CREATIVE DIGITAL PRACTICES FOR INCLUSIVE STEAM LEARNING

2026

Savvy Tech Toolkit

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#INCLUSION
#ENTREPRENEURSHIP

FROM SELF TO STARTUP. INCLUSIVE LIFE DESIGN FOR FUTURE ENTREPRENEURS.

Learning outcomes

Students will:

- Identify personal strengths, talents, and aspirations using coaching tools and reflective exercises.
- Strengthen teamwork, empathy, and inclusive thinking through creative collaboration.
- Use foresight and design thinking methods to connect personal values with social and entrepreneurial goals.
- Develop basic entrepreneurial and digital skills through STEAM-based visual tools.
- Create and present inclusive business ideas using intuitive, free digital platforms.

Main subject	Entrepreneurship and Personal Development
Related subjects	ICT, Social Sciences, Art & Design, Psychology, Career Guidance
Total time	5 sessions (corresponding to the 5E process) x 60 minutes each + 2 hours of independent group work
Number of students	15–20
Age group	16–25 years old (VET learners, NEETs, or vulnerable youth)

The activity in a nutshell

Introduction	The activity guides young and vulnerable learners through a journey of self-discovery and inclusive entrepreneurship. Using life-coaching techniques (Wheel of Life, metaphoric cards, foresight visioning) and creative prototyping tools (LEGO® Serious Play®, digital whiteboards and visualization platforms), participants identify their personal and professional aspirations and transform them into an inclusive business idea. They learn to visualise their talents, recognise their potential contribution to society, and express their ideas through digital storytelling tools such as Canva, Genially etc. The activity promotes self-awareness, creativity, employability, and entrepreneurship within a STEAM and inclusion framework.
Resources/ Equipment/ Materials	Coaching tools: printed Wheel of Life, metaphoric cards (e.g. Dixit or other visual metaphors). Creative materials: LEGO® bricks (for Serious Play prototyping) or alternative materials, as described in the "other information" section; post-its; markers. Digital tools: Miro or Padlet → brainstorming and idea mapping Canva → visual storytelling and concept development Genially → final presentation and pitch design Internet access, projector, and laptop/tablets for group work.
Prior Knowledge	Basic digital literacy and collaboration skills. No previous entrepreneurial knowledge required.
Pedagogies Used	Project-Based Learning Design Thinking Learning by Doing Life Coaching and Positive Psychology Foresight / Future Thinking Collaboration and Peer Feedback

5E Model activity planning

Phase	Procedure	Time
Engagement	"Who am I today?" Learners use the Wheel of Life to assess satisfaction across different life areas (career, creativity, relationships, learning). They then select one or more metaphoric cards to represent their dreams, fears, and strengths. In Padlet or Miro, each participant uploads their chosen card or keywords, creating a collective "map of aspirations". This phase helps participants visualise who they are and what motivates them.	60'
Exploration	"Imagine your future." Using a foresight-based exercise ("You in 5 years"), students visualise their desired future. With Miro/Canva Whiteboard, they create a mind map of their envisioned life, identifying values, skills, and unmet community needs. The facilitator supports connections between personal values and inclusion: "Who could benefit from your ideas?". Teams are based on shared goals.	60'
Explanation	"From self to idea." The educator introduces entrepreneurship as a tool for inclusion, showing examples of social enterprises via short videos. Teams explore their business idea using Business Model Canvas. They fill in simple sections—problem, solution, beneficiaries, value, key partners—guided by questions such as "How can your idea include others?"	60'
Extension	"Build your idea." Each team creates a physical prototype of their inclusive enterprise using LEGO® Serious Play®. Every brick represents a stakeholder, resource, or value. They take photos of their models and transfer them into a visual business plan via Canva or Genially. Optionally, teams can create a digital mock-up of their product/service.	60'
Evaluation	Pitch and reflect." Each team presents its business prototype through a 2–3-minute digital pitch made in Pitch.com or Genially. Peer evaluation follows, based on creativity, inclusiveness, and feasibility. Learners then complete the "My Path Forward" reflection sheet (3 questions: What did I learn? What talent did I discover? What is my next step?). To close, they choose a metaphoric card symbolising their next action toward employability.	60'

Impact maximization and further info

Final Product/ Outcome	A LEGO® prototype representing the inclusive business concept. A digital pitch (poster, presentation, or short video) created with Canva or Genially. An individual Wheel of Life reflection map documenting personal learning and growth.
Reflection and self-evaluation for students	"My Path Forward" worksheet (printed or digital on Padlet). Final metaphoric card reflection: each participant explains the meaning of their chosen card as a metaphor for future action. Optional self-assessment form via Google Forms or Mentimeter to evaluate growth in creativity, self-awareness, and inclusion.
Assessment	Pre-assessment: Miro or Padlet ("What do I know / want to know about entrepreneurship and inclusion?"). During: Observation checklist and peer feedback (collaboration, creativity, empathy). Post-assessment: Rubric evaluating the final product's inclusiveness, innovation, feasibility, and team collaboration.
Other information	If LEGO® Serious Play® kits are not available, the prototyping phase can be easily implemented using low-cost and accessible materials that still allow tangible representation of abstract ideas. Learners can use recycled materials such as cardboard, paper, wire, corks, clay, or modular building blocks (e.g., Jenga pieces, wooden cubes, bottle caps, or craft sticks). Remember: the key objective is not aesthetic perfection but the capacity to symbolically express concepts, relationships and values through physical creation.

#CREATIVITY

DISCOVERING SCIENCE THROUGH CREATIVE DESIGN

Learning outcomes

- Consolidate their understanding of STEAM concepts such as geometry, symmetry, and proportion through creative tinkering and exploration.
- Apply observation and design skills to represent natural scientific patterns artistically.
- Use digital tools to enhance and communicate their discoveries through visual storytelling.
- Strengthen inclusion, collaboration, and environmental awareness by connecting science and art.
- Reflect on how creativity deepens understanding and emotional engagement with scientific concepts.

Main subject	Art and Natural Sciences
Related subjects	Mathematics, Biology, ICT, Environmental Education
Total time	90' (consolidation activity)
Number of students	15 - 25
Age group	14 - 18 years old (VET learners, NEETs, or vulnerable youth)

The activity in a nutshell

Introduction	This consolidation activity, grounded in the tinkering methodology, helps learners reinforce previously introduced STEAM concepts — geometry, proportion, symmetry, and the relationship between natural patterns and scientific laws — through creative and reflective practice. Learners observe or photograph natural forms (leaves, shells, flowers, stones), recreate them through drawing or digital design, and then narrate their learning journey using digital storytelling. The activity integrates both analytical and creative thinking, allowing students to transform knowledge into expression and strengthen retention through multisensory, hands-on learning. It is short, accessible, and inclusive — ideal as a follow-up or reflective workshop after a module on natural geometry, biomimicry, or STEAM observation.
Resources/ Equipment/ Materials	Natural objects (leaves, shells, stones, flowers, etc.) Drawing tools: paper, pencils, markers, compass, ruler Digital tools: Smartphones or tablets with camera Canva → digital design or poster composition Genially → simple digital storytelling (photo + short captions) Padlet → collective gallery for final sharing Internet connection, projector (optional)
Prior Knowledge	Basic computer skills and understanding of key STEAM concepts (shape, symmetry, proportion, natural patterns).
Pedagogies Used	Tinkering (hands-on creative exploration and learning from mistakes) Learning by Doing Art-Based Learning Digital Storytelling Reflective and Collaborative Learning

5E Model activity planning

Phase	Procedure	Time
Engagement	The facilitator briefly revisits prior knowledge on geometry and symmetry in nature, showing 3–4 examples (shells, honeycombs, snowflakes). Short group reflection: "Where have we seen these patterns before?" Learners share quick ideas or images on Padlet.	10'
Exploration	In line with tinkering principles, students experiment freely: they observe a natural object, photograph or sketch it, and begin to recreate it using geometric shapes. Mistakes and improvisation are encouraged — the goal is exploration, not perfection.	20'
Explanation	The facilitator connects observation with scientific principles (e.g. energy balance). Students then reproduce part of their sketch digitally in Canva, experimenting with color, symmetry, and repetition to visualize what they learned.	15'
Extension	Students create a mini digital story (1–2 slides) in Genially showing: • Their photo or sketch of the natural pattern. • Their digital artwork. • 2–3 lines describing what scientific concept they recognized and how creativity helped consolidate their understanding. • All stories are uploaded to a shared Padlet gallery.	30'
Evaluation	Students watch each other's digital stories and leave brief comments or emoji reactions on Padlet. A short reflective closing question is shared orally or on-screen: "What scientific idea do I now understand better thanks to this creative activity?".	15'

Impact maximization and further info

Final Product/ Outcome	A creative eco-pattern artwork (handmade and/or digital). A short digital story summarizing scientific understanding and creative process. A shared digital gallery (Padlet) for collective reflection and peer appreciation.
Reflection and self-evaluation for students	Short written reflection: "How did creativity help me remember and better understand STEAM concepts?"
Assessment	Pre-assessment: Quick oral recap or quiz on prior STEAM concepts. During: Observation of engagement and creativity during exploration. Post-assessment: Rubric combining scientific understanding, creativity, and storytelling clarity.
Other information	Rooted in the tinkering methodology, this consolidation activity reinforces previous learning through a creative, multisensory approach. It transforms abstract STEAM concepts into tangible and emotional experiences, promoting both comprehension and inclusion. It can serve as a reflective session at the end of a STEAM module or as part of a cross-disciplinary workshop.

#CREATIVITY
#ENTREPRENEURSHIP

CREATIVE THINKING LAB. FROM IDEAS TO ENTREPRENEURIAL SOLUTIONS

Learning outcomes

Students will:

- Apply structured creative thinking techniques to generate innovative ideas.
- Develop an entrepreneurial mindset by identifying needs and proposing solutions.
- Use the Six Thinking Hats methodology to explore ideas from multiple perspectives.
- Experiment with visual prototyping using low-cost materials (tinkering approach).
- Use simple digital tools to present and communicate an entrepreneurial concept.
- Strengthen teamwork, problem-solving, and communication skills.

