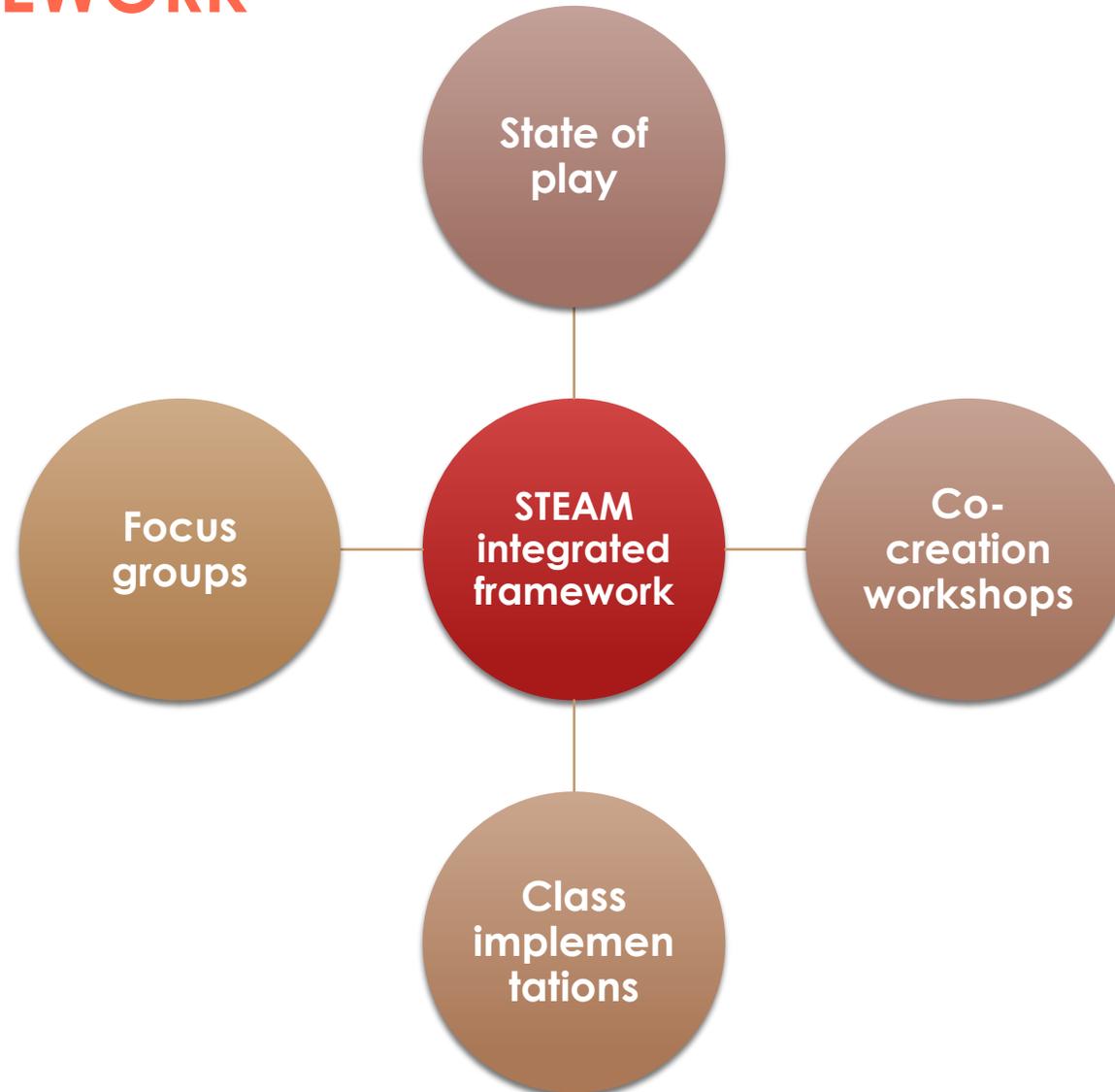# 3RD STE(A)M IT WORKSHOP
STE(A)M INTEGRATED FRAMEWORK – PATHWAYS TO STEAM EDUCATION

PATHS TO STEAM INTEGRATION
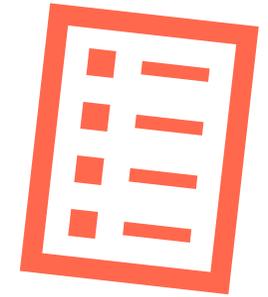
ROAD TO FRAMEWORK

SCOPE & VISION

- **Bring STE(A)M Integrated teaching/learning to the European Classrooms**

- **Support all key stakeholders**

- **Provide an evidence-based, practical, modular, easy to use framework**

STRUCTURE

- **Introduction**
  - Who is the framework for and what does it have it offer?
  - Methodology
- **Overview of the STE(A)M IT integrated framework**
  - Structure
  - How to use it
- **Understanding STEAM Integration**
  - What & why?
  - Real-world challenges
  - Pedagogies
  - 21st century skills

- **STEAM Integration in the European classroom**
  - Learning scenarios
- **CPD and learning opportunities**
  - MOOCs
  - STEM careers
- **Recommendations**
  - Recommendations for main stakeholders
  - Extensions

RELEVANT STAKEHOLDERS – TEACHERS IN PRIMARY AND SECONDARY EDUCATION

- The Framework is relevant for Primary school teachers who traditionally teach all the subjects in one class they are assigned to.

