STEAMBRACE

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TEACHER'S GUIDE TO STEAMBRACE ACTIVITIES

- This yellow document is designed to **help teachers better understand how to read and interpret all activities**, as well as how to effectively follow the **STEAMbrace methodology**.
- Serving as a behind-the-scenes guide, these documents mirror the final classroom activities but provide detailed insights for teachers about each part of the process. This ensures that, when it's time to implement the activities or even design their own using the STEAMbrace method, teachers can follow a clear protocol to minimize potential challenges and ensure a smooth execution.
- Below are the different parts of the **STEAMbrace methodology**, which will later appear alongside each section of the template to identify which part of the method each section of the activity refers to.

Phase 0 — Activity Planning

In this section, the activity is introduced and prepared by providing information on the **description of the activity, necessary materials, achievable objectives, ages, difficulty, theme, areas covered, and key competences (EU).**

Phase 1 — Discover and Value

Students are engaged through **challenge presentation, brainstorming, definition of the essential question, and researching the challenge**, aiming to capture their attention, explain **what they will learn, and stimulate recall of prior knowledge.**

Phase 2 — Explore

Students learn the necessary tools to solve the challenge, including the use of ICT, and are provided with clear instructions.

Phase 3 — Develop

Apply a possible solution using the software / Implement the solution
Guided practice / Independent performance

Phase 4 — Think

Students verify the implemented solution and collaboratively evaluate their performance, with additional assessment provided by the teacher, followed by feedback on their work.
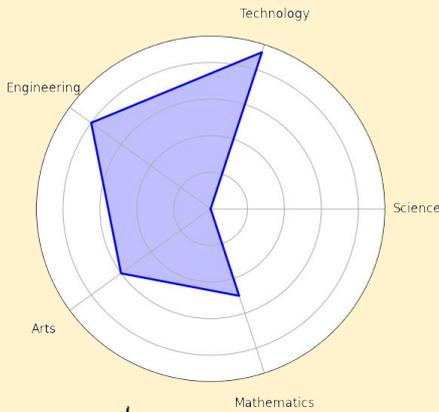
Phase 5 — Share

Students share their work and explore opportunities for **extension and transfer** of their learning to **new contexts**.

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ACTIVITY TITLE

Duration	Age	Difficulty
How long is the activity	For what ages is the activity aimed for	Easy/Medium /hard
TOPICS AND REFERENCES, E.G.: #SCIENCE #EXPERIMENTATION		

You will find a radar graph at the beginning illustrating the relative 'weight' of each STEAM area within the activity. A comprehensive perspective on STEAM cannot be achieved by addressing its disciplines in isolation. In most real-world scenarios, separating these fields is impractical due to their interconnected nature. That's why the themes of the activities are presented like this.

DESCRIPTION

Brief general description of the activity and what are the students going to do.

ACTIVITY OBJECTIVES

- **List of objectives that the activity with its development intends to cover.**

KEY COMPETENCES (EU)

Here will be marked down which of the following key competences of the E.U does the activity tackle:

- Literacy
- Multilingualism
- Numerical, scientific, and engineering skills
- Digital and technology-based competencies
- Interpersonal skills, and the ability to adopt new competencies
- Active citizenship
- Entrepreneurship
- Cultural awareness and expression

- ● Activity Kit
- ● Provided by the teacher/institution
- ● Downloadable Elements

MATERIALS

List of **materials required** for the activity and their **colour reference**

Empty bottle   **White vinegar**   **Baking soda**   **Funnel**   **Printable**
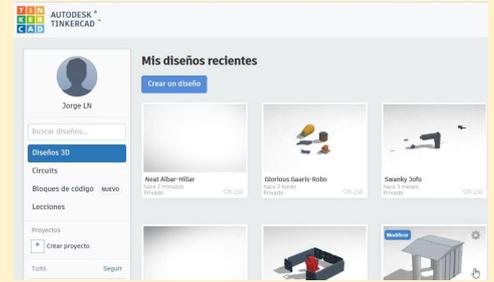
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Phase 0

PREVIOUS PREPARATION

At this point, the guidelines that the teacher must follow in case they need to configure any element, such as creating a work group in Tinkercad or dividing the students in groups„ are outlined.

Phase 1

CONTEXTUALIZATION AND   ADAPTATION

Here goes an **introduction to the activity and a section to give context to what students are going to learn in this session**.

This section provides a **theoretical introduction along with context and motivation** for the activity. Relatable situations are presented to help students connect with their reality, fostering engagement and curiosity to drive the activity forward.

To support our previous statements, each session will introduce problems, issues, or themes within a context that includes **relevant situations and information**, as much as possible. This approach helps students connect with the topic and engage meaningfully with the activity. This will be achieved (when the topic aligns well with this approach) by one or more of the following initiatives proposed to them:

- **Providing introductory content that encourages students to relate the material to their surroundings**

- **Apply what they've learned to real-life situations**

- **Consider other scenarios**

- **Challenge prior assumptions**

- **Reflect on how the topic might impact their future**

You will also find throughout this "teacher's backstage" reminders of **Gagné's** events and examples of how to apply them, as the **STEAMbrace methodology** is inspired by these events along with **challenge-based learning**.