Main subject	Entrepreneurship
Related subjects	Creativity, Communication, ICT, Social Sciences
Total time	120 minutes
Number of students	15–20 (teams of 3–4 participants)
Age group	16–30 years old

The activity in a nutshell

Introduction	This activity introduces entrepreneurship through a structured creativity approach based on the Six Thinking Hats methodology and the tinkering framework. Learners explore everyday challenges, generate ideas collaboratively, and transform them into simple entrepreneurial concepts using low-cost materials and intuitive digital tools. By experimenting with multiple thinking perspectives and visual prototyping, participants discover how creativity can lead to innovative and practical solutions. The activity promotes inclusion, confidence, and problem-solving skills, showing that entrepreneurship can be accessible.
Resources/ Equipment/ Materials	Physical materials (low cost) • paper sheets, sticky notes, scissors and tape • coloured markers • recycled materials (cardboard, magazines) • printed Six Thinking Hats template (optional) Digital tools (free) • Canva Whiteboard → visual idea development • Padlet → collaborative sharing • Canvanizer → simplified business model canvas • Mentimeter → voting and feedback • Genially or Canva → final idea presentation Equipment • smartphones or laptops • internet connection • projector (optional)
Prior Knowledge	Basic digital skills are sufficient.
Pedagogies Used	• Six Thinking Hats methodology (Edward de Bono) • Tinkering (learning through experimentation) • Learning by Doing • Design Thinking (simplified) • Collaborative Learning • Visual Thinking

5E Model activity planning

Phase	Procedure	Time
Engagement	The facilitator introduces entrepreneurship as the ability to respond creatively to real needs. Students individually write on sticky notes one small problem they observe in everyday life (school, environment, transport, digital tools, wellbeing). Ideas are collected on a board or Padlet and briefly discussed. Participants vote using Mentimeter for the problems they find most relevant. Teams are formed around shared interests.	20'
Exploration	Each team explores the selected problem using the Six Thinking Hats framework (each "hat" represents a thinking perspective): White hat → facts and information Red hat → emotions and intuition Black hat → risks and difficulties Yellow hat → opportunities and benefits Green hat → creative ideas and alternatives Blue hat → organization and decision-making Teams complete a simple worksheet or visual mind map answering guiding questions for each perspective.	30'
Explanation	Using a simplified version of the Business Model Canvas (via Canvanizer or paper template), students define: problem, solution, target users, value of the idea. The facilitator explains how creativity and empathy contribute to innovation and entrepreneurship.	25'
Extension	Using paper, collage, or drawing, teams create a simple visual representation of their idea (service, product etc.). Outputs are uploaded to Padlet to create a collective gallery.	25'
Evaluation	Each team presents its idea in 2 minutes. Participants provide feedback based on: clarity, creativity, usefulness. Students complete a short reflection: What helped me generate ideas? Which thinking hat was most useful? What did I learn about entrepreneurship?	20'

Impact maximization and further info

Final Product/ Outcome	• visual prototype of an entrepreneurial idea • structured creative process using Six Thinking Hats • simple digital presentation of idea • shared gallery of ideas (Padlet)
Reflection and self-evaluation for students	Students reflect on: • which thinking perspective was easiest or most difficult • how collaboration influenced creativity • how structured thinking supports innovation Short self-assessment scale: I can generate ideas → yes / partly / not yet I can collaborate creatively → yes / partly / not yet
Assessment	Pre-activity: discussion on perception of creativity and innovation During activity: observation of collaboration and engagement Post activity - evaluation of: clarity of idea application of Six Thinking Hats method creativity of solution ability to present idea
Other information	The activity is based on the Six Thinking Hats methodology, developed by Edward de Bono, which provides a structured yet flexible framework for creative thinking and decision-making. By encouraging learners to analyse ideas from multiple perspectives, the method supports inclusive participation and helps learners develop innovative solutions in a collaborative environment. The integration of a tinkering approach promotes experimentation, iteration, and learning through hands-on exploration, making entrepreneurship more accessible and engaging for learners with diverse backgrounds and learning styles. The use of low-cost materials ensures that the activity can be easily replicated in different educational settings. Bibliographical reference: de Bono, E. (1985). Six Thinking Hats. Boston: Little, Brown and Company.

#INCLUSION
#CREATIVITY

VISUAL STEAM CONSTELLATIONS. DESIGNING AN INCLUSIVE STEAM TOOL USING ART & VISUAL THINKING

Learning outcomes

Students will:

- Make STEAM concepts visually understandable and emotionally engaging
- Support inclusion and accessibility
- Develop creativity, critical thinking, and systems thinking
- Encourage collaboration and communication
- Encourage multiple learning styles and accessibility

Main subject	STEAM / ICT / Art Integration
Related subjects	InclusionScience, Technology, Engineering, Art, Mathematics, Creativity
Total time	1 hour 10 minutes (10 min introduction + 60 min activity implementation)
Number of students	10–30
Age group	12–18 years (adaptable for younger students or adults)

The activity in a nutshell

Introduction	In this activity, students explore change, collaboration, and storytelling by translating STEAM concepts into a visual constellation. The activity promotes inclusion and accessibility by allowing students to work with symbols, metaphors, and collaborative mapping. Students better understand complex STEAM topics through visual language, group connections, and narrative construction. Framing the activity: "We are not drawing to be perfect artists. We are mapping ideas." Focus on group connections, not artistic perfection.
Resources/ Equipment/ Materials	• A3/A2 paper • Markers, colored pencils • Pre-cut shapes (circles, squares, arrows, stars) • Sticky notes • Icon cards / narrative cards • Visual dictionary template • Stickers or reflection dots • Optional digital tools: Mentimeter, Padlet, Miro • Offline paper-based option
Prior Knowledge	Prior Knowledge Basic teamwork skills; openness to drawing; simple understanding of STEAM concepts.
Pedagogies Used	Inquiry-Based Learning, Project-Based Learning, Collaboration, Learning by Doing, Visual Thinking Strategies, Storytelling

5E Model activity planning

Phase	Procedure	Time
Engagement	Warm-Up: Drawing Without Words Students draw a STEAM concept (e.g., ecosystem, energy, innovation, system) using only lines and dots — no words allowed. Purpose: • Activate visual thinking, Reduce fear of drawing • Emphasize simplicity (lines & dots limitation) • Encourage symbolic thinking Short pair-share discussion: • What did you try to represent? What was difficult without words? Teacher frames the activity: "We are not drawing to be perfect artists. We are mapping ideas." Focus is on ideas and connections, not artistic perfection.	10'
Exploration	Students choose a STEAM topic in small groups. They create: • A visual dictionary of symbols • Simple shapes and metaphors • Early connections between elements Students explore relationships between concepts by arranging and connecting symbols. Teacher supports with guiding questions: • How are these elements connected? What changes if you move this symbol? What system is emerging? Focus: • Systems thinking, Group collaboration,Meaning-making through symbols	15'
Explanation	Students explain the meaning of their symbols and connections within their group. They: • Clarify why each symbol was created • Describe relationships between elements • Identify patterns or systems Teacher introduces explicit STEAM vocabulary and connects student-created symbols to academic concepts. This phase: • Strengthens conceptual understanding • Connects visual language to disciplinary language • Makes thinking visible	10'

5E Model activity planning

Phase	Procedure	Time
Extension	Groups create their Visual STEAM Constellation by connecting symbols into a larger conceptual map. They: • Build structured group connections • Form clusters (constellations) • Refine relationships between symbols Then, they develop a short storytelling narrative explaining the constellation. They may: • Use narrative cards • Present through storytelling and movement • Use visual posters or images • Add minimal written support if needed The constellation becomes a map for storytelling. Focus: • Deepening understanding • Expanding connections • Creative interpretation • Collaborative meaning-making	15'
Evaluation	Students present their constellation and narrative. Reflection Questions: • What symbol helped you understand the concept most? • How did visuals support your learning? • Which connection was most important? • What changed from the first idea to the final constellation? Assessment Methods: • Reflection dots • Exit tickets • Short verbal reflection • Mini-journal entry • Peer feedback • Teacher observation checklist • Rubric evaluation of constellation and collaboration	60'

Impact maximization and further info

Final Product/ Outcome	Final Product / Outcome A collaborative Visual STEAM Constellation: a symbolic concept map + visual dictionary + short narrative explaining a STEAM concept using visual language.
Reflection and self-evaluation for students	Exit tickets, reflection dots, peer feedback, short verbal reflection, or a mini-journal entry.
Assessment	Pre: Mentimeter poll, KWL chart - (know/ want to learn/learn)) During: Observation checklist, peer review. Post: Rubric evaluation of constellation, self-assessment.
Other information	Designed by Diana using Visual Thinking and Inclusive STEAM methodology.

#CREATIVITY
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BALANCE LAB: DESIGNING INCLUSIVE FUTURES THROUGH ART & STEAM

Learning outcomes

- Divers learning ways for learners for inclusive learning
- apply systems thinking crossectorial, to social and technological challenges
- express ideas using visual, verbal and digital storytelling
- collaborate using storytelling and world cafe.
- design inclusive STEAM-based solutions addressing real-world needs, using a sketching approach.
- reflect on personal roles (passion–profession–mission) in societal balance
- critical thinking, systems thinking, communication, creativity

Main subject	STEAM Education (with focus on Technology & Engineering) Architecture Building Design Perspective and Connections
Related subjects	• Art & Visual Communication • Social Inclusion & Citizenship Education • Digital Literacy • Ethics & Sustainability • Career Guidance / Personal Development
Total time	90 minutes (can be adapted to 60 or extended to 120)
Number of students	9–24 students (working in triads or small teams)
Age group	15–22+

The activity in a nutshell

Introduction	Students are introduced to the idea of balance in society: between technology, human needs, creativity, and inclusion. Inspired by the World Balance game logic, students will collaboratively explore how STEAM solutions can be designed with empathy and artistic thinking, not only technical efficiency. The activity frames life and innovation as a game of perspectives, where balance is achieved through dialogue, not competition. The IKIGAI method with the 3 circles that intersect in a point, keeping each individuality and matching with each of the other 2, can be used as a visual metaphor and scheme on the following : 1.Generating Solutions 2. Searching Connections 3.Match and dream big (developing the mindset) World_Balance_Game_Instructions: https://povyou.wordpress.com/2024/07/20/educational-board-games-by-pov/
Resources/ Equipment/ Materials	Digital device per team (tablet/laptop/phone) Online collaboration tools (Padlet / Miro / Canva) Timer (30–60 seconds) - hourglass or online clepsydra Materials (printed or digital formal from above resources links): https://drive.google.com/drive/folders/1PmRcGxb_qkmx8I-37pSVtN43vGYPlVjB Role cards (Listener, Speaker 1, Speaker 2) Perspective cards (Six Thinking Hats – simplified) Challenge cards (social / inclusion / sustainability prompts) - check link
Prior Knowledge	• Basic understanding of STEAM fields • Basic digital tool usage • No advanced technical knowledge required
Pedagogies Used	• Non-formal education • Game-based learning • Inquiry-based learning • Design thinking • Cooperative learning • Reflective practice

5E Model activity planning

Phase	Procedure	Time
Engagement	Procedure: Facilitator presents a short scenario: "A city wants to design a new public STEAM space that is inclusive, sustainable and creative." Students receive a Challenge Card (e.g. inclusive playground, smart library, eco-transport hub).	10'
Exploration	Students work in triads, each assigned a rotating role: • Listener – holds the challenge (context) - VOTE • Speaker 1 – connects the challenge to a STEAM solution - "HOW 1" • Speaker 2 – connects the challenge to art, inclusion or ethics - "HOW 2" Each speaker has 60 seconds to pitch ideas. Listener listens only. Roles rotate, inspired by the World Balance mechanism - above link	20'
Explanation	Listener explains why one connection felt more "balanced", using criteria adapted from the game: • relevance • logic • creativity • inclusiveness Facilitator introduces systems thinking and how balance emerges from multiple perspectives.	15'
Extension	Teams draw a Thinking Hat card and redesign their idea from that perspective: • Yellow → optimistic future • Black → risks & barriers • Green → creative alternatives • Red → emotional/user experience They visualize the idea digitally (sketch, infographic, concept map).	25'
Evaluation	Teams present their Balanced STEAM Concept. Peers vote using "balance tokens": not for the best idea, but for the most balanced one.	10'

Impact maximization and further info

Final Product/ Outcome	• A visual-digital concept of an inclusive STEAM solutionmap/ infographic , elevatorpitch • Short oral explanation showing multiple perspectives • Evidence of collaborative balance
Reflection and self-evaluation for students	Guided reflection questions: • Which role felt most natural for you? • Where did balance appear — and where was it missing? • How did art or empathy change the technical solution? • What does this say about your own passion–profession–mission balance?
Assessment	• Formative assessment through observation • Peer feedback (balance tokens) • Self-reflection statements • Optional rubric: creativity, inclusion, collaboration, clarity
Other information	• Can be adapted for Erasmus+, ICT labs, youth work, or teacher training • Works online or offline • Scales well for multicultural and multilingual groups • Strong link to career guidance and citizenship education • Resources and extension: https://drive.google.com/drive/folders/1PmRcGxb_qkmx8I-37pSVtN43vGYPlVjB

