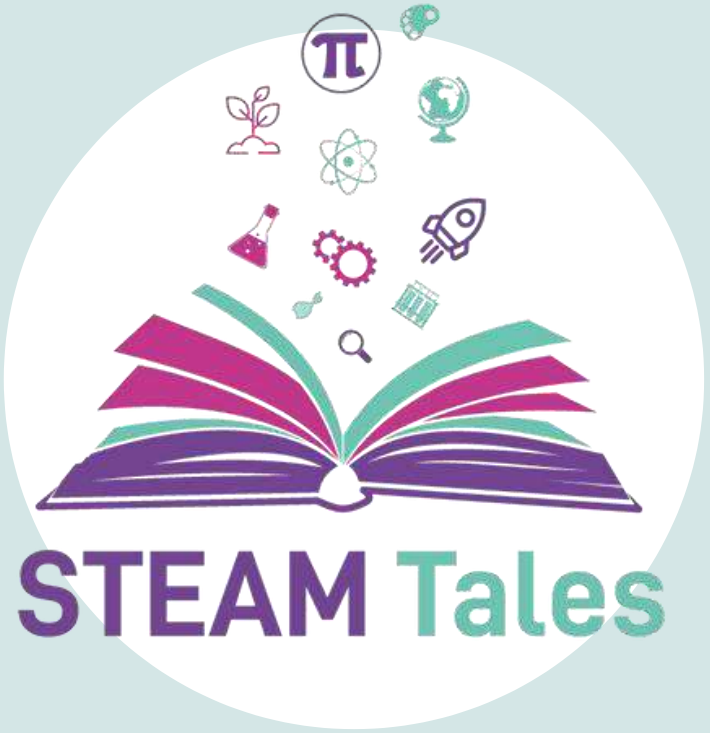


Co-funded by
the European Union

Assessment Protocol

MIND
Mittelhessisches Institut für Nachhaltigkeit und Diversität
GoINNO
U.PORTO
cesie
the world is only one creature
LogoPsyCom

Project Title

STEAM Tales – Enhancing STEAM education through storytelling and hands-on learning (KA220-HE-23 -24-161399)

Work Package

WP2 - STEAM education impact and role models in primary schools

Date of delivery

June 2025

Partners

MIND (Germany): César José de Sousa Reis, Katharina Haack
GoINNO (Slovenia): Nina Skrt Sivec
CESIE (Italy): Cecilie La Monica Grus
Universidade do Porto (Portugal): Carla Morais, Luciano Moreira, Ana Cunha Ferreira, José Pimenta
LogoPsyCom (Belgium): Tara Laura Della Selva

Contents

Assessment Protocol: context and aims 3

Instrument to assess children's perceptions, interest, and motivation in STEM fields 5

Activities 1 to 4: Advantages of analysing the children's perceptions of gender representation in STEM fields 5

Activities 5 and 6: Assess the interest and motivation in STEM fields 12

Selection form of the lesson plan according to the teacher's needs and curriculum objectives 17

References 19

Co-funded by the European Union

Assessment Protocol: context and aims

Project "STEAM Tales: Enhancing STEAM education through storytelling and hands-on learning" has been organised by the European Union's Erasmus+ Programme, based on a collaboration between MIND (Germany), GoINNO (Slovenia), the University of Porto (Portugal), CESIE (Italy), and LogoPsyCom (Belgium). It aims to foster interest in primary school children (especially girls) in Science, Technology, Engineering, Arts, and Mathematics, the STEAM fields, and, potentially, professional careers in STEAM fields in the future. To achieve this purpose, we explore the STEAM approach through the creation of lesson plans that combine storytelling and hands-on activities, available in the project's website, in the e-book and in the booklets. The stories created present women who have excelled in STEAM fields inspired in their biographies, written in a language accessible to children and structured in a tale-like format using the Hero's Journey Model conceptualised by Joseph Campbell (2008) (presented in detail in the Pedagogical Guide in Chapter 1) and subsequently complemented with illustrations of different milestones of each story. The hands-on activities are inspired by the work of female role models and aim to explore the concepts of science, technology, engineering and mathematics, explore the scientific method and link to the curriculum objectives of the 1st cycle of primary school.

As part of the STEAM Tales project, 12 role models were selected from the different fields of science, technology, engineering and maths, with different backgrounds, cultures and career journeys. After, 12 stories were written and 24 hands-on activities were developed.

Considering the purpose of equipping primary school teachers with all the instruments to help implement the materials developed in the project, the assessment protocol for primary school teachers is developed to be consulted in order to guide the implementation of each lesson plan.