- Primary school education can accommodate integrate STEM teaching due to the lack of specialization.

- Secondary school teachers teach older students who are able to understand more complex notions but cannot contextualize and fully link STEM subjects to real-life problems or careers for their future.

- The same time, teachers need access to information and resources compiled together in one place and this Framework combined with all the resources produced by the project, aspires to provide that.

WHO IS THE FRAMEWORK FOR?

TEACHERS OF PRIMARY OR SECONDARY

We expect head of schools in countries with significant school autonomy, to find within the framework practical information of the benefits of STEAM integrated teaching and learning and guidance on the steps they can follow to introduce this in within their school.

In schools where school autonomy is limited, we still expect that head of schools will find that the use of STEAM integrated teaching and learning offers many opportunities for teachers' professional development, promotes collaboration and peer learning, and in addition, it can be used within existing topics e.g., related to environmental education.

HOW TO NAVIGATE THE FRAMEWORK IF YOU ARE A TEACHER?

METHODOLOGY
Read about the steps followed that led to this publication: theoretical analysis, literature review, work with teachers, implementation process, capacity building program and quality assurance.
PAGE 5 TO 8

UNDERSTANDING STEAM INTEGRATION
What is STEM integration, reasons to choose for it, real-world challenges, pedagogical approaches that promote STEAM integration, STEM contextualisation, 21st century skills.
PAGE 8 TO 12

RECOMMENDATIONS
Recommendations and tips for stakeholders, Framework extensions
PAGE 17 TO 18

STEAM INTEGRATION IN THE EUROPEAN CLASSROOM
Master Learning Scenario, Primary Education examples, Secondary Education examples.
PAGE 12 TO 16

CPD (CONTINUOUS PROFESSIONAL DEVELOPMENT) AND LEARNING OPPORTUNITIES
MOOCs (massive open online courses) and STEM Careers.
PAGE 18 TO 19

CONCLUSIONS AND WAYS FORWARD
PAGE 20

The above-mentioned recommendations are based on what could potentially interest the different readers of the framework. Nevertheless, every reader should feel free to read the entire publication should they want to.

STEAM IT
AN INTERDISCIPLINARY STEM APPROACH

RELEVANT STAKEHOLDERS – HEAD OF SCHOOLS

▪ Integrated STEM teaching highlighted that when teachers collaborate, they maximize the results of their input

▪ In addition, integrated STEM teaching largely relies on collaboration between students, use of Project-Based Learning activities and Inquiry-Based Science Education.

▪ Having successfully implemented integrated STEM learning scenarios, the next challenge is to adopt the method at school level, engaging as many stakeholders as possible.

▪ Head of schools, whether active teachers or not, will have the opportunity to learn how it can be adopted in order to reach everyone.

RELEVANT STAKEHOLDERS – EDTECH SECTOR AND RESEARCHERS

- The EdTech sector, other industry representatives and researchers who have expertise in one domain usually, will use the Framework to understand how the right research questions and focusing on STEM careers while at school will result in a highly skilled workforce.

- With the current examples of learning materials produced and the overall results of the implementations, industry representatives and researchers that do not closely follow up with the developments in education will have the opportunity to learn how they can support schools more efficiently.

RELEVANT STAKEHOLDERS – POLICY MAKERS

- The lack of a common education system throughout Europe makes it difficult even for the most engaged policy makers in the sector, to follow with all the developments.

- The Framework will provide concrete, cohesive examples about the value and impact of integrated STEM teaching.

