your thinker thinking.

As you think to solve the following puzzle, observe your thoughts to the best of your ability:

#### **MONK-ON-THE-MOUNTAIN**

*"One morning, exactly at sunrise, a Buddhist monk began to climb a tall mountain. The narrow path, no more than a foot or two wide, spiraled around the mountain to a glittering temple at the summit.*

*The monk ascended the path at varying rates of speed, stopping many times along the way to rest and to eat the dried fruit he carried with him. He reached the temple shortly before sunset. After several days of fasting and meditation, he began his journey back along the same path, starting at sunrise and again walking at variable speeds with many pauses along the way. His average speed descending was, of course, greater than his average climbing speed.*

*Prove that there is a single spot along the path the monk will occupy on both trips at precisely the same time of day."*

#### **Our suggestion to mentors.**

Use zoom to do a synchronous debate and/or use mural to co-construct a mural with the drawings of your team.

Each team will be provided with a mural layout and account by overseers.

Then compile the answers in a simple doc and place it in the team google drive.

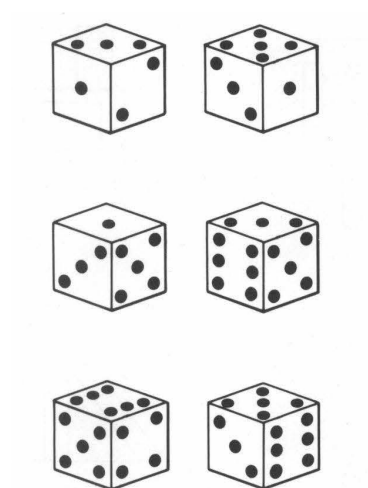
## Divergent thinking

22 JUNE 2020 MORNING

All teams will receive a common challenge for a 2 minutes solution.

### ROTATING DICE

Examine each pair of dice in Figure 1f, insofar as the dots indicate, the first die of the pair can be turned into the position of the second one, place a check next to the pair.



### FAST FUN

All teams will receive a common challenge for a 2 minutes solution. Teams will have different preparation processes that takes 15m.

#### Preparation:

Team 1: all members will have 15 m to read a scientific text chosen by the scientific mentors

Team 2: all members will have 15 m to observe an art project or text chosen by the arts/humanities mentors

Team 3: all members will have 15 m to read a boring text chosen by the overseers (given see attach)

Team 4: all members should change their working sets in 15 minutes (sit on the floor, change the music they were listening to, change their clothes into something pretty or daring, ...)

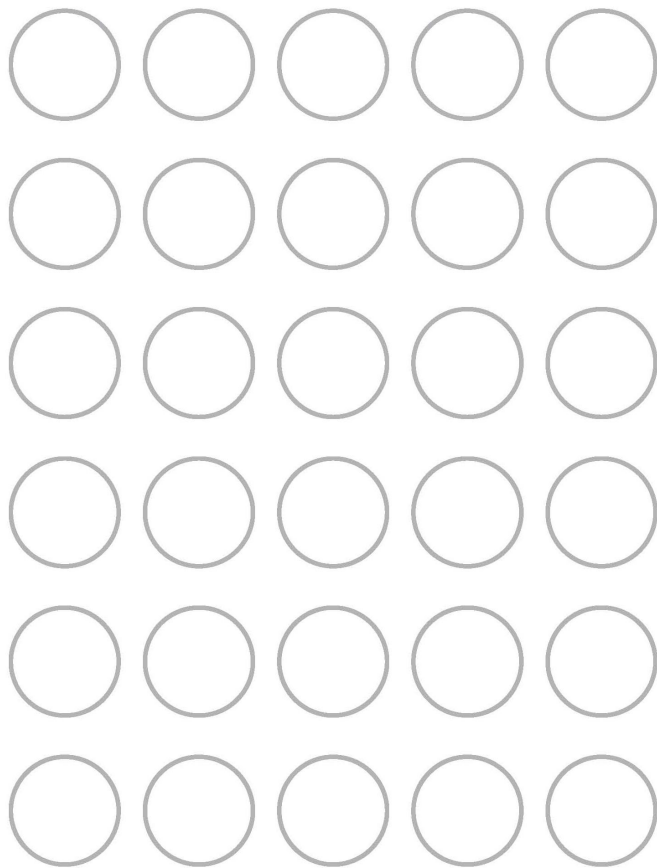
After the 15 m preparation team members should be asked to do the circles in 2 minutes