Co-funded by the European Union

This **Assessment Protocol** intends to help primary school teachers use the following instruments in order to choose the most appropriate lesson plan for their classroom, and to contextualise their conception:

1. The **Instrument to assess children's perceptions, interest, and motivation in STEM fields** aims to evaluate children's knowledge and perceptions of gender representation in STEAM fields, as well as their interest in them; it is available in the Annexe 1.
2. The **Selection form of the lesson plan according to the teacher's needs and curriculum objectives**, meant to help teachers choose the most adequate lesson plans developed in the project for their classrooms; it is available in the Annexe 2.

A schematic use of the instruments is presented below, in Figure 1.

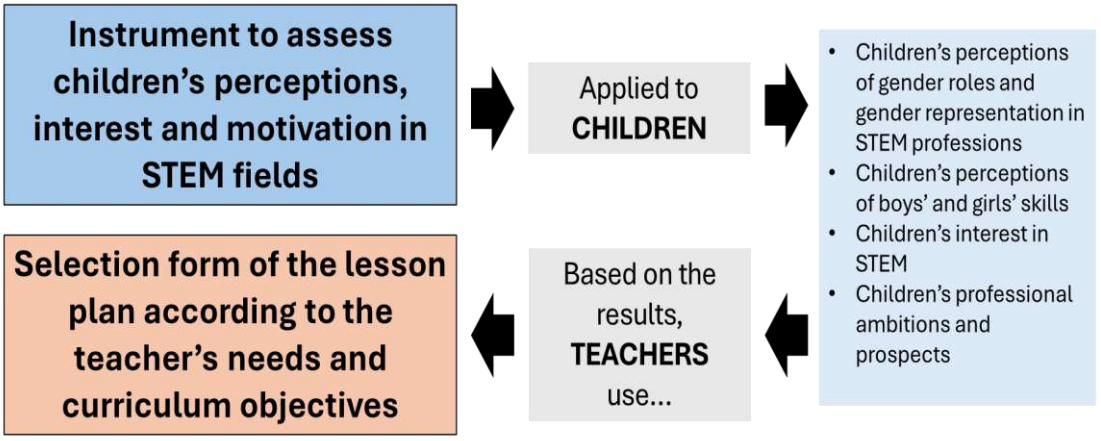


Figure 1 – The relationship between the Instrument for Assessing Children's Perceptions, Interest, and Motivation in STEM and the Lesson Plan Selection Form, which allows teachers to personalise their lessons based on students' needs and curriculum objectives.

The following sections of the document will provide a more detailed presentation of each of the instruments.

Co-funded by the European Union

Instrument to assess children's perceptions, interest, and motivation in STEM fields

The Instrument to assess children's perceptions, interest, and motivation in STEM fields (Annexe 1) is a questionnaire to be administered to the children with a purpose of evaluating children's perceptions through implicit and explicit associations of gender representation in different STEM fields and their associations between gender and different skills (Activities 1 to 4). Besides that, it intends to analyse their interest in STEM fields, their professional ambitions and prospects (Activities 5 to 6).

In order to develop these activities, we considered the theoretical concepts about the development of STEAM initiatives for little children and explored studies that conducted different evaluations of STEAM fields among children. More detailed information is present below.

Activities 1 to 4: Advantages of analysing the children's perceptions of gender representation in STEM fields

Children are vulnerable to gender stereotypes conveyed by their surroundings (family, school and society writ large) and by the media – stereotypes which condition the way they are educated, the way they relate to other people and their own professional and academic ambitions and prospects (Corbett & Hill, 2015; Farias, 2021; OECD, 2022; Sebastián-Tirado et al., 2023; Spencer et al., 2016; Sullivan et al., 2015). For instance, the logical and mathematical skills required in the STEM fields still tend to be associated more with the boys, as do the various professions in the STEM fields, a fact which undermines girls' interest in these subjects and their confidence in studying them, urging them to withdraw from the field (Borsotti, 2018; Botella et al., 2019; Farias, 2021; Gilchrist & Zhang, 2022; PISA, 2022; Piloto, 2023). This hinders gender equity in terms of representation and the capitalisation of human resources that is beneficial to scientific and technological progress.

Co-funded by the European Union

An assessment of children's perceptions of gender representations in STEM fields is, therefore, crucial as it allows for stereotypes, misconceptions, and biases to be effectively recognised and analysed and can be subsequently dealt with and deconstructed. Through this exercise, we can enable both boys and girls to acquire a positive STEAM identity, their individuals' sense of belonging and capacity within STEAM fields, which influences their career choices.

In the present questionnaire:

- Activity 1 deals with implicit association of gender with different STEM fields through colours.
- Activity 2 deals with association of gender with different skills.
- Activity 3 is about explicit association of gender with different STEM fields.
- Activity 4 is related perceptions regarding gender representation and gender roles in various STEM fields.

Next, more details will be provided about the context and structure of each activity.

Activity 1 aims to evaluate the implicit association of gender with professions using images, as well as to examine stereotypes in these associations. To do so, we implement an activity adapted from the research done by Gilchrist and Zhang (2022).