- By navigating the document, policy makers will be able to quickly identify all the relevant stakeholders that will help them contextualize and promote the adoption of the method on a larger scale (formally in the curriculum) in cooperation with the regional or national authorities.
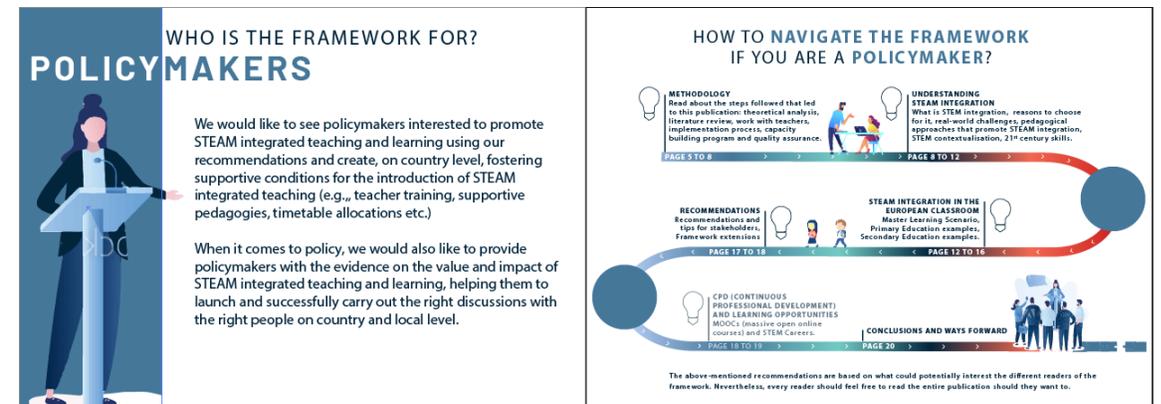
FROM THEORY TO PRACTICE

- An extensive literature review and a SWOT analysis took place in the beginning of the project.

- They resulted to the Deliverable 2.1 Integrated STEM Teaching State of Play.

- The aim of the publication was to provide an overview of the existing scientific and grey literature research on the topic while laying the foundation for the development of the **first Integrated STE(A)M education framework**.

FROM THEORY TO PRACTICE – WORKING WITH PILOT TEACHERS
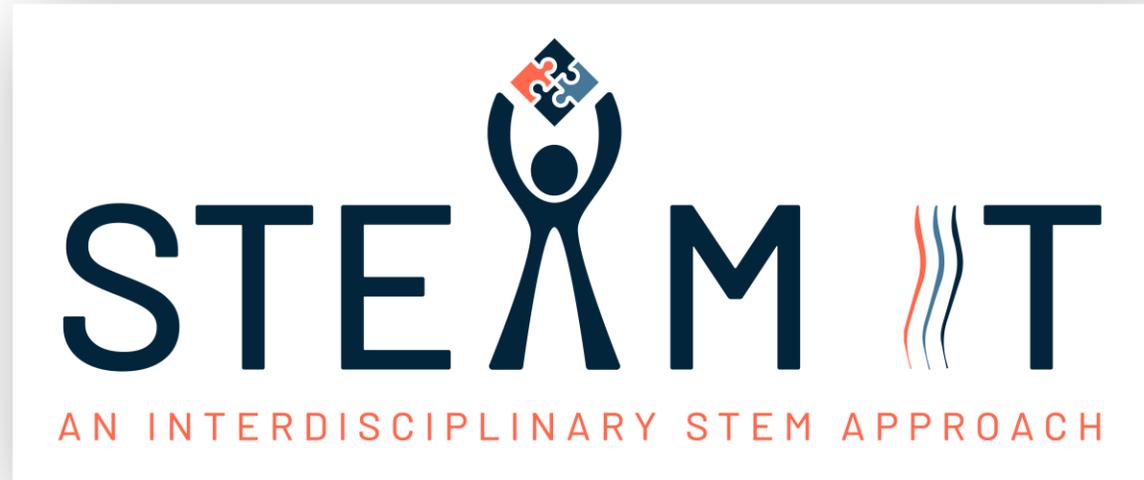
Positive feedback

- Teachers in Primary thought that integration should start **early on** when there is still significant time to design the relevant activities.

- This way, students will be familiar with the method already and will not face difficulty in exercising their critical thinking and analytical skills once they transition to Secondary school.

- The learning products as an outcome was an assessment method that students were looking forward too; it gave them a sense of accomplishment.

- In several occasions the original LS were modified and adapted, but wonderfully complemented to reflect the needs of each class.

Challenges

- In addition to integrated STEM teaching being a relatively new development in education, problems in accessing relevant materials were caused by the pandemic.

- There is a scarcity of materials to be used for integrated teaching and they can be found mainly online but not in a repository or a dedicated space. This is demotivating for teachers and combined with the lack of (continuous) training, teachers hesitate to engage more.

- There is generally a need for effort on behalf of teachers, especially if in Primary where students don't possess ''general knowledge'' or in Secondary if the topic examined is too complex.

STE**A**M **I**T

AN INTERDISCIPLINARY STEM APPROACH

HOW DID WE ARRIVE TO THESE CONCLUSIONS? PROCESS SO FAR

March 2020
Start the creation of the first drafts of learning scenarios

May 2020
All revised draft LS ready and beginning of the 1st implementation phase

September 2020
End of 1st implementation phase

October 2020
Interview with Lead Teachers and Focus Group discussions

January – May 2021
Testing of learning scenarios by other teams

April-May 2021
Focus Group discussions

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