Each participant is given a piece of paper with 30 blank circles on it, a pencil and 2 minutes on the clock. You are challenged to fill in as many circles as possible- with the aim being quantity, not quality. Maybe all your circles are variations on a theme, perhaps they are all emojis ... your one goal was to fill out as many as possible.

Then, after the exercise, share and reflect what similarities there were and encourage collaboration. The motive behind the 30 circles is to stop yourself from self-censoring. When you go for quantity, you don't have time to think your idea is bad, you can edit later. This is the stage where creativity flourishes.

Our suggestion to mentors. Use slack to share the challenge ROTATING DICE and collect the answers. Then use slack to share the preparation text or command and then after 15 m release the image FACT FUN and after 2 minutes collect the team answers (the drawings)  
Then compile the answers in a simple doc and place it in the team google drive.

**FAST FUN In the next 2 minutes, and no more, try to fill as many circles as possible. The aim is quantity not quality. Have fun!**



# Exploring the translation of the group's scientific field into other fields (Arts/Humanities...)

**22 JUNE 2020 AFTERNOON**

**Duration:** max 3h

**Challenge:** How to prepare a task/challenge for a diverse group with different knowledge and skills; including persons inside and outside the main Biotech scientific field of this team?

**Strategy/instructions:** discussion; guidelines: approach, time, contents, methods, resources, how to use

**Suggestion tasks:** rewrite a task you commonly give your science students into a broader student universe, or rewrite the abstract of a scientific text in your team expertise field into a text that can be published in a non-scientific journal (disentangle the jargon!)

make a short newspaper article or press release about a scientific discovery in your field.

how to make a short movie about a scientific discovery/fact in your field? A movie such as a "Kurzgesagt" (Very accessible movies about hardcore science topics) or a "ted education"

<https://kurzgesagt.org/youtube/> or

<https://www.youtube.com/watch?v=YI3tsmFsrOg&feature=youtu.be>

<https://ed.ted.com/>

DESIGN of Learning Environments

Making content accessible building on pre-existing knowledge.

Making thinking Visible

Helping people Learn from Others

Promoting Autonomy and Lifelong Learning

**Our suggestion to mentors.**

Use whatever tool you feel appropriate to work with your team.

Compile solutions as necessary and prepare to show some results in the day pitch at 4,30pm.

If possible, plan the task to be included as part of your educational toolkit.

# Make your own toolkit I and II

**Duration:** 4h 30 min

**Challenge:** Prepare a final multidisciplinary teaching learning proposal (educational toolkit)

**Strategy:** FOCUS – production/gathering on/off potential teaching material; prepare the final presentation; for guidelines of what to deliver in the final presentation follow the Template Guidelines (1, 2 or 3) or present your own.

## WHAT MIGHT an EDUCATIONAL TOOLKIT be?

Educational Toolkit may be a collection of tools, guidance and resources for designing future teaching workshops/classroom scenarios and using them to bring advanced and innovative learning and teaching to the academia/non-formal education. The toolkit helps the user (educator, mentor) to establish a path through the process of innovation into cooperation, creative learning environment.

Authoritative and adaptable resources for front-line staff that enables them to learn about an issue and identify approaches for addressing them. Toolkits can help translate theory into practice and practice into theory, and typically target one issue or one audience. Be daring, create a new definition of what an educational toolkit might be.

### One example of how to design an effective toolkit:

1. Give your team the right tools for the job. One of the critical components in executing a content strategy is building out a tailored content toolkit.
2. Design tools around the needs of users (define target audience first).
3. Make sure your content toolkit is easy to use. (clear language)
4. Tools for your content toolkit.
5. Further resources/reading.