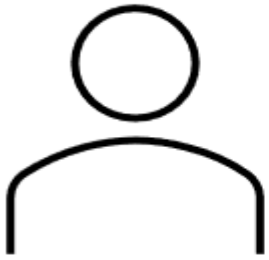
In the study applied by Gilchrist and Zhang (2022), children between the ages of 4 and 5 years listened to a series of short stories about various professions and were asked afterwards to identify what gender they thought the characters belonged to. The children listened to short stories about a nurse, a scientist, a flight attendant, a pilot, a police officer, and an English student in university. After listening to the stories, children associated professions like pilots to be exclusively for males, nurses to be solely for females, practically all scientists and police officers as male, and mostly the flight attendants and university English students as female.

Co-funded by the European Union

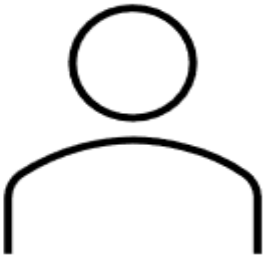
In Activity 1, a generic icon is repeated four times, which is said to belong to people who work in Science, Technology, Engineering and Mathematics, and children will be asked to associate each one of them with a field of STEM and colour the face of the icon according to their perception of gender representation in this field; they can use blue, pink and purple (blue normally associated with male gender, pink normally associated with female gender, and purple as a mix of blue and pink that children learnt in the first years of education); this is meant to get children to externalise possible implicit associations of gender to different STEM fields potentially linked to stereotypes.

1. The people below work in different fields. Paint each face according to the colour you think best suits the person: you can use pink, blue or purple.

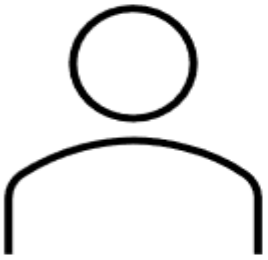
Science field



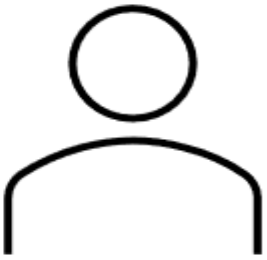
Technology field



Engineering field



Mathematics field



Co-funded by the European Union

Activity 2 intends to present a set of abilities identified in the literature as associated with gender stereotypes and to request that participants associate them with their perception of what gender presents the abilities identified. This activity was inspired by the study developed by Vilia and Candeias (2020), where they evaluated competence factors according to the self-efficacy in science fields, the intellectual accessibility in the field of study, the ability self-concept in the field of study, the self-concept in the field of study. The abilities related to science, technology, engineering and mathematics are typically associated with males, whereas those of care, the arts and literature are more commonly associated with females (Farias, 2021; PISA, 2022; Vilia & Candeias, 2020).

In Activity 2, children are told to match two columns – one lists a series of skills – Reading skills, Digital skills, Writing skills, Leadership skills, Mathematical skills, and Care skills – and the other presents three groups of people, one composed exclusively of boys, another composed by a mixture of boys and girls and a last one composed exclusively of girls. This will diagnose the children's perceptions of the different skills related to STEM and the representation of gender.

Co-funded by the European Union

2. Please match the columns according to the gender you consider having the skills presented.

Reading skills
Who reads well?

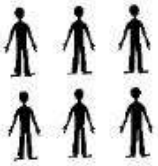
Digital skills
Who is good at surfing the web or handling technology like computers, cell phones, etc?

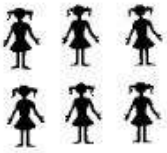
Writing skills
Who is good at writing?

Leadership skills
In the schoolyard, who is more likely to be the leader or captain of a play?

Mathematical skills
Who is good at maths?

Care skills
Who is good at taking care of others?