#INCLUSION

DIGI-EASY STEAM: LEARNING SMARTER WITH INCLUSIVE DIGITAL TOOLS

Learning outcomes

Students will:

- use simple digital tools to understand STEAM concepts more easily
- choose digital tools according to their learning style (visual, auditory, kinesthetic, logical)
- collaborate inclusively using low-barrier ICT tools
- apply digital tools to real-life learning situations
- gain confidence in digital environments regardless of prior skill level

Main subject	ICT for Inclusive STEAM Learning
Related subjects	• STEAM (Science, Technology, Engineering, Arts, Mathematics) • Digital Literacy • Inclusive Education • Communication Skills Personal Learning Strategies
Total time	120 minutes (can be reduced to 90)
Number of students	12–24 students
Age group	14–22+

The activity in a nutshell

Introduction	Digitalization should make life easier, not harder. Many students struggle not because content is difficult, but because tools are too complex or don't match their learning style. In this activity, students will practice in real time a small set of inclusive digital tools, learning how and why to use them for STEAM subjects. The focus is not on mastering technology, but on using it to understand better, especially for students with different needs and abilities
Resources/ Equipment/ Materials	Selected Inclusive Tools (ONLY THESE): 1. Padlet – visual & multimodal collaboration 2. Coggle – mind mapping for structure 3. Google Docs (Drive) – simple collaboration & writing 4. Canva – visual explanation of STEAM concepts 5. Vocaroo – audio explanation for auditory learners 6. Mentimeter – anonymous interaction & feedback Devices: phone / tablet / laptop (shared allowed)
Prior Knowledge	• Basic internet use • No prior experience with the tools required
Pedagogies Used	• Universal Design for Learning (UDL) • Learning by Doing • Peer Learning • Experiential Learning • Inclusive Digital Pedagogy

5E Model activity planning

Phase	Procedure	Time
Engagement	Facilitator asks: "Why do some people understand better when they see, others when they hear, and others when they do?" Students answer anonymously using Mentimeter word cloud: • "What makes learning hard for you?" This creates psychological safety and inclusion.	10'
Exploration	Students rotate through 3 DIGITAL STATIONS (small groups). Station 1 – UNDERSTAND VISUALLY Tool: Padlet STEAM Example: Climate change / Robotics / Geometry Students:post images, short texts, emojis, answer: "Explain this STEAM topic visually" Helps visual & dyslexic learners. Station 2 – UNDERSTAND STRUCTURE Tool: Coggle mindmap tool STEAM Example: How a robot works / Scientific process Students:create a simple mind map, use colors and icons Helps logical & analytical learners. Station 3 – UNDERSTAND BY HEARING Tool: Vocaroo STEAM Example: Explain a math or science concept Students:record a 1-minute voice explanation,no writing required Helps auditory learners & language learners.	30'
Explanation	SAME CONTENT – 3 DIFFERENT WAYS Using: • Google Docs → written explanation • Canva → infographic • Vocaroo → audio explanation Students see that content stays the same, but access changes. Discussion: "Which way helped you most?"	20'

5E Model activity planning

Phase	Procedure	Time
Extension	Students choose ONE STEAM topic and ONE digital tool that fits them best. They create a micro-learning product: • Canva → visual poster • Google Docs → simple guide • Vocaroo → audio explanation They work in real time, with facilitator support.	40'
Evaluation	Students give feedback using Mentimeter scales: • "I understood better than usual" • "This tool helped me" No grades, only learning feedback.	10'

Impact maximization and further info

Final Product/ Outcome	Each student creates: • 1 inclusive digital learning artifact • using a tool that matches their learning style Group outcome: • shared Padlet gallery of learning formats
Reflection and self-evaluation for students	Students answer (written, audio or visual – their choice): • Which tool helped me most? Why? • How can I use this tool in real life or school? • What makes learning easier for me?
Assessment	• Self-assessment • Peer feedback • Facilitator observation Focus on engagement and understanding, not technical skill
Other information	• Works well with fewer opportunities groups • Reduces digital anxiety • Can be reused across any STEAM topic • Easily adaptable for Erasmus+, SFI, Komvux, youth work Student Worksheets Materials: https://drive.google.com/drive/folders/1viX2SGWsQrSRaMZjTWUOsqDR66LX5cCe Applications ICT - more than 60 online tools that can be used, check here: https://docs.google.com/document/d/1Z5HhwpoZeIbUTfGD5uGxEfirdKryDA_ntvEXI9L03Nw/edit?tab=t.0

#ENTREPRENEURSHIP

INNOVATE FOR WATER PROTECTION: SMALL IDEAS, BIG IMPACT

Learning outcomes

Students will:

- Learn what water footprint means and why it matters.
- Identify daily activities that use water directly or indirectly.
- Develop teamwork, problem-solving, and creative thinking skills.
- Use digital tools to design a simple awareness product or idea.
- Show entrepreneurial thinking by creating and presenting a water-saving solution.

Main subject	Science and Technology
Related subjects	ICT, Mathematics, Environmental Studies, Entrepreneurship
Total time	5x40 minutes
Number of students	16 - 24
Age group	14–25 years old

The activity in a nutshell

Introduction	In this activity, students will learn about their water footprint — how much water they use in their daily life, from drinking to using technology or buying clothes. They will explore ways to save water at home and school and design a small digital campaign or product idea that helps people reduce water use. This activity connects Science and Technology with Entrepreneurship by encouraging students to find creative, real-world solutions.
Resources/ Equipment/ Materials	• Laptops or tablets with internet • Projector or smartboard • YouTube videos • Padlet • Canva or Google Slides • Water Footprint Calculator: https://www.waterfootprint.org/ • Generative AI • A4 papers, pens, sticky notes • Rubric and reflection forms
Prior Knowledge	Basic digital literacy and collaboration skills. No previous entrepreneurial knowledge required.
Pedagogies Used	Project-Based Learning Inquiry-Based Learning Learning by Doing Collaboration and Peer Feedback

5E Model activity planning

Phase	Procedure	Time
Engagement	Goal: Build curiosity and activate prior knowledge. 1. Show a short video: What is a Water Footprint?. Second video about Footprint 2. Ask guiding questions: "Where do we use water?" "Do you think your clothes need water?" 3. Use a Mentimeter poll about water footprint: ""How much water do you think you use per day?" 4. Fill in KWL Chart (K–W) on padlet.	30'
Exploration	Goal: Discover by doing and researching. 1. Students in groups of 6 use Water Calculator. Or they use AI to calculate. 2. They write results in a table (water footprint per day) on padlet 3. Discuss differences and reasons. 4. Brainstorm: "How can we reduce our water footprint?" on or Padlet 5. Teacher observes collaboration using the Observation Checklist.	40'
Explanation	Goal: Build understanding through teacher support. 1. Teacher explains direct and indirect water use. 2. Show infographic: "The hidden water in things we buy." 3. Vocabulary: footprint, sustainability, reduce, reuse. 4. Students match vocabulary and meanings. 5. Mini Quiz on Quizlet.	40'
Extension	Goal: Apply knowledge creatively. 1. Each team designs a digital product: - Poster or App prototype: "Save Water, Save Life". - Includes slogan, 2–3 facts, and 1 idea to reduce water use. 2. Students prepare a short entrepreneurial pitch (1–2 min) about their idea's benefit. 3. Teams exchange feedback using Peer Feedback Form.	40'
Evaluation	Goal: Reflect, assess, and share learning. 1. Teams present in online Padlet wall. 2. Use Rubric-Based Product Evaluation (teacher & peers). 3. Last column of KWL Chart (What I learned). 4. Reflect using Traffic Light Cards (🟢🟡🔴).	40'

Impact maximization and further info

Final Product/ Outcome	Digital Poster / App Prototype / Infographic "Save Water, Save Life" created with Canva or Genially. 1–5 minute Pitch Presentation (team-based) Posted on class Padlet wall
Reflection and self-evaluation for students	Students complete a short reflection activity to evaluate their learning and personal contribution. • "What did I learn about water footprint and sustainability?" • "What solution did I create and why is it useful?" • "How can I reduce my water use in daily life?" Students also reflect on their teamwork and participation using simple tools such as Traffic Light Cards (🟢🟡🔴) or a short self-assessment form.
Assessment	Pre-assessment: KWL Chart (Padlet or paper-based) to identify students' prior knowledge and questions about water footprint and sustainability. During: Observation checklist focusing on collaboration, participation, problem-solving, and idea generation during group work and discussions. Post-assessment: Rubric-based evaluation of the final product (digital poster/app prototype) including criteria such as creativity, feasibility, clarity of message, and entrepreneurial thinking. Peer feedback and short self-reflection are also used to assess learning progress.
Other information	This activity integrates Science, Technology, and Entrepreneurship by guiding learners to explore their water footprint and develop solution-oriented ideas. Through inquiry-based and project-based learning, students analyse real-life problems and transform their findings into simple awareness products or innovative solutions. The activity promotes sustainability, creativity, and responsible decision-making within a STEAM framework. It is flexible and can be adapted to different learning environments using accessible digital tools or low-cost materials.

#CREATIVITY

CREATIVE MOTION LAB: WHERE ART MEETS ENGINEERING

Learning outcomes

- Learn how engineering and art work together to create movement and design.
- Understand basic mechanical principles like balance, motion, and energy.
- Use creativity and teamwork to design a moving sculpture or artistic mechanism.
- Apply simple engineering tools and materials to create a prototype.
- Present and explain their sculpture design to the class.
- Develop communication, collaboration, and problem-solving skills.

Main subject	Engineering and Art
Related subjects	ICT, Design, Creativity
Total time	6x40'
Number of students	15 - 25
Age group	14 - 18 years old

The activity in a nutshell

Introduction	In this STEAM activity, students will explore how engineers and artists use creativity to make kinetic sculptures — artworks that move using simple mechanics. They will learn basic engineering ideas like balance, rotation, and motion, then apply these to design their own moving sculpture using simple materials. The activity encourages teamwork, design thinking, and creativity — connecting engineering principles with artistic expression.
Resources/ Equipment/ Materials	Cardboard, straws, skewers, glue, tape, rubber bands Recycled materials (plastic bottles, paper, strings, bottle caps) Scissors, rulers, markers, A4 paper Laptops or tablets with internet Projector or smartboard YouTube Video: .What is Kinetic Art? Padlet for presentation Observation checklist, rubric, peer feedback form
Prior Knowledge	Students should know simple shapes and balance concepts.
Pedagogies Used	Project-Based Learning Learning by Doing Inquiry-Based Learning Collaboration

5E Model activity planning

Phase	Procedure	Time
Engagement	Show short video: "What is kinetic art?" Ask guiding questions: "Can art move?" "How can engineers help artists make moving objects?" "What kind of materials can make art move?" "Which part helps movement: wheel, lever, or string?" Students share quick ideas on Padlet	30'
Exploration	Students are divided into groups of 5-6. They try to make some simple models that moves using materials such as straws, paper, tape, rubber bands, bottle caps. Teacher can demonstrate some simple examples like paper fan that spins, a straw wheel that turns. Students experiment freely with the materials and test which materials create better movement or balance. They take pictures or record short videos and upload on Padlet and explain it with one or two sentences	50'
Explanation	Teacher explains "Forces in a Kinetic Art". Present short infographic or slides. Introduce key terms: Motion – movement, Balance – equal, weight on both sides, Rotation – turning around, Axis – the line it turns on, Mechanism – parts that move. Use real-life examples: Alexander Calder's mobiles, Theo Jansen's Strandbeest. Matching or fill in the blanks exercises about key terms. Mini Quiz on kahoot about key terms.	40'
Extension	Each team designs a unique kinetic sculpture that moves. They sketch before building. They should make sure that the design both moves and looks beautiful. Students prepare a short presentation or pitch (1-2 minutes) about their design. Students give and receive feedback using Peer Feedback Form.	80
Evaluation	Gallery Walk is organized—all sculptures are displayed around the room. Each team presents for 2 minutes: What it is, How it moves, What they learned Designs are evaluated by using Rubric-Based Product Evaluation (teacher + peers). Students complete Traffic Light Reflection	40

