



COURSE DESCRIPTION

From STEM to STEAM: Integrating Art into STEM Education

Five days adding art to a STEM unit you already teach, one phase of the 5E model per day, so that students care about what they build as well as how it works.

DURATION 5 days · 25 hours	LANGUAGE English (B1+)	GROUP SIZE Max 20 participants
DAILY SCHEDULE 09:30–15:00 Monday to Friday, with a break for lunch	AUDIENCE All school levels No specific prerequisites — open to all teachers and school staff.	CERTIFICATE Attendance + Europass Mobility
COURSE CENTRES Antalya · İstanbul · İzmir · Mersin · Budapest · Bremen · Rome Dates and cities of the scheduled sessions are listed on the course page.		

01 Overview

Your STEM lessons already work. This week is about what the art actually adds, and where exactly it belongs in a unit you teach yourself.

- **Monday** — you turn one of your own curriculum topics into a question worth weeks of work, and design the moment that opens it.
- **Tuesday** — you build the investigation in the route your own classroom can actually run, and see what the other route would have looked like.
- **Wednesday** — you plan how students explain what they found by making something rather than writing about it.
- **Thursday** — you set the challenge that makes them use the idea somewhere new, and name the colleague you need for it.
- **Friday** — you write the marking criteria, then apply a colleague's criteria to a quick piece that colleague made as a learner earlier in the week, which is where a rubric that rewards neatness shows itself.

You go home with a two-to-three-week unit outline for a topic you already teach, one phase written out in full, and the artefact brief that goes with it. You declare on the first morning which route your classroom can run — with devices or without — and build every phase in it, so nothing here depends on your school owning a set of laptops.

02 Course description

An MP3 player, John Maeda once pointed out, was pure STEM technology from the day it launched — chips, code, engineering, nothing more. “But until Apple came along, it didn’t become desirable.” That gap is the whole argument for the A in STEAM. Maeda led the STEM-to-STEAM movement while president of the Rhode Island School of Design, and he put the reason plainly: STEM on its own “doesn’t create warmth and humanity and connection.”

Agreeing with that is easy. Teaching it on a Tuesday morning is not, and this is where most STEAM courses stop — at the argument, without a sequence. So the week runs on one. The BSCS 5E Instructional Model was developed by Biological Sciences Curriculum Study in the late 1980s, and it is still one of the most widely used instructional sequences in science teaching. Engage, explore, explain, elaborate, evaluate — one phase per day. Participants work through each phase as learners first, then write that phase of their own unit before the day ends.

Two rules come from the model’s own authors, and both are commonly broken. A phase is not optional and the order is not negotiable — the research behind the sequence found reduced effectiveness when phases were dropped or moved. And it was never meant for a single lesson. Rodger Bybee, who led the team that built it, puts its working scale at a unit of two to three weeks. What participants design here is a unit, not a one-off activity.

The art is not an extra day. Each phase has a place where making something is how the thinking gets done: an object or image that creates the puzzle in the engage phase, an archive to investigate in the explore phase, a built explanation instead of a written one in the explain phase, a prototype in the elaborate phase. Three tools carry that work — Google Arts & Culture as an archive, Scratch for explanations that move, Tinkercad for things that have to be modelled in three dimensions. Each one sits in the phase it actually serves rather than in a “digital tools” day of its own.

The week is built for both sides of the hyphen. A science teacher with no art training designs the making tasks and keeps the science claim in view; an art or humanities teacher works from their own subject and identifies the STEM colleague the unit will need — Thursday is where that colleague is named and what to ask them for is worked out.

Schools are not equally equipped, so the route is chosen rather than assumed. Participants say on the first morning what their classroom really has and build every phase in that route — the tool route if there are devices, the physical route if there are not — with the alternative shown alongside so the choice stays visible. The physical route is not a lesser version. The explore phase was never defined as a screen activity in the first place — a paper model, a storyboard or a scale drawing does the same work as its on-screen equivalent. No one finishes the week with a unit their own school cannot run.

The last day takes on the question art integration actually fails on: how do you mark a Scratch animation or a 3D model for what the student understood, rather than for how good it looks? Participants write the criteria, then try to apply a colleague’s criteria to a quick piece that colleague made as a learner earlier in the week — which is usually where a rubric turns out to be measuring polish.