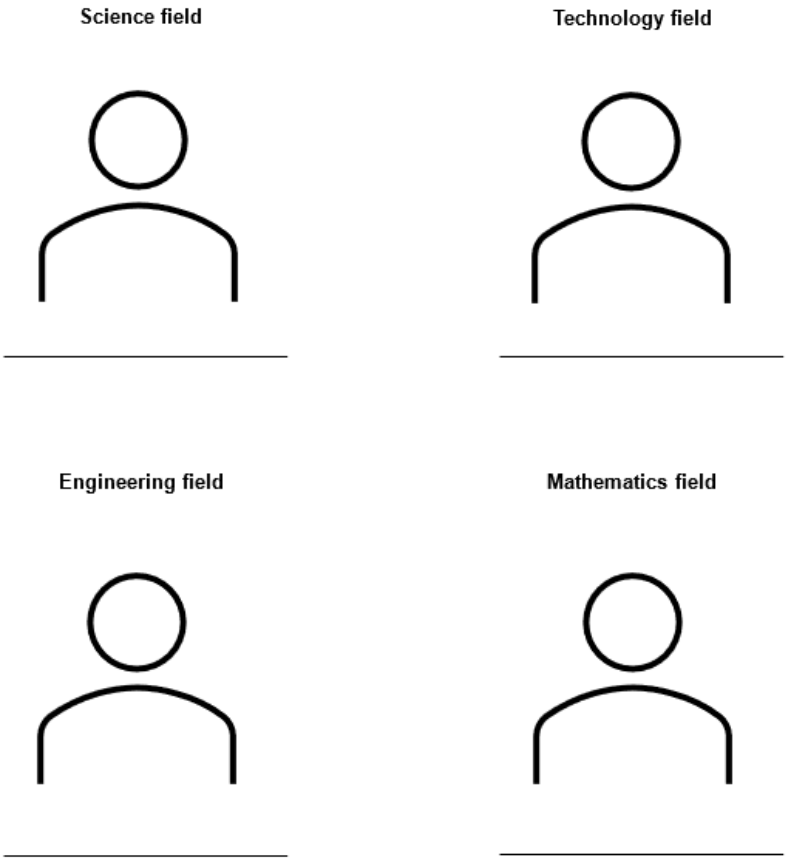
Activity 3 aims to explore the explicit associations of gender with professions using images, examining cultural stereotypes in these associations and comparing them with implicit associations from Activity 1.

Co-funded by the European Union

STEAM Tales

In Activity 3, children are told to return to Activity 1 and write on the line below each picture which gender they thought of for the face ("Boy", "Girl" or "Boy and Girl"). Here they are invited to externalise gender stereotypes explicitly while in Activity 1, implicit associations were sought after. As with Activity 1, the exercise applied by Gilchrist and Zhang (2022) serves as the basis for this Activity.

3. Return to Activity 1 and write on the line below each picture which gender you thought of for the face.



Activity 4 intends to evaluate the perceptions of gender in different professions. This is inspired by a study on attitudes towards the discipline of physics-chemistry by Vilia and Candeias (2020), in which participants were asked who they thought the subject was more suitable for and had to choose one option

Co-funded by the European Union

from the following semantic differentiation scale: “only for boys", "more for boys than for girls", "for boys and girls equally", "more for girls than for boys", "only for girls".

The results of the study by Gilchrist and Zhang (2022) also showed the stereotypical ideas clearly, with all students selecting a pilot as male and a nurse as female. Both the scientist and police officer were imagined to be male by all students except one. The flight attendant is imagined to be female by 12 students and to be male by only 4, whilst the English student is imagined to be female by 11 students and to be male by 5. Overall, the results showed how all of these professions can be viewed under a gender bias and stereotypical light.

In Activity 4, children are presented with a table that lists a series of professional fields – Science, Mechanics, Technology, Kindergarten Education, Engineering, Mathematics – and are told to say if each field *is for* and *can be for* (these are two distinct questions) “Boys”, “Girls” or “Boys and Girls”; the is for question is meant to elicit a judgement of fact, essentially asking children who they think generally works on the field (men, women or both), whereas the can be for question is meant to elicit a judgement of value, asking children if they think only people of a certain gender should work on the field. The intention was to evaluate the perceptions of children about the association of gender with different professions, such as STEM professions and professions identified as extremes in gender representation. To provide a more comprehensive understanding of the subject matter, the inquiry was about which gender is most representative of each profession, as well as which gender could be more representative of each profession.

Co-funded by the European Union

4. For each profession, place an X in one of the options (boys, girls, boys and girls) to help us complete each sentence.

		Boys	Girls	Boys and Girls
Science	is for ...			
	can be for ...			
Mechanics	is for ...			
	can be for ...			
Technology	is for ...			
	can be for ...			
Kindergarten Education	is for ...			
	can be for ...			
Engineering	is for ...			
	can be for ...			
Mathematics	is for ...			
	can be for ...			

Activities 5 and 6: Assess the interest and motivation in STEM fields

According to Cohen (2021) and UNESCO (2017), girls' confidence in their STEM-related abilities (such as critical thinking, creativity, collaboration, and communication) begins to decline between the ages of 6 and 8 (a period coinciding with the first years of school education), closely associated to a negative STEAM identity. This seems to be due to the negative stereotyping, decreasing girls' enjoyment and self-confidence when approaching STEM (Spencer et al., 2016). Assessing children's interest and motivation in STEM allows us to deconstruct stereotypes they may hold, which might be harmful for themselves, constituting an obstacle to the pursuit of their dreams.

In the questionnaire presented:

- Activity 5 explicitly and directly asks children about their interest in Science, Technology, Engineering and Maths (or indifference to them).
- Activity 6 aims to ask children about their career ambitions and prospects and how their parents influence them.