### Examples

[http://www.d-think.eu/uploads/1/6/2/1/16214540/dthink\\_toolkit\\_en.pdf](http://www.d-think.eu/uploads/1/6/2/1/16214540/dthink_toolkit_en.pdf)

[https://artswork.org.uk/wp-](https://artswork.org.uk/wp-content/uploads/2019/09/AW_STEAM_Toolkit_030919_V17_WEB_READY.pdf)

[content/uploads/2019/09/AW\\_STEAM\\_Toolkit\\_030919\\_V17\\_WEB\\_READY.pdf](https://artswork.org.uk/wp-content/uploads/2019/09/AW_STEAM_Toolkit_030919_V17_WEB_READY.pdf)

[https://drive.google.com/drive/folders/1CyEqdaBV\\_BhcP49We9m12nEGkmFpCRho?usp=sharing](https://drive.google.com/drive/folders/1CyEqdaBV_BhcP49We9m12nEGkmFpCRho?usp=sharing)

## TEMPLATE HIPOTESIS 1:

### Toolkit Guidelines

- 1) the accumulation of stocks of knowledge:
  - a) Main paradigms in your Biotech field of Knowledge
  - b) Seminal readings
  - c) Source of information (most important journals, websites, etc.)
  - d) Main current challenges in your biotech field
  
- 2) the creation of flows of knowledge between people and organizations:
  - a) Examples of projects in other areas/fields of knowledge that explore the main subject (artistic project)
  - b) Example of STEM/STEAM close project
  - c) Sources of dialogical information
  
- 3) Metacognition - the changing perception of self as new knowledge, skills, and one's ability to participate in a community of practice are assimilated:
  - a) Visualize thinking and understanding (methods - what methods did your team explored)
  - b) Ask questions (what questions did we asked | What questions did we replied to?)
  - c) Reflect (I used to think | Now I think)
  
- 4) How to support exploration:
  - a) A lesson plan (prepare an example of your mini lesson plan /activity - introduction, goals, audience, guide to practice, assessment)
  - b) Identify the challenges this activity/lesson plan may face (what could be the most difficult thing in this activity - process, equipment required, complex concepts...

## TEMPLATE HIPOTESIS 2:

### Toolkit Guidelines

Module title:

What are the main components of the Module/Course?

Target audience:

Type: Annual | Semestrial | Module

Curricular (year):                      Extra-Curricular:

ECTS:

Hours (number):

Theoretical

Theoretical-practical

Laboratory

Others

Contact

Autonomous

Total (hours):

Learning Outcomes

- What kind of knowledge and skills/competencies should students acquire by the end of the Module/Course's process of teaching-learning? (Statement - By the end of the Teaching-Learning process, students should be able to...)

#### Contents

- Which contents will the syllabus of this Module/Course cover?  
- What will be the added value of this Module/Course to student training in multidisciplinary fields | STEAM?

#### Methodologies

- What teaching activities/tasks are expected to be implemented during contact hours, throughout the proposed time frame? How about during autonomous work hours?

#### Assessment

- How will the learning outcomes be assessed? Which evaluation methods will be selected (summative, formative | continuous, final)? What assessment tools will be used? What are the assessment criteria and parameters?

#### Resources

- What available or online resources/tools do you recommend?

#### Stakeholders

- Identify stakeholders', institutions or experts, should be involved?

#### Bibliography

- What does the general bibliography include?

## TEMPLATE HIPOTESIS 3:

### Toolkit Guidelines

Title:

What are the main components?

Target audience:

Duration / Hours (number):

Theoretical components (duration):

Practical components (duration):

#### Learning Outcomes

- What kind of knowledge and skills/competencies should students acquire by the end of the toolkit / activity? (By the end of the Teaching-Learning process, students should be able to...)

Theoretical components (description):

Practical components (description):

- What will be the added value of this toolkit to participants training in multidisciplinary fields / STEAM?

#### Methodologies

- What teaching activities/tasks are expected to be implemented?

#### Assessment

- How should the learning outcomes be assessed? Which evaluation methods should be selected (summative, formative | continuous, final)? What assessment tools should be used? What should be the assessment criteria and parameters?