03 Learning outcomes

- 01 Sequence a STEAM unit through all five phases of the BSCS 5E model, in the order the model specifies.
- 02 Place an artistic or design task inside a phase because it does the thinking there, not as decoration at the end.
- 03 Build every phase in the route your own school can run — with digital tools or with physical materials — and know what the other route would have required.
- 04 Use Google Arts & Culture, Scratch and Tinkercad for the specific jobs they are good at, rather than as a general “technology” add-on.
- 05 Write assessment criteria that judge what a made artefact shows about understanding, not how finished it looks.
- 06 Leave with a two-to-three-week STEAM unit outline for a topic you teach, with one phase written out in full and its artefact brief attached.

04 Methodology

Live the phase before you design it	Each day opens with participants working through that day's 5E phase as learners, so the sequence is experienced before it is planned.
Your own curriculum topic, all week	Every participant works on one topic they actually teach, brought from home, rather than a demonstration example — the unit that leaves with them is for a real class.
Your route, declared on day one	Participants say on the first morning what their classroom genuinely has, then build every phase in that route — with the alternative shown alongside, so the choice stays visible. The finished unit is one their own school can run.
The tool sits in the phase it serves	Google Arts & Culture for investigation, Scratch for explanation, Tinkercad for prototyping — introduced where the unit needs them rather than in a separate technology session.
Marked by a colleague, not by the trainer	The criteria you write are applied by someone else, and you apply a colleague's — which is where a rubric that rewards polish over understanding shows itself.

05 Daily programme

Day 1

Engage: the puzzle, and why the A is not decoration

- **Warm-up:** an object is passed round with no explanation — participants meet the group by arguing about what it is for, which is the engage phase happening to them
- Maeda's argument in his own words, and what it does and does not claim: art as the thing that makes STEM matter to people, not as a way to make lessons prettier
- **The BSCS 5E model end to end:** what each phase is for, why the order is fixed, why phases are not optional
- Why engage is the shortest phase and why it is not a pre-test — Bybee's own caution, and what teachers do instead
- **Declaring your route:** each participant states what their classroom actually has, and fixes the topic and driving question their unit will run on
- **Build:** draft the engage phase of your own unit, including the object, image or sound that opens it

Day 2

Explore: investigating an archive

- **Warm-up in new pairs:** two minutes each to describe something in your own subject that a photograph could not explain, then pairs merge into fours and pick the hardest one — regrouping the room before the day's investigation
- One painting, no caption — what can be established from evidence alone, and what is only a guess
- What makes an activity an investigation rather than a demonstration, and how to tell the two apart in your own plans
- Google Arts & Culture as a source of primary material: high-resolution artefacts examined for the science, engineering or mathematics inside them
- **The physical route:** the same investigation with printed images, objects and measurement by hand

- **Build:** draft the explore phase, with the evidence students will collect and the form they will record it in
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Day 3

Explain: building the explanation instead of writing it

- Explaining a process using only movement or drawing, no words — then comparing what survived
 - **The explain phase is student-led first:** how to hold back the vocabulary until students need it
 - **Scratch as an explanation tool:** an animation that has to be sequenced correctly to work, which makes a wrong model visible
 - **The physical route:** a comic strip, a flip-book or a demonstrated sequence doing the same job
 - **Quick piece:** each participant makes a short explanation of one idea from their own topic, in their own route — an animation, a comic strip or a flip-book — and keeps it for Friday's cross-marking
 - **Choosing the form:** what a diagram, an animation, a model or a narration each reveals and each hides about student understanding
 - **Build:** draft the explain phase and decide the artefact your students will produce
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Day 4

Elaborate: transfer, prototypes and the second teacher

- The same concept in a completely new situation — how far can it travel before it breaks
 - What makes an elaboration challenging but achievable, and why this is the phase most often cut for time
 - **Tinkercad for prototyping:** modelling a solution in three dimensions when the constraint is real and the design has to answer it
 - **The physical route:** card, paper and scale drawing under the same constraints
 - **Quick piece:** a rough prototype for one constraint from your own topic, in your own route, also kept for Friday
 - **The second teacher:** which colleague your unit genuinely needs, and what you would ask them for
 - **Build:** draft the elaborate phase and the cross-subject connection your unit rests on
 - **Close:** choose which of the phases you have drafted this week you will write out in full tomorrow, and note what you still need for it
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Day 5