Next, more details will be provided about the context and structure of each activity.

Co-funded by the European Union

Activity 5 and **Activity 6** aim to assess the interest and ambitions for future professions in STEM fields among the children. This activity is inspired by the study of Malecki et al. (2024) that analyses the interest and ambitions for future professions among girls and boys in high school. Although the purpose of this study was to assess which presentation of role models (female, male or gender-neutral) was more likely to stimulate interest in the participants, we used a similar procedure to assess interest and aspirations for future professions in STEM fields in primary school children.

In Activity 5, children are explicitly asked if they are interested in Science, Technology, Engineering and Mathematics – a question to be answered with "Yes", "No" or "I don't know (children might not even know what the field is, case in which they should answer I don't know).

5. Are you interested in the fields of science, technology, engineering and maths? Put an X in the option that apply to you.

	Yes	No	I don't know
Science			
Technology			
Engineering			
Mathematics			

In Activity 6, there are three different questions with the same set of answers – children are asked:

- What profession they want to have in the future, this question will allow to understand the children's ambitions for their future profession.
- What profession they think they will have in the future, this question will allow to compare the children's ambitions and their self-confidence in these fields, their perception of their abilities.
- What profession their parents want them to have in the future, this question will allow the comparison between the children's ambitions, the children's perception of their abilities and the parents' wish for their children's future.

Co-funded by the European Union

And for each question they are told to choose only one of the following fields: science, technology, engineering, mathematics, kindergarten education, mechanics or other (in the last case, they must write the profession in a line in front of the option); if the children have interest in more than one option, they should pick the one they think is their favourite.

6. Put an X in the option that apply to you.

In the future, the profession I want to have is in the field of …

☐ … science

☐ … technology

☐ … engineering

☐ … mathematics

☐ … kindergarten education

☐ … mechanics

☐ Other: _____

In the future, I think I will have a profession in the field of …

☐ … science

☐ … technology

☐ … engineering

☐ … mathematics

☐ … kindergarten education

☐ … mechanics

☐ Other: _____

Co-funded by the European Union

In the future, my parents want me to have a have a profession in the field of ...

- ☐ ... science
- ☐ ... technology
- ☐ ... engineering
- ☐ ... mathematics
- ☐ ... kindergarten education
- ☐ ... mechanics
- ☐ Other: _____

Co-funded by the European Union

To know more about the studies that inspired the creation of the "Instrument to assess children's perceptions, interest, and motivation in STEM fields":

- Gilchrist, E., & Zhang, K. C. (2022). Gender stereotypes in the UK primary schools: Student and teacher perceptions. International Journal of Educational Reform. https://doi.org/10.1177/10567879221114889
- Malecki, W. P., Kowal, M., Krasnodębska, A., Bruce, B. C., & Sorokowski, P.. (2024). The reverse Matilda effect: Gender bias and the impact of highlighting the contributions of women to a STEM field on its perceived attractiveness. Science Education, 108(5), 1474–1491. https://doi.org/10.1002/sce.21878
- Sebastian-Tirado, A., Felix-Esbri, S., Forn, C., & Sanchis-Segura, C. (2023). Gender stereotypes selectively affect the remembering of highly valued professions. Sex Roles. https://doi.org/10.1007/s11199-023-01355-z
- Vilia, P., & Candeias, A. A. (2020). Attitude towards the discipline of physics-chemistry and school achievement: Revisiting factor structure to assess gender differences in Portuguese high-school students. International Journal of Science Education, 42(1), 133–150. https://doi.org/10.1080/09500693.2019.1706012

All these activities will map children's perceptions of gender representation in STEM, their interests and ambitions for future careers in STEM. After administering this instrument and analysing the children's responses, teachers will have a broader perspective on possible stereotypes and the choice of STEM fields to develop in the classroom.

Co-funded by the European Union

Selection form of the lesson plan according to the teacher's needs and curriculum objectives

Based on the information extracted via the Instrument to assess children's perceptions, interest, and motivation in STEM fields, teachers can use the Selection form of the lesson plan according to the teacher's needs and curriculum objectives (Annexe 2) to choose a suitable lesson plan that addresses these topics. It includes information about the stories' role model's names, birth years (and death years if necessary), nationalities, time periods (contemporary or historical), STEM field they worked in and specific disciplines they worked in (i.e., astronomy, geology) and it lists the lesson plans (story and associated hands-on activities – there are two sets of hands-on activities for each role model/story) together with the topics/themes/concepts they cover (i.e., the solar system, electromagnetism, respiratory system) and hyperlinks to access them. Role models' nationalities, time periods and specific STEM fields serve as filters in the documents.