Impact maximization and further info

Final Product/ Outcome	A working Kinetic Sculpture — artistic and moving design A short team presentation (1–2 min) Shared on Padlet or classroom display
Reflection and self-evaluation for students	Students reflect on their creative process and teamwork during the activity. Reflection prompts: "How did we make our sculpture move?" "What creative idea did we use in our design?" "What was easy or difficult in our project?"
Assessment	Pre-assessment: KWL Chart (Padlet or paper-based) to explore students' prior knowledge and questions about water footprint and sustainability. During activity: Observation checklist to assess students' participation, collaboration, problem-solving, and idea development during group work. Post-assessment: Rubric-based evaluation of the final product (digital poster/app prototype) focusing on creativity, clarity, feasibility, and entrepreneurial thinking. Peer feedback and short self-reflection (Traffic Light Cards or reflection sentences) are also used to support assessment.
Other information	This activity integrates Engineering, Art, and Creativity by engaging learners in designing and building kinetic sculptures. Through hands-on and project-based learning, students explore basic mechanical principles such as motion, balance, and rotation while expressing their ideas through artistic design. The activity promotes creativity, problem-solving, and collaboration within a STEAM framework. The use of low-cost and recycled materials makes it easily adaptable to different educational contexts, supporting inclusive and experiential learning.

#INCLUSION

LIGHTING INCLUSION: EVERY IDEA SHINES

Learning outcomes

Students will:

- Understand basic electric circuits and conductivity.
- Use LED technology safely and correctly.
- Combine science and art to express personal or cultural identity.
- Develop problem-solving and debugging skills.
- Collaborate inclusively with peers.

Main subject	Science (Physics) and Art with Inclusion
Related subjects	ICT, Mathematics, Engineering
Total time	5x 40 minutes
Number of students	20-30 students
Age group	14–30 years old

The activity in a nutshell

Introduction	In this STEAM-based and inclusive project, students explore how light and art can communicate identity and diversity. By building simple LED circuits and integrating them into artistic paper designs, students learn fundamental electricity concepts while expressing cultural or personal symbols. The project follows Universal Design for Learning (UDL) principles to ensure that every student, regardless of language level or artistic skill, can participate meaningfully.
Resources/ Equipment/ Materials	• Copper tape or aluminum foil with adhesive • LED diodes (5mm or surface-mounted) • 3V coin batteries (CR2032) • Colored cardboard and tracing paper • Scissors, tape • Visual instruction sheets (diagrams)
Prior Knowledge	Students should: • Be able to work in pairs or small groups and share responsibilities. • Have basic fine motor skills (cutting, folding, placing small components). • Understand simple cause-and-effect relationships (e.g. "If there is a connection, the light turns on"). • Have basic awareness of safety rules when using small electronic components (e.g. battery handling).
Pedagogies Used	• Project-Based Learning • Inquiry-Based Learning • Learning by Doing • Collaboration & Peer Mentoring • Inclusive Education (UDL)

5E Model activity planning

Phase	Procedure	Time
Engagement	The teacher dims the lights and shows a sample LED artwork or a short video of a light-up card. Without explanation, the light is turned on and off to create curiosity. Guiding questions are asked: "What do you see?" "Why is the light on?" "Can art and science work together?" Students share initial ideas in pairs using simple language, drawings, or gestures. Inclusion: Visual focus, no pressure to speak; observation is acceptable.	20'
Exploration	Students work in pairs or small groups and receive an LED, coin battery, and copper tape. They experiment by trying different connections to make the LED light up. They test materials (paper, plastic, copper tape) to understand conductivity and observe what works or not. The teacher facilitates with guiding questions and observes without direct correction, encouraging trial and error. Vocabulary displayed visually: conductive, insulator, positive (+), negative (–), connection.	30'
Explanation	The teacher gathers students and builds on their discoveries. Key concepts are introduced: simple circuit, connection, polarity, and conductivity. Visual explanations and simple metaphors (e.g. electricity as a road) are used. Students match vocabulary with images and demonstrate understanding through quick checks	40'
Extension	Students design an artwork that represents their identity or a meaningful symbol. They create the front design and build the circuit on the back using LED, battery, and copper tape. Students test, debug, and improve their designs while supporting each other through peer collaboration.	70'
Evaluation	A Gallery Walk is organized with dimmed lights to display illuminated artworks. Students present their work using simple sentences: "My design shows..." "I chose this because..." Teacher and peers give supportive feedback. Students complete a short reflection to evaluate their learning and experience.	40'

Impact maximization and further info

Final Product/ Outcome	• An illuminated paper artwork with a working LED circuit • A short oral presentation explaining the design and idea • A classroom gallery display showcasing diverse student works
Reflection and self-evaluation for students	Students reflect on their learning process, creativity, and collaboration during the activity. • "What did I learn about circuits and light?" • "What does my design represent?" • "What was easy or difficult for me?" Students use simple tools such as Traffic Light Cards (🟢🟡🔴) or short reflection sentences to evaluate their participation and progress.
Assessment	Pre-assessment: Short discussion or visual prompts to explore prior knowledge about electricity and light. During: Observation checklist focusing on participation, collaboration, and problem-solving during hands-on activities. Post-assessment: Simple rubric evaluating functionality of the circuit, creativity of the design, and clarity of presentation. Peer feedback and short self-reflection are also included.
Other information	This activity integrates Science, Art, and Inclusion by guiding learners to explore basic electrical circuits through creative expression. Students design illuminated artworks that reflect their identity while developing fundamental knowledge of electricity and design. The activity promotes inclusion, collaboration, and self-expression within a STEAM framework. It uses simple materials and flexible methods, making it accessible and adaptable to different learning environments.

#INCLUSION

INCLUSIVE SOCIETY

Learning outcomes

Students will learn to:

- Develop problem-solving and design thinking skills
- Enhance collaboration and digital communication
- Foster inclusive and entrepreneurial mindsets
- Improve creativity through STEAM-based tools
- Critical, analytical thinking
- Communication and reasoning skills
- Objective self-assessment

Main subject	Social sciences
Related subjects	Languages, psychology, ICT with integrated topics of inclusion, creativity and entrepreneurship.
Total time	5x40min, (up to 5-7 academic hours, however it varies from the level of difficulty and a part of tasks can be assigned to be done at home to save time for class work).
Number of students	Can be done as pair or group work. Recommended to do in groups to enhance teamwork and save time.
Age group	14+

The activity in a nutshell

Introduction	Learners are exploring diversity and inclusion in the environment around them by creating and guiding interviews with peers and developing a visual representation of the interview results (video or presentation). It involves scientific approach combined with computer skills, design thinking emphasizing the importance of acknowledging inclusion and diversity around them.
Resources/ Equipment/ Materials	• List all tools and resources required: • Preparatory work and interviews can be done in 2 ways: • Option 1:traditional way using paper and pen, • Option 2: using digital tools (such as Padlet, Google Keep) to prepare interview questions, record or film them. Then a laptop, tablet or smartphone is needed. • Laptops, tablets or smartphones to create a video or any kind of visual presentation (can be also a mindmap, charts, creative expression). • Tools that could be used: Canva, Padlet, genially, Capcut, or similar.
Prior Knowledge	• Basic digital literacy – understanding how to use computer, web-based tools or apps such as Padlet, Google Keep, Canva, or Genially. • Basic video editing or visual design skills – knowing how to record, edit, and organize simple visual materials (optional but useful). • Instructional English – ability to understand basic commands and instructions in apps or platforms if the local language interface is not available. • Teamwork and communication skills – ability to collaborate, share ideas, and divide tasks effectively, vreating interview question and guiding the interviews
Pedagogies Used	• Problem Solving • Observation-Based Learning • Project-based learning • Collaboration • Learning by Doing

5E Model activity planning

Phase	Procedure	Time
Engagement	This activity engages students in planning, researching, communicating, analysing and developing visual representation of their findings and perspectives. It links real-life situations to practical aspects and solutions of inclusion thus connecting them to improved emotional microclimate in the learning environment, higher tolerance and understanding among peers. The educator here works as a mentor and technical support if needed, while all stages are guided by learners to build the content relevant to their understanding, experience and needs. Ask student to respond to the Intro questions: • What do you understand about diversity and inclusion? • What feelings does it provoque to you? Show students this video: https://www.youtube.com/watch?v=3A07yC5j028 Discussion questions after watching the video: • In your opinion why do people want to feel accepted? • If you had any, remember a similar situation in your life. If you want, share your feelings about the situation with your classmates. • Why support of your peers matters?	20'
Exploration	Exploratory phase & Interviews: They create 4-5 questions to explore inclusion around them. These questions are then used in interviews. Each group interviews at least 5 different people. They can be mixed ages to get more diverse insight and experiences. Interviews can be verbal, thus improving their interpersonal communication skills. Or they can be in a form or survey, yet then learners have to create a supporting intro text to the survey to get people involved. The results are summarized.	80'

5E Model activity planning

Phase	Procedure	Time
Explanation	Explanation phase gathers, analyses and summarizes all research results. They should lead to conclusions and suggestions for improvements.	40'
Extension	Learners create a digital visual representation (poster, video, infographic, chart, presentation, interactive game or similar) to show their findings based on their understanding. This would allow students to express thor creativity, expand design thinking, presentation and communication skills. As for the educator it would show the actual needs according to what their learners find relevant in respective age group. Optional Students may: • develop interactive games to explore the topic deeper, • build simple training material, • create a vocabulary relevant to the topic, including expressions that improve reasoning, understanding cause and consequences or grammar to talk about probabilities. • For young adults, they may explore deeper national legislation that supports inclusion and explore how efficient it is in real-life settings Students apply their knowledge by creating a product: digital poster, app prototype, animated story, infographic, etc., using ICT tools like Canva, Scratch, Genially, create a podcast, video with subtitles, interactive game. It can be a collaboration work involving several subjects if at school.	40' for discussion **Optional:** Vocabulary 2x40' Developing learning materials 3x40' extra research 2x40'
Evaluation	• Self-evaluation based on the bingo card (see in annex 1) • Group discussion about their findings, developing reasoning skills in native or target language.	Self evaluation 10' Discussion 30'

Impact maximization and further info

Final Product/ Outcome	• An informative material that explains current situation of inclusion among their peers. • This outcome provides educators and mentors more objective and trustworthy information about the environment around their learners. Therefore this may be used as a tool for educators to develop more trustworthy relationship within the group in future.
Reflection and self-evaluation for students	Educator provides reflection bingo cards for each learner: They may be anonymous, additional revelation may be added by learners on the bingo page. Later students either present or submit them to educator or mentor who them would see the success and main struggles to work with in future. The bingo fields can be cut out and put on a wall in a visible place, then it can be used as a thermometer - each student draws a green star for things they learnt or orange for those who were challenging.
Assessment	1. As an evaluation tool students create evaluation criteria together with their mentor during preparatory phase. 2. The evaluation tool can be digital, verbal or written. It is used in evaluation stage and involves also self-assessment. 3. A general task assessment and reflection can be done by creating exit tickets or bingo game that is the final stage of the whole activity and can be done anonymously to get a general overview of necessary improvements and actual successes.
Other information	This activity would provide knowledge about inclusion in several levels: interpersonal (preparatory and exploratory stage), cognitive (explanation and extension stage) and personal (evaluation and reflection stage). Please refer to **ANNEX 1 - Reflection bingo card**

Annex 1: Reflection bingo card

I understand what is inclusion	I understand what is diversity	I know how to be more tolerant
I recognize empathy	I know where to look for help when I feel excluded or bullied	I feel that social media triggers me negatively
My friends have positive impact on me	I positively interact with others	I can be supportive when needed.