Evaluate: marking understanding, not polish

- Two student artefacts, one beautiful and one crude — participants try to agree which shows more understanding
- Writing criteria a student can read and use, separating the science claim from the craft
- **Cross-marking in fours:** each participant applies a colleague's criteria to a quick piece that colleague made, on their own topic, as a learner on Day 3 or Day 4, then the four compare where the criteria failed them
- Two cases brought to the whole group, chosen for what they expose rather than for how well they went
- **Writing block:** the phase chosen yesterday is written out in full with its artefact brief, the criteria are revised against what cross-marking exposed, and the unit outline is completed

- Course evaluation, certificates and course documents

PLEASE NOTE

Sessions run from 09:30 to 15:00, Monday to Friday, with a break for lunch. Timings can shift a little to suit the venue and the group.

Course activities and content may vary depending on participants' needs and the trainer leading the session; any changes are at the trainer's discretion. If there is a specific topic you would like included, please let us know — content-related requests must reach us at least 3 weeks before the course start date so we can confirm them in time.

06 Materials

- The BSCS 5E Instructional Model: Origins and Effectiveness (Bybee et al., 2006, BSCS) — the phase descriptions and the research behind the sequence, worked through during the week.
- Rodger Bybee's own reflections on the model, including his cautions on phase order and working scale.
- John Maeda's STEM-to-STEAM interview, read in full on Day 1 rather than quoted second-hand.
- A blank five-phase unit template with a reference column showing what the alternative route would have required, filled in day by day and taken home completed.
- Google Arts & Culture, used as an archive of high-resolution primary material during the explore phase.
- Scratch, used to build explanations that have to run in the right order to work.
- Tinkercad, used to model solutions in three dimensions during the elaborate phase.

07 How to prepare

- Bring one topic you actually teach — the unit you build during the week will be for that topic and that class.
- If you can, have the curriculum or syllabus text for that topic with you — a photo or printout of the relevant page is enough. If you cannot get hold of it, we work from what you know on Day 1.
- Know what your classroom really has: how many devices, whether students can log in, and what physical materials you can get hold of. The week is designed around your answer, so an honest one is more useful than an optimistic one.
- Bring a laptop if you can. Google Arts & Culture needs no account. Scratch runs in the browser without one too, but it cannot save your work to the web unless you sign in — so if you take the tool route, either create a free Scratch account before you travel or plan to download anything you make to your own computer. On the physical route you will not need it. Tinkercad also asks for a free account, so if you are on the tool route, setting that up in advance saves time on Day 4.
- Nothing needs to be bought or installed beyond that.

08 After the course

- Participants will receive their Certificate of Attendance and the co-signed Europass Mobility document.
- Participants will complete a general course evaluation and event survey.
- Participants will receive course materials, videos, photos, and PDF documents in both digital and print formats.
- Follow-up support: self-evaluation materials are provided. Depending on the group, an email group may be set up so that participants can keep exchanging ideas.

09 Why this is Erasmus+ eligible

The Erasmus+ Programme Guide names digital transformation as a horizontal priority, stating that "the Erasmus+ programme plays a key role in supporting citizens of all ages in acquiring the digital skills and competences they need to live, learn, work, exercise their rights, be informed, access online services, communicate, critically consume, create and disseminate digital education content" (Erasmus+ Programme Guide 2026, Part A – Priorities of the Erasmus+ Programme, p. 8).

10 What the course fee covers

INCLUDED IN THE COURSE FEE

- 25 hours of training and course materials
- Certificate of Attendance + Europass support
- On-site local support throughout the week

ARRANGED SEPARATELY BY THE PARTICIPANT

- Travel to the host city — invitation letter on request
- Accommodation — we share recommended options
- Travel & health insurance

ISSUED BY

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COURSE PAGE

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ABOUT ERASMUS MOBILITY ACADEMY

Erasmus Mobility Academy (OID: E10304561) is an Erasmus+ training provider offering professional development courses for educators, school staff and youth workers across Europe. Our courses are designed for international mobility — open to participants travelling from a country other than the host country — and support schools in building lasting institutional capacity. We provide structured learning, logistical guidance and certification with Europass.