Teachers can choose a lesson plan:

- that addresses a particular STEM field around which children harbour particularly strong gender stereotypes (based on the conclusions drawn on the basis of the instrument)
- that addresses a particular STEM field about which they lack knowledge or interest
- based on subjects and topics that are aligned with curriculum guidelines
- based on the nationality of the role model in order to cement a feeling of familiarity (which can make it easier for the children to identify with her)

The instruments developed within the scope of this project play a crucial role in supporting teachers by providing a practical and clear framework to personalize teaching activities according to the students' needs. By allowing the assessment of students' perceptions, interests, and motivations regarding STEM fields, the instruments help adjust pedagogical approaches, ensuring that each student receives the necessary support.

Co-funded by the European Union

The second instrument, focused on selecting activities according to curriculum objectives and the specific needs of teachers, complements the initial assessment by offering practical guidance for implementing activities in the classroom context. Together, these instruments provide teachers with a holistic and dynamic approach, helping them adapt their teaching practices and create a more inclusive and effective learning environment for students.

Co-funded by the European Union

References

Borsotti, V. (2018). Barriers to gender diversity in software development education: Actionable insights from a Danish case study. In Proceedings of the 40th International Conference on Software Engineering: Software Engineering Education and Training (pp. 146–152).

Botella, C., Rueda, S., López-Iñesta, E., & Marzal, P. (2019). Gender diversity in STEM disciplines: A multiple factor problem. Entropy, 21(1), 30. https://doi.org/10.3390/e21010030

Campbell, J. (2008). The Adventure of the Hero. In J. Campbell (Ed.), The Hero with a Thousand Faces (3rd ed., pp. 49–127). New World Library.

Cohen, S. M., Hazari, Z., Mahadeo, J., Sonnert, G., & Sadler, P. M. (2021). Examining the effect of early STEM experiences as a form of STEM capital and identity capital on STEM identity: A gender study. Science Education, 105(6), 1126–1150. https://doi.org/10.1002/sce.21670

Corbett, C., & Hill, C. (2015). Solving the equation: The variables for women's success in engineering and computing. American Association of University Women.

Farias, S. S. (2021). O PISA 2018 e a educação STEM das raparigas. Instituto de Sociologia da Universidade do Porto. http://www.barometro.com.pt/2021/08/02/o-pisa-2018-e-a-educacao-stem-das-raparigas/

Gilchrist, E., & Zhang, K. C. (2022). Gender stereotypes in the UK primary schools: Student and teacher perceptions. International Journal of Educational Reform. https://doi.org/10.1177/10567879221114889

Malecki, W. P., Kowal, M., Krasnodębska, A., Bruce, B. C., & Sorokowski, P. (2024). The reverse Matilda effect: Gender bias and the impact of highlighting the contributions of women to a STEM field on its perceived attractiveness. Science Education, 108(5), 1474–1491. https://doi.org/10.1002/sce.21878

Co-funded by the European Union

OECD. (2022). Gender stereotypes in education: Policies and practices to address gender stereotyping across OECD education systems (OECD Education Working Papers No. 271). https://doi.org/10.1787/a46ae056-en

Piloto, C. (2023). The gender gap in STEM. MIT Professional Education. https://professionalprograms.mit.edu/blog/leadership/the-gender-gap-in-stem/

PISA. (2022). PISA 2022 results (Volume I): The state of learning and equity in education. OECD. https://www.oecd-ilibrary.org/sites/53f23881-en/index.html

Sebastian-Tirado, A., Felix-Esbri, S., Forn, C., & Sanchis-Segura, C. (2023). Gender stereotypes selectively affect the remembering of highly valued professions. Sex Roles. https://doi.org/10.1007/s11199-023-01355-z

Spencer, S. J., Logel, C., & Davies, P. G. (2016). Stereotype threat. Annual Review of Psychology, 67, 415-437. https://doi.org/10.1146/annurev-psych-073115-103235

Sullivan, K., Byrne, J. R., Bresnihan, N., O'Sullivan, K., & Tangney, B. (2015, October). CodePlus—Designing an after school computing programme for girls. In 2015 IEEE Frontiers in Education Conference (FIE) (pp. 1-5). IEEE.

UNESCO. (2017). Cracking the code: girls' and women's education in science, technology, engineering and mathematics (STEM). https://unesdoc.unesco.org/notice?id=p::usmarcdef_0000253479

Vilia, P., & Candeias, A. A. (2020). Attitude towards the discipline of physics-chemistry and school achievement: Revisiting factor structure to assess gender differences in Portuguese high-school students. International Journal of Science Education, 42(1), 133-150. https://doi.org/10.1080/09500693.2019.1706012

Co-funded by the European Union

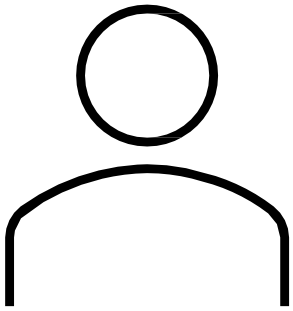
ANNEXES

ANNEXE 1

Gender: ☐ Male ☐ Female ☐ I would rather not say

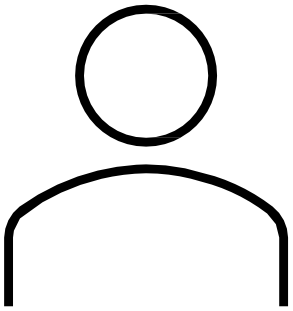
1. The people below work in different fields. Paint each face according to the colour you think best suits the person: you can use pink, blue or purple.