#### Resources

- What available or online resources/tools do you recommend?

#### Stakeholders

- Identify stakeholders', institutions or experts, should be involved?

#### Bibliography

- What does the general bibliography include?

# 06. Evaluation

## Proposed Rubric to review toolkits

Weight (%)	Category	Low	Medium	High
30	Didactic Potential	Learning Outcomes of toolkit are not very clear AND not ambitious enough	Learning outcomes are clear OR ambitious enough	Learning outcomes are clear AND ambitious enough
25	Practical implementation	Toolkit is not possible to implement AND instructions are unclear for use	Toolkit is possible to implement OR instructions are clear for use	Toolkit is easy to implement AND instructions are clear for use
30	Creative/innovative	Toolkit is not very creative or innovative. AND Arts, humanities and sciences are not very well combined	Toolkit is very creative or innovative. OR Arts, humanities and sciences are well combined	Toolkit is very creative and innovative. AND Arts, humanities and sciences are very well combined in a novel way
15	Fun	Toolkit does not seem very fun to use AND it does not stimulate play	Toolkit seems fun to use OR invites playfulness within the subjects	Toolkit seems fun to use AND invites playfulness within the subjects

### NOTE:

Evaluation of educational toolkits will be made by all participants through the pool (23rd at 4.30pm after the final presentation)

Also, on the 23rd all participants including mentors should fill the

### Participant Feedback Form

A google docs form will be sent to all. You can check the form information at:

<https://3.basecamp.com/3975488/buckets/13560399/uploads/2247974383>

Overseers will be judging and nominating teams according to the mentioned criteria (Least Complaining team; Funnier team; Creative overall proposals) and compiling individual votes on the educational toolkit according to criteria defined in the above rubric

# ANNEXES

## D-Day Ice breaker moment (divergent thinking)

**18 JUNE 2020 MORNING**

This is implemented directed by the overseers, through slack, to all participants.

**Challenge:** Object / Team Association Exercise

You have 10 min to fulfil this task

make a list of all the attributes you can assign to this object



- make a list of attributes you have in common with the object
- share your group top 5 associations and the categories on the selection basis.

## Oriented debate

**Between 18 (morning) and 21 of JUNE**

**Duration:** 30 min

**Moderator:** (write down the name of this tool moderator)

**Challenges:**

1. What is your favorite example of a product or thing which required cross-disciplinary collaboration in order to create, and why?
2. What is apparently the most challenging/difficult thing considering the theme?
3. This question is to be answered after the 18th evening parallel public debates) What thrilled your team from what you all heard/saw on the 18th evening presentations?

**Strategy/instructions:**

Debate. Each group should register most relevant comments and conclusions.