I understand what is inclusion	I understand what is diversity	I know how to be more tolerant
I recognize empathy	I know where to look for help when I feel excluded or bullied	I feel that social media triggers me negatively
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#CREATIVITY
#ENTREPRENEURSHIP

SCIENCE ELEVATOR PITCH

Learning outcomes

Students will:

- Develop public speaking skills when presenting the work
- Obtain strategic thinking needed for present selling points and creating compelling value proposition
- Improve creativity with the usage of visual tools
- Develop collaboration among students necessary for the effective group work
- Enhance positive interdependence (i.e. where team work is fostered through shared goals, shared responsibility, conflict resolution for the effective group work)

Main subject	Any STEAM subject
Related subjects	• ICE - Inclusion, Creativity and Entrepreneurship • Technology, communication
Total time	4x 40 minutes
Number of students	Unlimited. Work individually or in pairs
Age group	15+

The activity in a nutshell

Introduction	This lesson is designed within a STEAM and ICE framework with the goal to enhance communication among students, alongside boosting creativity. Entrepreneurship is developed through idea-selling skills. Throughout the four allocated lessons for this topic, students will explore benefits and downsides of an individually selected scientific invention and develop a 90-second elevator pitch to present its value and engage potential customers.
Resources/ Equipment/ Materials	• Research resources: devices such as computers, laptops with internet access personal smartphones, teacher-provided sheets with examples of scientific inventions • Planning tools: students' notebooks, notes in phones, teacher-provided sheets (optional). • Presentation tools: Canva, PowerPoint, Genially, cue cards (for students who prefer paper-based format) • Teacher resources - a video example of an elevator pitch.
Prior Knowledge	1. Basic note-taking and organisational skills - ability to write down ideas, to organise gathered information (e.g. with the use of Google document, Word, notebook). 2. Communication skills - ability to express ideas. 3. Basic research skills - ability to use a search engine (e.g. Google) in order to find necessary information. 4. Collaborative skills - ability to work in a group.
Pedagogies Used	• STEAM integration - for effective, immersive learning aspects of science, communication, creativity and entrepreneurship are used. • Problem-solving and creativity - to deepen understanding of the topic, teacher-centred lectures will be shifted to student-centred approach • Project-based learning - students work for an extended time period (in this case, several lessons) on a project, researching an invention and creating an elevator pitch, concluding with a presentation. • Inquiry-based learning

5E Model activity planning

Phase	Procedure	Time
Engagement	Example activities: 1. Start a lesson with an "Entry ticket" method to check students' prior knowledge, e.g. "What kind of scientific inventions do you know that have revolutionised our lives ?, "Do you know what an elevator pitch is?" 2. Show a short video of an elevator pitch (e.g.:https://youtu.be/SA5eYjdijvI?si=dJKkzaJ3xaq46nop or https://www.youtube.com/watch?v=D80RTRjP1tQ Continue the lesson with a question that is linked to a real-life Example: "Imagine you are in an elevator with an investor. You have 90 seconds to promote your product and convince them to invest. Which product qualities would you mention?" 1. Guiding questions could be asked, such as: • What grabbed your attention first? • Was the problem clear? • Was the solution provided? In this phase, students brainstorm scientific inventions (e.g. smartphones, computers, automobiles, etc.), share their observations on what made the pitch effective (video example) - e.g. problem statement, offering problem solution, clear structure.	40'
Exploration	In this phase students are provided with: 1. A list of scientific inventions, in case there is a lack of ideas provided. 2. Reliable sources for searching information, e.g. Science Daily, Science News. 3. A graphic table with four sections: invention, benefits, downsides, problem solved. (*See Annex 1*), Padlet can be used. Students carry out a hands-on activity to generate ideasexplore posed questions. • Choose a scientific invention, e.g. a portable phone charger (powerbank) and detect the target audience • Research the invention, identify its benefits and downsides. • Example: benefits - portable, cost-effective; downsides: slower charging • Identify the problem-What should be improved? • Innovation - How to improve it? Provide solution.	30'

5E Model activity planning

Phase	Procedure	Time
Explanation	A clear elevator pitch structure is provided and explained step by step (worksheet template in Annex 2): Example sentences should be provided in order to give students an understanding of how an elevator pitch is done. Example sentences: • Have you ever struggled with...? • Our product offers a solution such as... • Unlike other products, we offer ...	40'
Extension	Create a poster or use digital tools such as Canva, Genially, PowerPoint to present the result. Students are provided with a choice-based task option: 1. Creation of a poster 2. Creation of a presentation 3. Creation of a storyboard* on Padlet or similar app *Storyboard is a way to visualise a storyline in the way of a comic book or visuals like mood board. It includes images or drawings, a problem scenario, a product solution. https://www.storyboardthat.com/storyboards/aaron-sherman/product-solution-benefit	40'
Evaluation	1. Students deliver the final 90-second elevator pitch. 2. Use visuals of their choice to support the elevator pitch. 3. Convince the audience to buy the product. 4. Complete a self-reflection on their performance. For self-assessment, different methods could be used, such as rubrics, checklists, traffic light system by using colours (red, yellow, green) to signal their level of understanding. Example of a student reflection: 'I spoke clearly, but lacked visuals. Next time I would put more focus into developing stronger visuals.' 1. Receive a teacher's and peer feedback. Peer feedback can be given anonymously in Padlet. 2. Self-evaluation questions in ***Annex 3***	40'

Impact maximization and further info

Final Product/ Outcome	90-second elevator pitch alongside with the visual presentation of the findings. The final outcome demonstrates the students' ability to visualise their ideas and highlight key aspects that makes it easier for the audience to comprehend information.
Reflection and self-evaluation for students	Self-reflection questions for students: 1. What part of your pitch do you think was the strongest? 2. Do you think you managed to convince the audience to buy your product? 3. What would you improve next time?
Assessment	Pre-assessment tools: https://www.livingskysd.ca/documents/de9c47e8-9ca1-4337-b172-43464f9d4b02/Module2PreassessmentStrategies1copy.pdf 1. Entry tickets: short questions for reviewing prior knowledge and for setting the stage about a new topic, e.g. "What kind of scientific inventions do you know?, "What should an elevator pitch include?" During assessment tools: 1. Teacher observation checklist: a teacher provides feedback on students' group and individual work, including assessment of collaboration, engagement and communication. 2. Peer review: students provide feedback for their groupmates on engagement in the project, strengths and areas for growth. Possible post-assessment tools: 1. Kahoot!, Quizizz: these platforms offer interactive quizzes and polls that can be used for quick checks of understanding. 2. Think-pair-share: students first think about a question individually, then discuss it in pairs, and finally share their thoughts with the larger group. 3. Self-assessment - student reflection on what should be improved and what went well.
Other information	

Annexes

Invention and its target audience

Benefits/Downsides

Problem

Solution

Annexes

Who are you?: Provide a brief introduction of who you are and what your role and mission is.	
Who is the buyer?: Identify your target customer.	
What is the problem the product solves?: Include a strong value proposition.	
Why is your product the best solution?: Prove why you are better than the competition.	
What is next?: Include a call to action.	

Annex 2: Building the elevator pitch

#INCLUSION
#CREATIVITY
#ENTREPRENEURSHIP

GIVING CLEAR INSTRUCTIONS

Learning outcomes

Students will:

- Develop critical thinking skills
- Obtain strategic thinking needed for creating instruction logical
- Improve creativity with the usage of visual tools, include daily used objects
- Develop collaboration among students necessary for the effective group work
- Enhance positive interdependence (i.e. where team work is fostered through shared goals, shared responsibility, conflict resolution for the effective group work)

Main subject	Engineering, science
Related subjects	• ICE - Inclusion, Creativity and Entrepreneurship • STEAM - effective communication, giving clear instructions
Total time	4x 40 minutes
Number of students	at least 2 per group
Age group	14–30 years old

The activity in a nutshell

Introduction	This lesson is designed within a STEAM and ICE framework with the goal to enhance communication, define effectively the results of each action, state clear steps and instruct others effectively, using also language elements for structured and logical text. Activities to be carried out: 1. Research of the topic, i.e. the purpose of giving a clear instruction, the main elements of instructions, key words in the target language, for example, sequence adverbs and imperative or suggestions. 2. Watch the video example: https://www.youtube.com/watch?v=FN2RM-CHkuI 3. Team-up and decide a thing or activity for which your team will write instructions. For example, brushing your teeth, making a cup of tea or an omelette.
Resources/ Equipment/ Materials	• Device with internet connection to watch an example video • Paper and pencil/pen to write with or digital notebook (e.g., Padlet) • Materials of choice needed to prepare specific instructions
Prior Knowledge	Students should have: • Basic note-taking and organisational skills - ability to write down ideas, to organise gathered information (e.g. with the use of Google document, Word, notebook). • Communication skills - ability to express and structure ideas. • Basic research skills - ability to use a search engine (e.g. Google) in order to find necessary information. • Ability to state thoughts clearly and in a logical manner. • Collaborative skills - ability to work in a group.
Pedagogies Used	• STEAM integration • Collaborative learning • Project-based learning • Inquiry-based learning

5E Model activity planning

Phase	Procedure	Time
Engagement	Activities for students should be prepared in order to attract students' attention. Example activities: 1. Start a lesson with a video: Watch the video example: https://www.youtube.com/watch?v=FN2RM-CHkuI 2. Discuss: what problem is being solved in the video? What facilitates understanding the instructions and what should they be like? 3. Teacher introduces sequencing words in the target language (Example for English: https://www.teacherspayteachers.com/Product/Sequencing-Words-13173507) 4. Students split into groups.	20'
Exploration	In the exploration phase: 1. Each group chooses 1 activity or an item for which they will create instructions. (For example: How to make an omelette?) Instructions should be as short and straightforward as possible. 2. Brainstorm and make a draft of further steps. 3. Write down the instruction using sequencing adverbs, such as, *firstly, then, meanwhile, later, after that, next, finally, lastly*.	40'
Explanation	In the explanation phase, each group tests their own instructions. Group members complete a self-assessment and make sure that every step of the instruction is accurate, easy to understand and that the sequencing words are used correctly.	20
Extension	In this phase, groups exchange their instructions and test each other's work. Share feedback	20'
Evaluation	Each group evaluates the instruction they have tested. Example for criteria: • Are the instructions clear and easy to understand? • Are they functional? Did they work properly? • Have the sequencing adverbs been used correctly? • Creativity Later each group exchanges their suggestions and feedback.	40'

Impact maximization and further info

Final Product/ Outcome	• Students have learned the use of different sequence words • They have acquired strategic thinking and guidance building • They have practiced stating their thoughts clearly. • They have written an instruction for a real activity.
Reflection and self-evaluation for students	In the explanation phase, each group writes down self-evaluation and comments about their own work while testing their instructions. In the extension phase, groups test each other's instructions and give feedback based on predetermined criteria.
Assessment	Criteria examples for evaluation: • Are the instructions clear and easy to understand? • Is it functional? • Have the sequencing adverbs been used correctly? • Creativity
Other information	

#CREATIVITY
#ENTREPRENEURSHIP

PAPER AIRPLANE OPTIMIZATION. EFFECTS OF WING SHAPES AND THROWING ANGLES

Learning outcomes

Students will:

- Design and conduct an experiment with controlled variables (angle, wing shape, ballast).
- Collect accurate data and compute mean, median, and standard deviation.
- Interpret graphs and understand the qualitative relationship between angle and flight distance.
- Develop engineering thinking: stability, center of gravity, dihedral effects.
- Strengthen teamwork, communication, creativity, and problem-solving skills.
- Engage in STEAM thinking with elements of inclusion (role rotation) and entrepreneurship (presenting results).