Science field



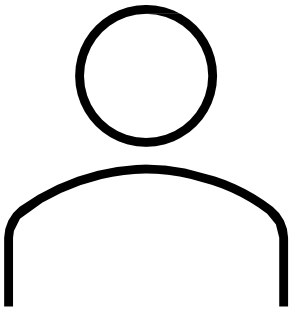
_____

Technology field



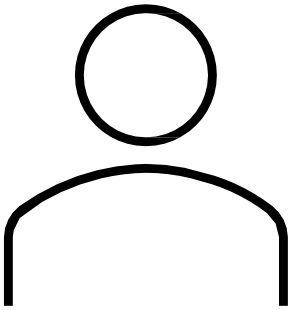
_____

Engineering field



_____

Mathematics field



_____

STEAM Tales

2. Please match the columns according to the gender you consider having the skills presented.

Reading Skills

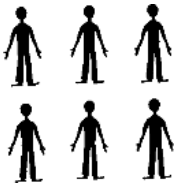
Digital Skills

Writing Skills

Leadership Skills

Mathematical Skills

Care Skills



3. Return to Activity 1 and write on the line below each picture which gender you thought of for the face.

4. For each profession, place an X in one of the options (boys, girls, boys and girls) to help us complete each sentence.

		Boys	Girls	Boys and Girls
Science	is for …			
	can be for ...			
Mechanics	is for …			
	can be for ...			
Technology	is for …			
	can be for ...			
Kindergarten Education	is for …			
	can be for ...			
Engineering	is for …			
	can be for ...			
Mathematics	is for …			
	can be for ...			

5. Are you interested in the fields of science, technology, engineering and maths? Put an X in the option that apply to you.

	Yes	No	I don't know
Science			
Technology			
Engineering			
Mathematics			

STEAM Tales

6. Put an X in the option that applies to you.

Select only one option that applies to you:

In the future, I would like to have a profession in the field of …

- [ ] … science
- [ ] … technology
- [ ] … engineering
- [ ] … mathematics
- [ ] … kindergarten education
- [ ] … mechanics
- [ ] Other: _____

Select only one option that applies to you:

In the future, I think I will be able to have a profession in the field of …

- [ ] … science
- [ ] … technology
- [ ] … engineering
- [ ] … mathematics
- [ ] … kindergarten education
- [ ] … mechanics
- [ ] Other: _____

Select only one option that applies to you:

In the future, my parents think I might have a profession in the field of …

- [ ] … science
- [ ] … technology
- [ ] … engineering
- [ ] … mathematics
- [ ] … kindergarten education
- [ ] … mechanics
- [ ] Other: _____

STEAM Tales

ANNEXE 2

Women Role Model	Birth year	Nationality	Time	STEM field	Specific STEM fields
Zita Martins	1979	Portuguese	Contemporary	S	Geology, Physics and Astronomy
					Geology, Physics and Astronomy
Elvira Fortunato	1964	Portuguese	Contemporary	E-T	Chemistry, Physics
					Chemistry, Physics
Domitila de Carvalho	1871 - 1966	Portuguese	Historical	M	Mathematics, Architecture, Engineering
					Biology and Medicine
Ana Mayer-Kansky	1895 - 1962	Slovenian	Historical	S	Chemistry
					Chemistry
Ángela Piskernik	1886 - 1967	Slovenian	Historical	S	Biology and Arts
					Science and Engineering
Emmy Noether	1882 - 1935	German	Historical	S-M	Physics
					Physics and Engineering
Rose Dieng-Kuntz	1956 - 2008	Senegalese	Contemporary	T-E	Technology and Maths
					Mathematics, Science and Technology
Rita Levi Montalcini	1909 - 2012	Italian	Historical	S	Biology, Engineering, Medicine and Technology
					Biology and Medicine
Samantha Cristoforetti	1977	Italian	Contemporary	E	Astronomy
					Astronomy and Physics
Andreja Gomboc	1969	Slovenian	Contemporary	S	Astronomy and Physics
					Physics
Asta Hampe	1907 - 2003	German	Historical	E	Engineering and Physics
					Engineering, Physics and Mathematics
Maryam Mirzakhani	1977 - 2017	Iranian	Contemporary	M	Engineering and Mathematics
					Engineering and Mathematics