# The Hexagram

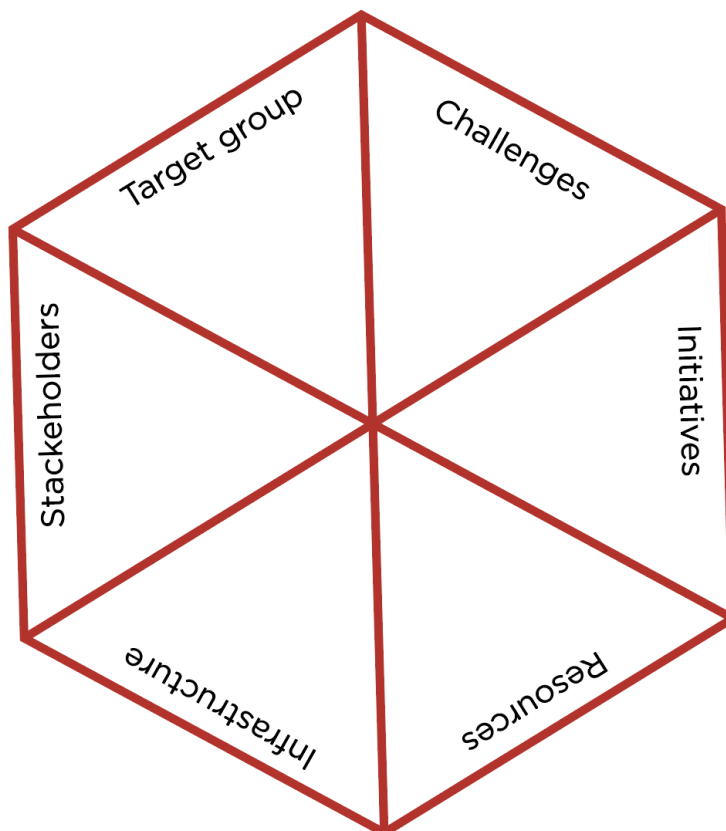
Between 18 (morning) and 21 of JUNE

**Duration:** 30 min

**Moderator:** (write down the name of this tool moderator)

**Challenge:** Define, in collaboration, target publics and identify other components for the course/module or educational tool kit.

**Strategy/instructions:** Fill the diagram by posting your opinion in the different areas of the hexagram.



## Visual thinking

### Between 18 (morning) and 21 of JUNE

As you think to solve the following puzzle, observe your thoughts to the best of your ability:

#### **MONK-ON-THE-MOUNTAIN**

"One morning, exactly at sunrise, a Buddhist monk began to climb a tall mountain. The narrow path, no more than a foot or two wide, spiraled around the mountain to a glittering temple at the summit.

The monk ascended the path at varying rates of speed, stopping many times along the way to rest and to eat the dried fruit he carried with him. He reached the temple shortly before sunset. After several days of fasting and meditation, he began his journey back along the same path, starting at sunrise and again walking at variable speeds with many pauses along the way. His average speed descending was, of course, greater than his average climbing speed.

Prove that there is a single spot along the path the monk will occupy on both trips at precisely the same time of day."

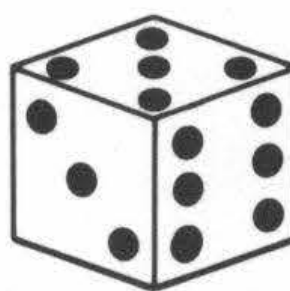
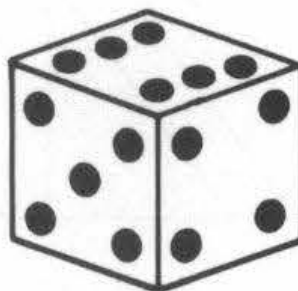
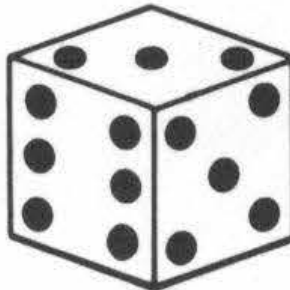
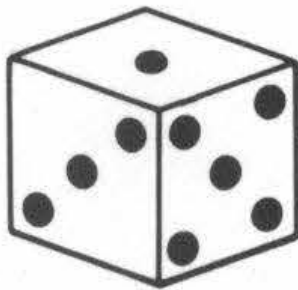
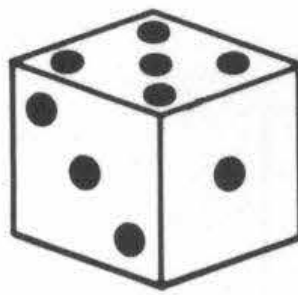
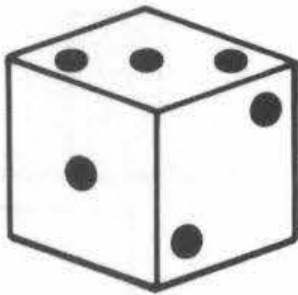
Do as many drawings as necessary, and share your thoughts (through drawing) with your team.

## Divergent thinking

22 JUNE 2020 MORNING

### ROTATING DICE

Examine each pair of dice. If, insofar as the dots indicate, the first die of the pair can be turned into the position of the second one, place a check next to the pair. you have 2 minutes to solve this task.