Main subject	Mathematics and engineering
Related subjects	Technology, Art (model creation), Physical Education (throwing technique) ICE: Inclusion, Creativity, Entrepreneurship
Total time	2 x 45 minutes (or 1 x 90 minutes)
Number of students	20-30 students (teams of 3 or 4)
Age group	13+

The activity in a nutshell

Introduction	In this STEAM-based lesson, students explore how engineering design and mathematical analysis can improve the performance of paper airplanes. Working in inclusive teams with rotating roles, they investigate how different wing shapes and throwing angles affect flight distance or glide time. Using an inquiry-based approach, students design and run a controlled experiment, collect data, and calculate mean, median, and standard deviation. They apply engineering thinking to evaluate stability and optimize their models. The lesson integrates creativity (designing models), collaboration, and entrepreneurship as students present and justify their results. Activities include model construction, test flights, structured measurements, statistical analysis, graph creation, and team reflection.
Resources/ Equipment/ Materials	• A4 paper (same weight/type for all models) • Tape (max. 10 cm per plane), optional: one paperclip for ballast • 15 m+ measuring tape, chalk/tape for marking distances • Stopwatch (phone), printed angle template (10°, 20°, 30°) • Data sheets for measurements • Indoor space free of drafts • optional: laptops, tablets, phones (Mentimeter)
Prior Knowledge	• Meaning of mean and median • Basic measurement and recording skills • Ability to work in a team
Pedagogies Used	• Inquiry-Based Learning • Problem Solving & Engineering Design Thinking • Project-Based Learning • Collaboration (role rotation) • Gamification ("best median" award) • Learning by Doing

5E Model activity planning

Phase	Procedure	Time
Explanation	In this phase, the teacher formalizes the scientific and mathematical concepts behind the students' observations. Students are introduced to key data analysis concepts such as **mean, median, and sample standard deviation**, helping them quantify and summarize the results of their experiments. The teacher also explains **trajectory stability**, linking observed flight behaviors to aerodynamic principles like lift, drag, and center of gravity. Students then **organize their collected data**, calculate averages, and identify patterns. Finally, the teacher explains the expected **"hump" shape** of the graph plotting **angle of launch vs. flight distance**, showing that moderate angles often yield the greatest distance, while very low or high angles reduce performance.	10-12'
Extension	Students expand their investigation by **running the full experiment**, performing **five throws** at each of the three angles for every wing model. They **record the resulting distances or flight times** and calculate statistical measures such as **mean, median, and standard deviation**, allowing them to analyze patterns and variability in their data. Students then create hand-drawn **graphs** to visualize their results, including error bars representing ± standard deviation. Finally, students apply **engineering reasoning** to interpret their findings, considering how factors such as center of gravity (CG), dihedral angle, and wing area influence flight performance.	30'
Evaluation	Students **analyse and compare their experimental results** to determine which wing designs and launch angles performed best. Teams use **medians** as the primary ranking metric and standard deviations as a tie-breaker. Students then engage in a **quick reflection**, answering questions such as which angle and wing shape worked best and how stable each flight was. Next, students complete a self-assessment, reflecting on what aspects of their experimental design and execution were successful and what could be improved in future trials. Finally, the teacher reviews team outcomes using a rubric, checking for understanding of scientific concepts, accuracy in data analysis, and application of engineering reasoning.	10'

5E Model activity planning

Phase	Procedure	Time
Engagement	The lesson begins by capturing students' curiosity and activating their prior knowledge through guided questioning and i**nteractive discussion**. The teacher prompts students to think critically about real-world flight dynamics by asking: *"Why does a glider fly longer? Why does a dart fly straighter and faster?"* These questions encourage students to observe differences in flight behavior and consider the underlying physics. Students then engage in a brainstorming session to identify factors that might **affect the flight path** of an object, such as angle of launch, mass, wing area, and center of gravity (CG). Students generate hypotheses and connect the activity to scientific concepts like aerodynamics, gravity, and inertia. To assess prior understanding and maintain engagement, a quick **pre-assessment** is conducted using a **Mentimeter poll or** a **show-of-hands** activity. This provides the teacher with insight into students' existing knowledge but also gives students an interactive and participatory way to share ideas getting students involved and curious about the upcoming hands-on activities.	8'
Exploration	Students investigate the factors affecting flight. Working in teams, they select three different wing shapes and three throwing angles (10°, 20°, 30°) to test. This allows students to explore how design and launch angle influence flight distance and stability. Students are guided to plan for controlled variables, ensuring a fair test: all gliders use the same type of paper, the same student performs the throws, and the experiments take place in a consistent environment. This teaches the importance of controlling variables in scientific experimentation. Teams design their experiment by planning five trials per angle, allowing them to collect sufficient data for analysis. They then construct the gliders, using minimal tape and optional ballast only if it can be applied consistently, emphasizing precision and reproducibility in their models. Before formal data collection, students perform 2–3 test throws to calibrate throwing force, which helps them standardize their technique and ensures that differences in flight are due to their experimental variables rather than inconsistent effort.	30'

5E Model activity planning

Phase	Procedure	Time
Explanation	The teacher gathers students and builds on their discoveries. Key concepts are introduced: simple circuit, connection, polarity, and conductivity. Visual explanations and simple metaphors (e.g. electricity as a road) are used. Students match vocabulary with images and demonstrate understanding through quick checks	40'
Extension	Students design an artwork that represents their identity or a meaningful symbol. They create the front design and build the circuit on the back using LED, battery, and copper tape. Students test, debug, and improve their designs while supporting each other through peer collaboration.	70'
Evaluation	A Gallery Walk is organized with dimmed lights to display illuminated artworks. Students present their work using simple sentences: "My design shows..." "I chose this because..." Teacher and peers give supportive feedback. Students complete a short reflection to evaluate their learning and experience.	40'

Impact maximization and further info

Final Product/ Outcome	1. **Foldable Model Card for Each Airplane:** Each team creates a card documenting the design of each glider, including wing shape, angle of launch, and any modifications such as ballast or dihedral. 2. **Completed Statistics Sheet:** Students compile their experimental data into a sheet that includes **mean, median, and standard deviation** for each wing-angle combination. 3. **Hand-Drawn Graph:** Students create a visual representation of their data, plotting flight distance or time against launch angle for each model.

Reflection and self-evaluation for students	During the Evaluation Phase, students think about their progress and experiments.
	• Analysis of Results: Students answer reflective questions.
	  ◦ *Which angle and wing shape gave the best median? Why?*
	  ◦ *How does the standard deviation support your conclusion?*
	• Self-Assessment of Design: Students list **two improvements** for their next model.
	• Reflective Recording: Responses can be submitted on Traffic Light Cards (green = confident, yellow = somewhat confident, red = need help), Exit Tickets, or a Reflective Journal/Log.

Assessment	**Mentimeter Poll:** Students respond to quick questions about flight, gliders, and darts to gauge prior knowledge and misconceptions. **Discussion Questions:** Teacher-led prompts such as *"Why does a glider fly longer? Why does a dart fly straighter?"* to activate thinking and assess understanding of basic aerodynamics. **Observation Checklist:** Teacher monitors teamwork, collaboration, creativity, and adherence to experimental procedures. **Data Sheet Accuracy:** Students record flight distances, angles, and other variables; teacher checks for completeness, correctness, and proper handling of controlled variables. **Statistics Correctness Check:** Teacher verifies that students correctly calculated mean, median, and standard deviation. **Rubric-Based Product Evaluation:** Teams' foldable model cards, hand-drawn graphs, and overall experimental documentation are assessed for scientific accuracy, clarity, and engineering reasoning. **Reflection Answers / Self-Assessment:** Students respond to reflective prompts (e.g., best wing shape, supporting evidence, proposed improvements) to demonstrate understanding and metacognition.

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DESIGN OF AN AIR-POWERED ROCKET CAR IN A STEAM-BASED ICT PROJECT

Learning outcomes

Students will:

- understand key physical laws related to motion, with special focus on Newton's Third Law of Motion (action–reaction), as well as the role of air pressure, friction, mass distribution, and air resistance. They recognize how theoretical physical principles manifest in a real, observable system.
- develop problem-solving and design thinking skills through planning, building, testing, measuring, data collection and iterative improvement. They strengthen digital competencies by documenting their work, collaborating through online tools and presenting results in digital form.
- develop an inclusive and entrepreneurial mindset, learning to cooperate in heterogeneous teams, value different ideas, take initiative, experiment, accept failure as part of learning and continuously refine their solutions.

Main subject	Mathematics and engineering
Related subjects	Physics, Science, Technology, Mathematics, Art, ICT – Information and Communication Technology ICE: Inclusion, Creativity, Entrepreneurship
Total time	3 × 45 minutes (135 minutes total)
Number of students	20-30 students (teams of 3 or 4)
Age group	13+

The activity in a nutshell

Introduction	This lesson is an ICT-integrated STEAM project in which students design, build and test an air-powered rocket car. The core aim is for learners to understand the physical laws of motion through direct experimentation, especially Newton's Third Law, which states that every action force has an equal and opposite reaction force. Students experience how air expelled backward generates forward motion of the vehicle. Throughout the project, learners use digital tools for planning, collaboration, data recording and presentation, while working in an inclusive, team-based and inquiry-driven learning environment. The teacher facilitates learning by guiding reflection and supporting exploration rather than delivering ready-made solutions.
Resources/ Equipment/ Materials	Laptops or tablets (minimum one per group), internet access, Padlet or Jamboard for brainstorming, Canva or Google Slides for digital documentation, measuring tape or ruler, cardboard or foam board, plastic bottles, bottle caps or wheels, straws or wooden skewers for axles, balloons or manual air pumps for propulsion, adhesive tape, glue, scissors, markers, safety goggles.
Prior Knowledge	Basic computer and internet skills, experience with simple group work, understanding of basic measurement units (cm, m), everyday experience with moving objects.
Pedagogies Used	Enquiry-Based Learning, Problem Solving, Project-Based Learning, Collaboration, Learning by Doing

5E Model activity planning

Phase	Procedure	Time
Engagement	The teacher introduces the topic using a visual stimulus (image or short video) of an air-powered or balloon-driven vehicle. Students respond to open-ended guiding questions such as: *What happens when air is released from a balloon? Why does the object move in the opposite direction? What factors might influence how far or how fast a vehicle can move?* Students record their initial ideas and assumptions on a digital collaboration tool (e.g., Padlet). No formal explanations or definitions are provided at this stage.	15'
Exploration	Students work in small teams to design and build their first air-powered rocket car prototype. During planning, they discuss how variables such as wheel alignment, mass distribution, friction, and the direction of air release may affect motion. Teams construct the prototype, test it on a flat surface, measure the distance travelled, and observe speed and stability. Students formulate simple, testable hypotheses (e.g., reducing friction will increase distance), modify their design, and retest. Through hands-on experimentation, students directly experience the practical effects of Newton's Third Law, observing how backward air flow generates forward motion.	35'
Explanation	Building on the exploration results, the teacher guides a structured discussion to formalize understanding. Key concepts are introduced and clarified, with emphasis on Newton's Third Law of Motion (action–reaction) and a qualitative interpretation of Newton's Second Law (relationship between force, mass, and acceleration). The roles of friction, air resistance, and mass distribution are explicitly discussed. Visual aids such as diagrams or short animations support concept formation. Students connect their experimental observations and measurements to the corresponding physical laws, and misconceptions are addressed.	20'