STEAM Tales

Women Role Model	Topics/Themes/Concepts
Zita Martins	universe, solar system, asteroid, meteoroid, meteorite, space dust, magnetism
	universe, solar system, meteoroid, asteroid, meteorite, impact, craters, gravity
Elvira Fortunato	electricity, battery, chemical reaction
	electricity, battery, chemical reaction, paper properties
Domitila de Carvalho	architecture, polyhedra, stability, shapes
	respiratory system, lung function, diaphragm, air pressure
Ana Mayer-Kansky	solvents, useful chemistry, recycling, reusing
	home chemistry, measurement, laboratory equipment
Ángela Piskernik	plants, botanical science, photosynthesis, transpiration, tension-cohesion-adhesion theory
	conservation of nature, environment, ocean pollution, oil, importance of oil, oil spill, substances, oil removal
Emmy Noether	Angular momentum, gyroscope, rotational symmetry, conservation laws
	Bernoulli Principle, airflow, aerodynamics, conservation laws, movement
Rose Dieng-Kuntz	Semantic Web, information links, mind maps, AI
	AI, facial expressions, emotions
Rita Levi Montalcini	microscope, optics
	senses, sight, hearing, smell, taste, touch, nervous system
Samantha Cristoforetti	Solar system, Sun, planets
	Space Rocket, air pressure, motion
Andreja Gomboc	stars, atmosphere, light, light speed, black holes, refraction
	rainbow, Newton's disc, white light, visible light waves
Asta Hampe	Static electricity, attraction, repulsion, electrical charge
	Electromagnetism, magnetic fields, simple circuits
Maryam Mirzakhani	geometry, shapes, manipulation, playdough, 2D and 3D structures
	geometry, shapes, patterns, mosaic, creativity

Women Role Model	History + Hands-on Activity
Zita Martins	1st lesson plan: Zita, the scientist who searched for life in pieces of the Universe + Find a meteorite
	2nd lesson plan: Zita, the scientist who searched for life in pieces of the Universe + Meteorite impact on Earth
Elvira Fortunato	1st lesson plan: Elvira Fortunato, the paper engineer + Fruit battery
	2nd lesson plan: Elvira Fortunato, the paper engineer + The power of chemicals
Domitila de Carvalho	1st lesson plan: Domitila de Carvalho: A fearless trailblazer + Exploring geometry and architecture with the tower challenge
	2nd lesson plan: Domitila de Carvalho: A fearless trailblazer + Lung model
Ana Mayer-Kansky	1st lesson plan: Ana, the brave ~~princess~~ scientist + Solving dried markers
	2nd lesson plan: Ana, the brave ~~princess~~ scientist + Making slime
Ángela Piskernik	1st lesson plan: Ángela, the guardian angel of nature + How flowers absorb water
	2nd lesson plan: Ángela, the guardian angel of nature + Cleaning an oil spill
Emmy Noether	1st lesson plan: Emmy Noether: The Mathematician Who Dared to Dream + Exploring Noether's Angular Momentum
	2nd lesson plan: Emmy Noether: The Mathematician Who Dared to Dream + Exploring Noether's Conservation Principles with the Bernoulli Principle
Rose Dieng-Kuntz	1st lesson plan: Rose, the desert flower and digital mind master + The WWW game
	2nd lesson plan: Rose, the desert flower and digital mind master + The emotional recognition game
Rita Levi Montalcini	1st lesson plan: From An Egg to the Nobel Prize: The Remarkable Journey of Rita-Levi Montalcini + Homemade Microscope
	2nd lesson plan: From An Egg to the Nobel Prize: The Remarkable Journey of Rita-Levi Montalcini + Five senses exploration kit
Samantha Cristoforetti	1st lesson plan: Samantha, the girl who went to space. Twice! + Exploring the solar system
	2nd lesson plan: Samantha, the girl who went to space. Twice! + Build a rocket
Andreja Gomboc	1st lesson plan: Andreja Gomboc: A professional stargazer + Why do stars twinkle?
	2nd lesson plan: Andreja Gomboc: A professional stargazer + Visible light
Asta Hampe	1st lesson plan: Asta Hampe, The blueprint of engineering + Hear the science (speaker) + Exploring static electricity with a balloon
	2nd lesson plan: Asta Hampe, The blueprint of engineering + Hear the science (speaker) + Building an Electromagnet
Maryam Mirzakhani	1st lesson plan: Maryam Mirzakhani, the mathemagician + Flexible geometry
	2nd lesson plan: Maryam Mirzakhani, the mathemagician + Mathematic mosaic

STEAM Tales

Co-funded by
the European Union

STEAM Tales (KA220-HE-23-24-161399) is funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Nationalen Agentur im Pädagogischen Austauschdienst. Neither the European Union nor the granting authority can be held responsible for this.