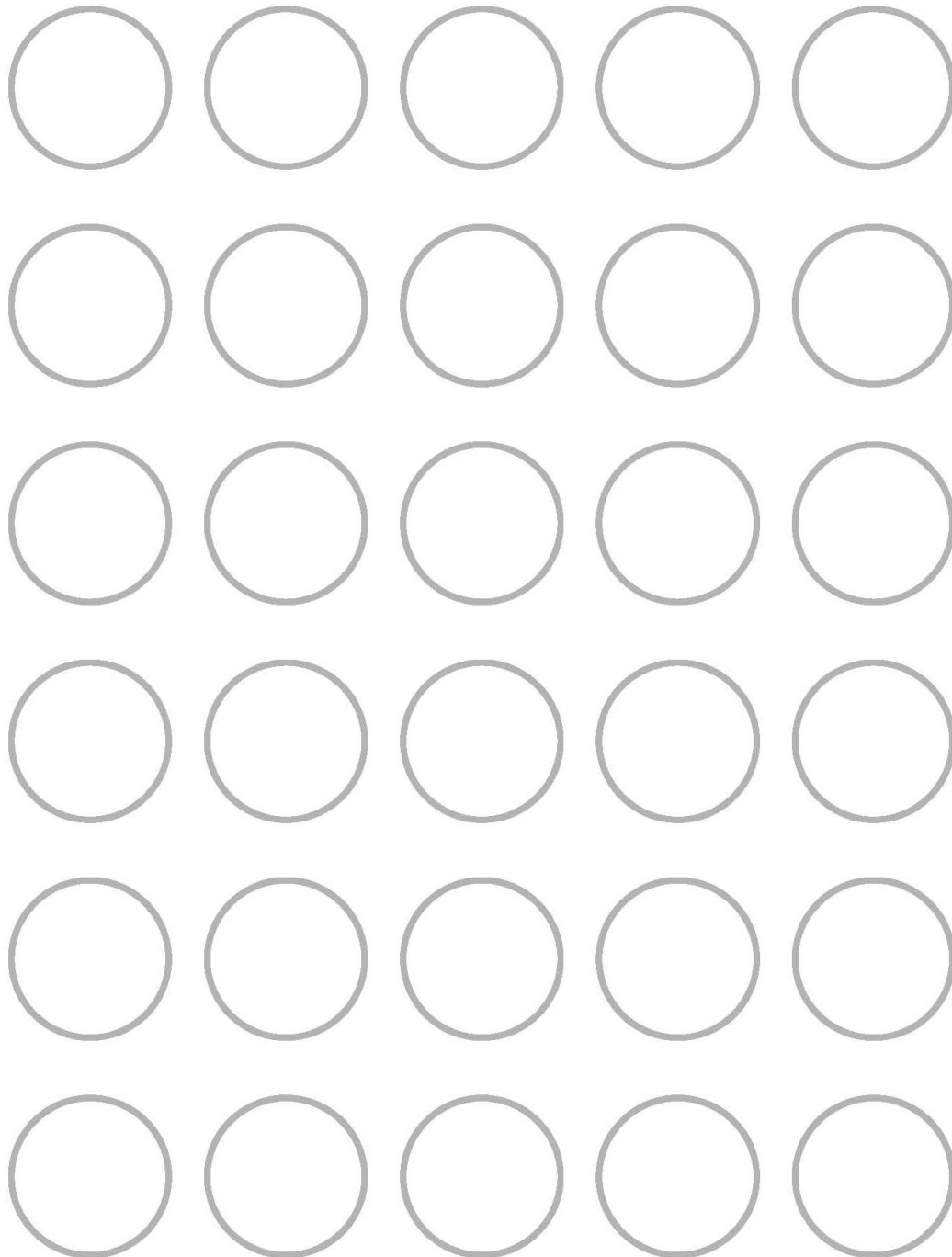


**TEAM 3 FAST FUN preparation text.**

Please read this text in the next 15 minutes.