5E Model activity planning

Phase	Procedure	Time
Extension	Students apply their conceptual understanding by redesigning and optimizing their rocket cars. Each group deliberately modifies one or more parameters (e.g., reducing friction, improving wheel alignment, changing mass distribution, adjusting air outlet direction) and conducts additional tests. Results are compared with previous measurements to evaluate improvement. Students digitally document each iteration using ICT tools, including photos, short explanations, and simple data tables. This phase deepens learning by linking theory to practice and encourages creativity, experimentation, and evidence-based decision-making.	40'
Evaluation	Students present their final prototypes and digital documentation through a gallery walk or an online Padlet wall. Peer feedback is provided using predefined criteria focusing on functionality, application of physical laws, clarity of explanation, and quality of digital presentation. Students complete self-assessment and reflection activities to evaluate their learning progress and teamwork. The teacher conducts summative assessment using a rubric and provides feedback on both the process and the final outcomes.	20'

Impact maximization and further info

Final Product/ Outcome	A functional air-powered rocket car prototype accompanied by a digital presentation or poster that documents the engineering design process, testing results, applied physical laws (especially Newton's Third Law), and design improvements.
Reflection and self-evaluation for students	Students complete structured reflection activities such as exit tickets, reflective journals or digital logs. Guiding questions include: *Which design decision had the greatest impact on performance? How did Newton's laws appear in your experiment? What would you change in a further iteration?* Students also complete self-assessment and peer-assessment forms focusing on collaboration, creativity and problem-solving
Assessment	**Pre-assessment:** KWL chart or short digital poll during the Engagement phase to identify prior knowledge. **Formative assessment:** teacher observation checklist, monitoring of teamwork and iterative improvements during Exploration and Extension. **Summative assessment:** rubric-based evaluation of the final prototype and digital product, complemented by student self- and peer-assessment during the Evaluation phase
Other information	This activity plan is based on the 5E learning model, STEAM pedagogy, and the Engineering Design Process. It supports inclusive learning environments, entrepreneurial competencies and purposeful integration of ICT tools. The project is adaptable to different classroom contexts and student ability levels

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SPAGHETTI BRIDGE CHALLENGE. TRUSS STRUCTURE AND EFFICIENCY

Learning outcomes

Students will:

- design and build simple structures applying basic engineering principles;
- use measurement and calculation skills accurately in practical tasks;
- solve problems through testing, experimentation, and improvement;
- collaborate effectively and share responsibilities within a team;
- analyze data and evaluate results using critical thinking;
- understand basic structural principles, forces, and material properties;
- recognize the importance of efficiency in design and resource use;
- demonstrate curiosity and creativity in developing solutions;
- show persistence and resilience when facing challenges;
- apply responsibility and safety awareness during activities;
- demonstrate respect, active listening, and constructive collaboration;
- reflect on their learning process and identify areas for improvement.

Main subject	Mathematics and engineering
Related subjects	**Mathematics** (ratios, basic statics) **Visual Arts** (technical drawing, design) **Physics** (force, torque, load distribution) **ICE:** Inclusion (team roles), Creativity (design solutions), Entrepreneurship (budgeting and planning options)
Total time	2 x 45 minutes (or 1 x 90 minutes)
Number of students	20-30 students (teams of 3 or 4)
Age group	13+

The activity in a nutshell

Introduction	In this lesson, students will explore **STEAM** concepts by designing and building a **truss bridge** from spaghetti. They will learn about the **structural role of triangles, load distribution, and material efficiency**, while applying inclusion, creativity, and entrepreneurship (ICE) principles by working in diverse teams, assigning roles, and managing a "budget" of materials. Students will plan their design, build a prototype, test its load-bearing capacity, and analyze the results. They will also reflect on what worked, what failed, and how to improve their bridge in the next iteration.
Resources/ Equipment/ Materials	**Building materials:** 200–250 g dry spaghetti per team, glue gun or wood glue + CA glue + accelerator, protective mat **Measuring tools:** Scale (grams accuracy), ruler, marker, A3 paper for bridge design, two tables or chairs as supports (span 45–50 cm), hook or clip for loading, small weights, water bottle, or sandbags for testing load **Digital / Optional tools:** Laptops or tablets (for recording data, creating design sketches, or documenting the process), spreadsheet software or Google Sheets (for recording load, mass, and calculating efficiency), optional apps: Canva or simple drawing apps (for bridge design) **Other resources:** Safety glasses (optional but recommended), teacher handouts with instructions, rubrics, and data sheets, observation checklist for teamwork and safety
Prior Knowledge	• Basic measurement skills • Simple calculations and ratios • Teamwork skills • Basic drawing/design skills • Safety awareness
Pedagogies Used	• Inquiry-Based Learning • Project-Based Learning • Problem Solving • Collaboration • Learning by Doing • Gamification

5E Model activity planning

Phase	Procedure	Time
Engagement	The teacher uses activities that help students connect their prior knowledge of measurement, geometry, and basic structures to the new task of building a spaghetti bridge. The teacher does not lecture or explain concepts in detail but instead uses demonstrations, questions, or hands-on mini-experiments—such as showing a cardboard frame and inserting a diagonal—to illustrate the stabilizing effect of triangles. Students are encouraged to predict outcomes, discuss in small groups, and reflect on what makes structures strong. Pre-assessment tools, like quick questions or group discussions, can be used to gauge students' prior knowledge and guide the lesson effectively.	8-10'
Exploration	Students work on hands-on activities to apply their prior knowledge and develop new ideas about truss structures and material efficiency. They investigate how triangles and different joint designs affect the strength of a bridge. Students form testable questions, design a preliminary bridge model, conduct experiments, gather measurements, and analyze the data to see how design choices influence load capacity. They use the Engineering Design Process (EDP) to plan, prototype, test, and refine their bridge. Working in teams allows students to share ideas, communicate effectively, and solve problems collaboratively. Digital tools like Padlet, Jamboard, or spreadsheet apps can help them record designs, collect data, and visualize results.	30'
Explanation	The teacher addresses the questions and observations that students developed during the exploration phase. This phase is more teacher-directed but closely guided by students' experiences. Students demonstrate their understanding of truss structures, load distribution, and material efficiency, while the teacher clarifies misconceptions and explains key concepts such as why triangles provide stability, how joints affect strength, and how to calculate bridge efficiency (N/kg). Teachers can use short videos, interactive presentations, diagrams, or infographics to support understanding. Vocabulary and technical terms may be introduced using tools like Quizlet or visual aids. Students are encouraged to relate these explanations directly to their own bridge designs and test results, linking theory to practical outcomes.	40'

5E Model activity planning

Phase	Procedure	Time
Extension	Students continue their hands-on work by completing and improving their spaghetti bridges. They apply the knowledge gained in the exploration and explanation phases to test different design solutions, strengthen weak points, and optimize efficiency (N/kg). Students may also connect this project to other subjects, such as mathematics for calculations, physics for forces and torque, or visual arts for bridge design aesthetics. They can create a final product that includes the bridge, a measurement report, and a visual presentation or poster summarizing their results and improvements. Using ICT tools like Canva, Jamboard, or Genially, students can document their process, display graphs of load versus bridge mass, and communicate their findings creatively. This phase encourages deeper understanding, reflection, and interdisciplinary learning.	30'
Evaluation	Students reflect on their learning and compare their results to the goals set at the start of the lesson. They assess their understanding of truss structures, material efficiency, and teamwork, while teachers evaluate progress toward the learning outcomes. Both formative and summative assessments can be used. Students may complete a rubric evaluating design, construction, data collection, and reflection. They can also share results and insights through a gallery walk, digital poster, or online Padlet wall. Self-assessment and peer feedback using Google Forms or reflective journals encourage students to identify strengths, areas for improvement, and next steps. This phase helps students recognize their growth, consolidate learning, and expand their understanding by discussing findings with others.	10'

Impact maximization and further info

Final Product/ Outcome	• Refined spaghetti bridge prototype optimized for strength and efficiency. • Data report or infographic showing measurements, maximum load, and efficiency (N/kg). • Visual presentation or poster summarizing the design process, test results, improvements, and lessons learned. • Optionally, a digital product such as a Canva poster, Jamboard board, or Genially presentation that communicates the project outcomes creatively.
Reflection and self-evaluation for students	**Reflective journals or learning logs**: Students write about what worked, what failed, and what they would improve in the next iteration.
Assessment	• **Exit tickets**: Short responses to prompts like "What was the most important thing you learned today?" or "What would you change in your bridge design?" • **Traffic light cards**: Students indicate understanding/confidence with red (need help), yellow (some understanding), green (fully understood). • **Self-assessment rubrics**: Students rate their own performance on design, teamwork, construction, data collection, and reflection. • **Peer feedback forms**: Students give constructive feedback to teammates about their contributions and collaboration.
Other information	This activity plan is based on the 5E learning model, STEAM pedagogy, and the Engineering Design Process. It supports inclusive learning environments, entrepreneurial competencies and purposeful integration of ICT tools. The project is adaptable to different classroom contexts and student ability levels.

Impact maximization and further info

Final Product/ Outcome	1. **Foldable Model Card for Each Airplane:** Each team creates a card documenting the design of each glider, including wing shape, angle of launch, and any modifications such as ballast or dihedral. 2. **Completed Statistics Sheet:** Students compile their experimental data into a sheet that includes **mean, median, and standard deviation** for each wing-angle combination. 3. **Hand-Drawn Graph:** Students create a visual representation of their data, plotting flight distance or time against launch angle for each model.

Reflection and self-evaluation for students	During the Evaluation Phase, students think about their progress and experiments.
	• Analysis of Results: Students answer reflective questions.
	  ◦ *Which angle and wing shape gave the best median? Why?*
	  ◦ *How does the standard deviation support your conclusion?*
	• Self-Assessment of Design: Students list **two improvements** for their next model.
	• Reflective Recording: Responses can be submitted on Traffic Light Cards (green = confident, yellow = somewhat confident, red = need help), Exit Tickets, or a Reflective Journal/Log.

Assessment	**Mentimeter Poll:** Students respond to quick questions about flight, gliders, and darts to gauge prior knowledge and misconceptions. **Discussion Questions:** Teacher-led prompts such as *"Why does a glider fly longer? Why does a dart fly straighter?"* to activate thinking and assess understanding of basic aerodynamics. **Observation Checklist:** Teacher monitors teamwork, collaboration, creativity, and adherence to experimental procedures. **Data Sheet Accuracy:** Students record flight distances, angles, and other variables; teacher checks for completeness, correctness, and proper handling of controlled variables. **Statistics Correctness Check:** Teacher verifies that students correctly calculated mean, median, and standard deviation. **Rubric-Based Product Evaluation:** Teams' foldable model cards, hand-drawn graphs, and overall experimental documentation are assessed for scientific accuracy, clarity, and engineering reasoning. **Reflection Answers / Self-Assessment:** Students respond to reflective prompts (e.g., best wing shape, supporting evidence, proposed improvements) to demonstrate understanding and metacognition.