CAPTURE INTEREST

We can start by using one of these three questions:

- What makes the ideal participant in your course feel curious?
- What gives them a sense of self-sufficiency?
- What do they want to achieve in their career?

TELL THEM WHAT THEY ARE GOING TO LEARN

Each lesson should have a clear learning objective. Once we have captured their attention, what powerful, effective, and meaningful learning (for them) are we going to offer?

Tell them what the students will be able to do as a result of this lesson.

STIMULATE RECALL OF PRIOR KNOWLEDGE

Concepts are not learned from scratch; it is very important to highlight prior knowledge to connect it with the new content. Depending on the prior knowledge, the information can be presented in two ways:

- Useful prior information: In this case, we will recall the prior knowledge to prepare them to absorb the new content.
- Incorrect prior information: In this case, we can start from the premise of 'Everything you know about the moon is wrong!' and then present the real knowledge.

Below are some "boxes" of activities and additional information related to the context of the activity that you may find in this section. These are optional, but the facilitator or teacher who wishes to implement them may do so. Depending on the type of activity, these boxes are distinguished by different colors: **classroom supplementary activity**, **complementary tools/exercises**, and **notes for the teacher.** Each of these categories is explained in detail below.

Box for complementary tools and exercises, for example:
Watch video 🎥 - "Video title" + link

Classroom activity 💡

A proposal to the teacher to complement the theory and information that is being given.

Note for the teacher 📝

This box could be used to either give the solutions of "classroom activities" to the teacher or to highlight some important parts of the activity for example things that should be taken into account or tips.

ACTIVITY

Development of the main activity with the objective tools and issues to tackle.

Here may also be used the "**Note for the teacher 📝**" box in order to specify something about the steps of the activity or anything relevant to its development. In this part, you may also find tutorials or complementary activities.

Some **tips** on how to approach this section:

PRESENT THE INSTRUCTION

Depending on the specific learning objective, **the information should be presented differently based on the type of learning**. Some interesting approaches are:

- Present verbal information in small segments.
- Provide relevant graphics to give context.
- Present useless and ineffective attitude options that the student MIGHT adopt (and their harmful long-term effects).
- Present the correct (target) attitude choice (and its long-term benefits).
- Present the concepts (big ideas) that students need to understand to perform the skill.
- Present the tools and resources that students must have to perform the skill.
- Guide students through the specific steps involved in performing the skill.

GUIDED PRACTICE

Whenever possible, **guided practice should be conducted to internalize and correctly use the knowledge presented**.

The important point in guided practice is to make sure you are truly providing guidance and not just asking students to perform the activity on their own, which is the NEXT step.

INDEPENDENT PERFORMANCE

At this point, the student will test the acquired knowledge by performing the activity on their own. Even so, the teacher will provide guidelines and create the necessary space for the student to practice safely.

It is very important for students to perform the skill by themselves because doing so generates a sense of self-efficacy.

CONCLUSION AND SHARING

Closure of the activity, here you may also find the "Classroom activity 💡" box with complementary questions, dynamics, or debate proposals that the teacher may use that are helpful for making conclusions with the participants about the activity and its content.

FEEDBACK

Once the previous phase is completed, it should be determined whether they have successfully performed the activity on their own.

- Self-reflective feedback
- Peer feedback
- Instructor comments
- Automated feedback

EVALUATION

When planning your **lesson evaluation**, don't assume it must be a quiz. For example, in a lesson on baking a chocolate cake, a quiz won't show if students have gathered the ingredients, but a photo of them laid out on the kitchen table would. This also applies to the STEAM activities presented.

There will be boxes with suggestions of evaluation for each activity depending on its dynamic.

EXTENSION AND TRANSFER

Once it is determined that the participants have indeed achieved the intended learning, they should be encouraged to use their learning in **other contexts**.

Also, the project's **social media** will be linked in this section in case whoever makes the activity wants to share their results. They will be presented like this:

LinkedIn

Instagram

X

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PROJECT EVALUATION

This section is reserved for activities of a **curricular** nature. The following table outlines the **activity objectives**, the **corresponding EU key competencies** for them, and the **general evaluation criteria** for each objective. An example is shown below:

Activity Objectives	Key Competences (EU)	Evaluation Criteria
Foster interest in new technological tools	Digital and technology-based competencies	Digital and technology-based competencies The student shows enthusiasm and engagement when exploring digital tools for animal classification and is interested in learning more about the technology used, researching on his/her own or asking relevant questions.
Develop scientific curiosity	Numerical, scientific, and engineering skills	Ability to formulate questions about the characteristics of animals and reflect on the scientific implications of the activity. Compares and reflects on the results obtained when classifying animals, and identifying patterns and differences.
Understand the concept of decision trees and their use		The student contributes to the construction of a coherent and well-structured decision tree. He/she is able to adjust the decision tree according to new samples or data presented. Shows understanding of the use of decision trees as a tool for classifying information.

BIBLIOGRAPHY AND REFERENCES

The bibliography section is dedicated to activities that cover topics—particularly in the introduction—that present a large amount of information requiring verification. In such cases, the sources from which the information was obtained are provided.