<b>1960</b>	<b>1962</b>	<b>1964</b>	<b>1966</b>	<b>1968</b>
<b>Males</b>	<b>Males</b>	<b>Males</b>	<b>Males</b>	<b>Males</b>
David	Michael	Michael	Michael	Michael
Michael	John	John	David	David
John	David	David	John	James
James	Robert	Robert	James	John
Greg	James	James	Robert	Robert
Mark	Mark	Mark	William	William
William	William	William	Richard	Mark
Richard	Richard	Richard	Mark	Christopher
Thomas	Thomas	Thomas	Thomas	Richard
Steven	Jeffrey	Jeffrey	Jeffrey	Brian
<b>Females</b>	<b>Females</b>	<b>Females</b>	<b>Females</b>	<b>Females</b>
Mary	Lisa	Lisa	Lisa	Lisa
Susan	Mary	Maisie	Maria	Michelle
Maria	Maria	Maria	Mary	Kimberly
Karen	Karen	Susan	Michelle	Maria
Lisa	Susan	Karen	Patricia	Jennifer
Linda	Linda	Patricia	Susan	Melissa
Donna	Patricia	Donna	Karen	Tammy
Patricia	Donna	Linda	Sandra	Angela
Debra	Cynthia	Kimberly	Deborah	Mary
Deborah	Debra	Elizabeth	Elizabeth	Susan
<b>1961</b>	<b>1963</b>	Angela	<b>1967</b>	<b>1969</b>
<b>Males</b>	<b>Males</b>	<b>1965</b>	<b>Males</b>	<b>Males</b>
David	David	<b>Males</b>	Michael	Michael
Michael	John;	Michael	David	David
John	Michael	James	James	John
James	James	John	John	Robert
Robert	Robert	David	Robert	James
Mark	Mark	Robert	William	William
William	Richard;	William	Mark	Richard
Richard	William	Richard	Richard	Christopher
Thomas	Thomas	Mark	Jeffrey	Mark
Derrick	Kevin	Thomas	Christopher	Brian
Kenneth;	<b>Females</b>	Jeffrey	<b>Females</b>	<b>Females</b>
Steven	Lisa	<b>Females</b>	Lisa	Lisa
<b>Females</b>	Mary	Lisa	Maria	Jennifer
Mary	Maria	Maria	Kimberly	Michelle
Lisa	Sheena	Karen	Michelle	Kimberly
Susan	Karen	Mary	Mary	Maria
Maria	Patricia	Kimberly	Susan	Melissa
Karen	Linda	Susan	Angela	Amy
Linda	Donna	Patricia	Melissa	Mary
Patricia	Sandra	Cynthia	Jennifer	Elizabeth
Louise	Deborah	Linda		Karen
Sandra	Marie	Donna		
Brenda				

**FAST FUN:** In the next 2 minutes, and no more, try to fill as many circles as possible. The aim is quantity not quality. Have fun!



# Exploring the translation of the group's scientific field into other fields (Arts/Humanities...)

**22 JUNE 2020 AFTERNOON**

**Duration:** max 3h

**Challenge:** How to prepare a task/challenge for a diverse group with different knowledge and skills; including persons inside and outside the main Biotech scientific field of this team?

**Strategy/instructions:** discussion; guidelines: approach, time, contents, methods, resources, how to use

**Suggestion tasks:** rewrite a task you commonly give your science students into a broader student's universe, or rewrite the abstract of a scientific text in your team expertise field into a text that can be published in a non-scientific journal (disentangle the jargon!)

make a short newspaper article or press release about a scientific discovery in your field.

how to make short movie about a scientific discovery/fact in your field? A movie such as a "Kurzgesagt" (Very accessible movies about hardcore science topics) or a "ted education"

<https://kurzgesagt.org/youtube/>

or <https://www.youtube.com/watch?v=YI3tsmFsrOg&feature=youtu.be>

<https://ed.ted.com/>

# Make your own toolkit I and II

**23 JUNE 2020 MORNING**

**Duration:** 4h 30 min

**Challenge:** Prepare a final multidisciplinary teaching learning proposal (educational toolkit)

**Strategy:** FOCUS - production/gathering on/off potential teaching material; prepare the final presentation; for guidelines of what to deliver in the final presentation follow the Template Guidelines (1, 2 or 3) or present your own.