Impact maximization and further info

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DESIGN THINKING CHALLENGE: SOLVE A REAL-WORLD VET PROBLEM

Learning outcomes

- Develop problem-solving and design thinking skills
- Enhance collaboration and digital communication
- Foster inclusive and entrepreneurial mindsets
- Improve creativity through STEAM-based tools
- Strengthen user-centered thinking and practical innovation skills
- Communicate ideas clearly using prototypes and visual tools

Main subject	ICT / Entrepreneurship / Technology
Related subjects	Art, Engineering, Science, Economics, Design
Total time	60–90 minutes
Number of students	10-25
Age group	13-18

The activity in a nutshell

Introduction	In this lesson, students explore how Design Thinking can be used to solve real-world challenges in vocational education and training (VET). Working in small teams, they identify a problem from an everyday school or workplace context, define the needs of a specific user, brainstorm creative solutions, and build a simple prototype using digital or physical materials. The activity promotes creativity, critical thinking, teamwork, and user-centered problem-solving—essential STEAM and entrepreneurial competencies for future careers.
Resources/ Equipment/ Materials	• Paper, cardboard, LEGO, markers, scissors, tape • Laptops/tablets • Padlet or Jamboard for brainstorming • Design Thinking worksheet (Empathize – Define – Ideate – Prototype – Test) • Optional: Canva or Miro for digital prototyping • Short video showing a real-world problem situation
Prior Knowledge	Students should have: • Basic teamwork and communication skills • Basic digital skills (Padlet, Jamboard, device handling) • Awareness of everyday problems in school or workplace contexts
Pedagogies Used	Design Thinking • Inquiry-Based Learning • Collaboration • Project-Based Learning • Learning by Doing • Creativity and Innovation Methods

5E Model activity planning

Phase	Procedure	Time
Engagement	Teacher shows a short video (Why Some Designs Are Impossible to Improve: Quintessence: https://youtu.be/DEg5u1kyNEs?si=AXzgRTCBsyfwhsoK) of an everyday or workplace problem (e.g., a broken product, an unclear workflow). Afterwards, they briefly discuss who experiences this problem and how it affects daily work or life. Using Padlet, they collaboratively collect additional problem situations they have observed, creating a shared overview that prepares them for the Design Thinking process.	15'
Exploration	Students work in teams to explore the problem using Design Thinking: 1. Empathize: 2. Identify a real user (e.g., student, teacher, technician, customer, patient) and their needs. 3. Define: 4. Formulate one clear problem statement: 5. "A user struggles with X because Y." 6. Ideate: 7. Brainstorm at least 5 possible solutions on sticky notes or Padlet. 8. Encourage creativity without judgment. Students investigate the problem, ask questions, compare ideas, and test initial assumptions using digital tools or simulations.	30'
Explanation	Teacher explains the Design Thinking process using examples and clarifies key concepts. Vocabulary or important terms can be introduced using a short video, infographic, or Quizlet activity. Teams refine their problem statement and select their best idea using "Dot Voting". Teacher corrects misconceptions and supports clearer user-centered thinking	20'

5E Model activity planning

Phase	Procedure	Time
Extension	Teams develop a simple prototype of their chosen solution using: • Craft materials (paper, cardboard, LEGO, markers) or • A digital tool (Canva, Miro) Students prepare a short explanation: • Who is the user? • What is the problem? • How does our prototype solve it? • Why is this solution better than existing alternatives?	40'
Evaluation	Gallery Walk: Teams present their prototypes to their classmates. Students walk around the room, review the different prototypes, and give peer feedback using the "Two Stars and One Wish" method. This means they provide two positive comments (two stars) and one constructive suggestion for improvement (one wish) for each prototype. Students complete a reflective journal entry: "What did I learn about creative problem-solving today?" Teacher uses a rubric to evaluate teamwork, creativity, clarity, and user-centeredness.	20'

Impact maximization and further info

Final Product/ Outcome	A physical or digital prototype demonstrating a user-centered solution, along with a short explanation of the problem, target user, and rationale behind the design.
Reflection and self-evaluation for students	• Exit ticket: "One challenge & one insight from today." • Self-checklist: user understanding, creativity, teamwork. • Short reflective journal.
Assessment	Pre-assessment: Mentimeter poll on "What is a problem?" During: Teacher observation checklist, peer feedback, group discussions Post-assessment: Rubric-based evaluation of prototype + student reflection
Other information	This activity is based on Design Thinking principles as described in the EnterSTEAM chapter "Why Creativity Matters in STEAM Subjects". Change The Way You Solve Problems Using Design Thinking: https://youtu.be/MMouHj75YwQ?si=7uwdUACpgeGn1sdT Problem Tree Template: Problem Tree | Genially templates FREE Problem Tree Template | Miro 2025 https://www.mural.co/templates/problem-tree-analysis

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ACT IT OUT: USING THEATRE & VISUAL STORYTELLING TO UNDERSTAND STEAM PROBLEMS

Learning outcomes

- Improve communication and presentation skills
- Develop empathy and social understanding
- Use visual techniques to illustrate abstract concepts
- Strengthen teamwork and creativity

Main subject	Drama / Arts / Communication
Related subjects	Drama / Arts / Communication
Total time	45-60 minutes
Number of students	10-25
Age group	14-28

The activity in a nutshell

Introduction	This lesson helps students understand and explain problems by acting them out. Using theatre improvisation and visual storyboards, students explore communication challenges, customer interactions, or technical misunderstandings that often occur in vocational settings. Theatre techniques improve empathy and social skills, while visual tools help structure professional communication.
Resources/ Equipment/ Materials	• Paper, markers • Canva, Jamboard, or Google Slides • Space for short role-plays • Props (optional): objects, costumes, tools
Prior Knowledge	What should students already know before starting this lesson? • Basic teamwork skills • Willingness to participate in simple theatre exercises • Basic communication skills
Pedagogies Used	• Theatre-based learning • Visual Thinking Strategies • Collaboration • Learning by Doing • Inquiry-Based Learning

5E Model activity planning

Phase	Procedure	Time
Engagement	Warm-up game: "Freeze Frame" • Teacher calls out workplace situations such as: • "customer complaint", "machine not working", "confused patient". • Students freeze in a pose representing the situation. • This activates prior knowledge and introduces the idea of reading body language and communication issues.	15'
Exploration	Students work in small groups to explore the problem dramatically and visually. 1. Teams choose or receive a real VET-related situation, e.g.: ◦ Customer is unhappy ◦ Patient is afraid or confused ◦ Machine shows an error code ◦ Team miscommunication 2. Teams analyse the situation, discussing: ◦ Who is involved? ◦ What emotions or misunderstandings are present? ◦ What makes the situation difficult? 3. Groups create a short "problem scene" (20–30 sec) ◦ Only show the problem, not the solution ◦ Focus on communication breakdown, tone, and gestures 4. They sketch 2–3 simple drawings of the key moments ◦ Early visualisation of the problem ◦ Helps structure their understanding ◦ Can be done on paper or Jamboard/Canva	20'

5E Model activity planning

Phase	Procedure	Time
Explanation	Teacher provides targeted input based on what students explored: • Why theatre techniques help identify emotions, misunderstandings, and communication problems • How visual storyboards structure interactions and make problems visible • Simple tips for effective acting (voice, space, gesture, clarity) • Simple tips for visual storytelling (sequence, perspective, highlighting key moments) Then: Teams create a complete 4–6-panel storyboard of their "problem scene", either analog or digital.	20'
Extension	Teams now perform the Solution Scene. 1. Re-play the same situation — but this time: ◦ using clearer communication ◦ showing empathy ◦ solving the misunderstanding ◦ demonstrating professional behaviour 2. Teams update their storyboard to include: ◦ the improved communication ◦ the new outcome ◦ clear visual representation of the solution	20'
Evaluation	Students share their scenes and storyboards. Peer Feedback Questions: • Was the problem clear? • Was the solution realistic and professional? • Did the visual storyboard help explain the situation? Student reflection: Short written response: "How did theatre help me understand the problem better?" Teacher evaluates teamwork, communication, and creativity.	20'

Impact maximization and further info

Final Product/ Outcome	A short role-play consisting of a Problem Scene and a Solution Scene A visual storyboard (analog or digital) of the situation and its resolution
Reflection and self-evaluation for students	• Exit ticket: "One challenge & one insight from today." • Self-checklist: user understanding, creativity, teamwork. • Short reflective journal.
Assessment	Pre: Warm-up observation (Freeze Frame) During: Peer review forms, teacher observation checklist Post: Rubric evaluating: • Communication clarity • Realism and professionalism of solution • Quality and coherence of storyboard • Collaboration and creativity
Other information	Activity based on the chapter "Theatre and Visual Techniques in STEAM" in your EnterSTEAM project material.

#CREATIVITY

COMPUTATIONAL THINKING LAB: TURN A REAL-WORLD TASK INTO AN ALGORITHM

Learning outcomes

- Understand and apply computational thinking steps
- Break down real-world problems into clear, logical steps
- Develop structured workflows (algorithms)
- Improve problem-solving and digital reasoning
- Connect STEAM logic with vocational tasks

Main subject	ICT / Computer Science
Related subjects	Engineering, Mathematics, Robotics, Economics
Total time	45-60 minutes
Number of students	10-25
Age group	14-25

The activity in a nutshell

Introduction	In this lesson, students learn how Computational Thinking supports problem-solving in technical and vocational fields. They decompose a professional task (e.g., checking a machine, onboarding a customer, preparing materials) into small steps, identify patterns, and create a clear algorithm. Students can also implement their workflow in Scratch or Blockly for deeper understanding.
Resources/ Equipment/ Materials	• Laptops/tablets • Scratch, Blockly, or Draw.io • Worksheets (decomposition + patterns + algorithm) • Whiteboard & markers
Prior Knowledge	What should students already know before starting this lesson? • Basic digital skills • Ability to describe simple steps • No coding experience required
Pedagogies Used	• Theatre-based learning • Visual Thinking Strategies • Collaboration • Learning by Doing • Inquiry-Based Learning

5E Model activity planning

Phase	Procedure	Time
Engagement	Teacher demonstrates a simple "everyday algorithm": "How to make a sandwich". Students notice how many tiny steps are needed.	15'
Exploration	Teams choose one VET-related process, e.g.: • "Checking in a gym customer" • "Starting a machine safely" • "Preparing a meal" • "Cleaning a workspace" Students decompose the task into small steps and identify patterns.	20'
Explanation	Teacher explains: • Decomposition • Pattern recognition • Abstraction • Algorithm design • Students refine their steps to be more precise.	20'
Extension	Teams create their algorithm, in one of these formats: • Flowchart (draw.io / Canva) • Pseudocode • Scratch/Blockly implementation • Step-by-step instructions	20'
Evaluation	Teams test each other's algorithms: "Can another group follow the steps correctly?" Students adjust unclear steps. Reflection: "What did I learn about thinking like a computer?"	20'

Impact maximization and further info

Final Product/ Outcome	Reflection and Self-Evaluation • Exit ticket: "Which CT step was hardest?" • Self-checklist: clarity, logic, precision • Short journal entry
Reflection and self-evaluation for students	• Exit ticket: "One challenge & one insight from today." • Self-checklist: user understanding, creativity, teamwork. • Short reflective journal.
Assessment	Pre: KWL chart on "What is CT?" During: Teacher observation, peer testing Post: Rubric: clarity, logic, completeness of algorithm
Other information	Based on the chapter section on Computational Thinking.

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