## **WHAT MIGHT an EDUCATIONAL TOOLKIT be?**

Educational Toolkit may be a collection of tools, guidance and resources for designing future teaching workshops/classroom scenarios and using them to bring advanced and innovative learning and teaching to the academia/non-formal education. The toolkit helps the user (educator, mentor) to establish a path through the process of innovation into cooperation, creative learning environment.

Authoritative and adaptable resources for front-line staff that enables them to learn about an issue and identify approaches for addressing them. Toolkits can help translate theory into practice and practice into theory, and typically target one issue or one audience. Be daring, create a new definition of what an educational toolkit might be.

## **One example of how to design an effective toolkit:**

1. Give your team the right tools for the job. One of the critical components in executing a content strategy is building out a tailored content toolkit.
2. Design tools around the needs of users (define target audience first).
3. Make sure your content toolkit is easy to use. (clear language)
4. Tools for your content toolkit.
5. Further resources/reading.

# TEMPLATE HIPOTESIS 1:

## Toolkit Guidelines

- 1) the accumulation of stocks of knowledge:
  - a) Main paradigms in your Biotech field of Knowledge
  - b) Seminal readings
  - c) Source of information (most important journals, websites, etc.)
  - d) Main current challenges in your biotech field
  
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  - b) Example of STEM/STEAM close project
  - c) Sources of dialogical information
  
- 3) Metacognition - the changing perception of self as new knowledge, skills, and one's ability to participate in a community of practice are assimilated:
  - a) Visualize thinking and understanding (methods - what methods did your team explored)
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- 4) How to support exploration:
  - a) A lesson plan (prepare an example of your mini lesson plan /activity - introduction, goals, audience, guide to practice, assessment)
  - b) Identify the challenges this activity/lesson plan may face (what could be the most difficult thing in this activity - process, equipment required, complex concepts...

# TEMPLATE HIPOTESIS 2:

## Toolkit Guidelines

Module title:

What are the main components of the Module/Course?

Target audience:

Type: Annual | Semestrial | Module

Curricular (year):                      Extra-Curricular:

ECTS:

Hours (number):

Theoretical

Theoretical-practical

Laboratory

Others

Contact

Autonomous

Total (hours):

Learning Outcomes

- What kind of knowledge and skills/competencies should students acquire by the end of the Module/Course's process of teaching-learning? (Statement - By the end of the Teaching-Learning process, students should be able to...)

Contents

- Which contents will the syllabus of this Module/Course cover?  
- What will be the added value of this Module/Course to student training in multidisciplinary fields | STEAM?

Methodologies

- What teaching activities/tasks are expected to be implemented during contact hours, throughout the proposed time frame? How about during autonomous work hours?

Assessment

- How will the learning outcomes be assessed? Which evaluation methods will be selected (summative, formative | continuous, final)? What assessment tools will be used? What are the assessment criteria and parameters?

Resources

- What available or online resources/tools do you recommend?

Stakeholders

- Identify stakeholders', institutions or experts, should be involved?

Bibliography

- What does the general bibliography include?

# TEMPLATE HIPOTESIS 3:

## Toolkit Guidelines

Title:

What are the main components:

Target audience:

Duration / Hours (number):

Theoretical components (duration):

Practical components (duration):

Learning Outcomes

- What kind of knowledge and skills/competencies should students acquire by the end of the toolkit / activity? (By the end of the Teaching-Learning process, students should be able to...)

Theoretical components (description):

Practical components (description):

- What will be the added value of this toolkit to participants training in multidisciplinary fields / STEAM?

Methodologies

- What teaching activities/tasks are expected to be implemented?

Assessment

- How should the learning outcomes be assessed? Which evaluation methods should be selected (summative, formative | continuous, final)? What assessment tools should be used? What should be the assessment criteria and parameters?

Resources

- What available or online resources/tools do you recommend?

Stakeholders

- Identify stakeholders', institutions or experts, should be involved?

Bibliography

- What does the general bibliography include?