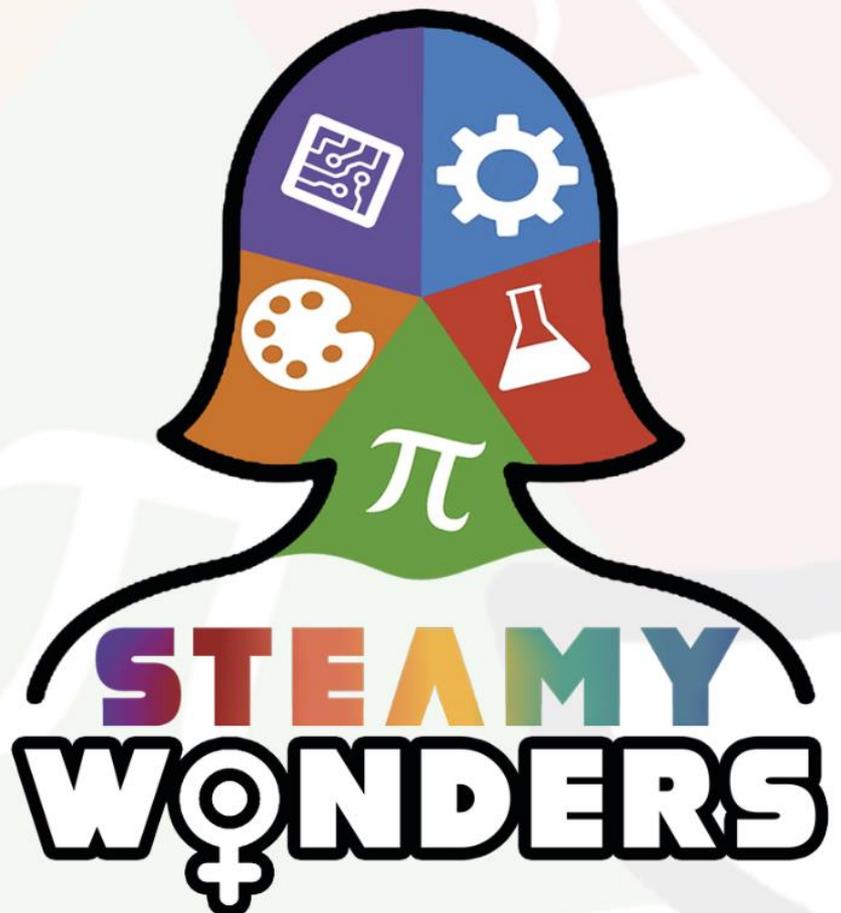


Tutor's Handbook

Science and Motivation
infographic





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STEAMY WONDERS Tutor Handbook – Science and Motivation Infographic

The aim of this short handbook is to support you, as an experienced trainer or career advisor to use the STEAMY WONDERS Interactive Infographics with learners in your workplace. If you are currently working as a Learning and Development professional within a larger organisation or company, this handbook will help you to introduce the STEAMY WONDERS Interactive Infographics in your work establishment. When developing these Interactive Infographics, the focus has been to support female learners considering a career in STEAM, to build their confidence and skills so that they can plan successful careers in the STEAM sectors.

7 European partners have developed five Interactive Infographics for each STEAM subject:

- X Science
- X Technology
- X Engineering
- X Arts
- X Mathematics

Each of the Interactive Infographics also addresses the following themes:

- X Motivation
- X Confidence
- X Career planning
- X Personal resilience
- X Career management

Through the STEAMY WONDERS project, we have developed a suite of 35 Interactive Infographics – to support and encourage women to develop their careers in STEAM.

This handbook will guide you through the Interactive Infographics to use in your workplace with women. In this handbook, you will be introduced to what an interactive infographic is, a little about the topic that is being addressed in this Interactive Infographic. You will then gain



awareness of the activities that are embedded in this Infographic and some suggestions on how they can be used best in a group of learners.

This short handbook addresses an Interactive Infographic created to support females at the onset of their career choice into STEM, who are also ready to develop their skills and competencies in relation to **Science and Motivation**.

What is an Interactive Infographic?

An Interactive Infographic is an engaging educational experience for learners. The Infographics include learning resources that absorb the user to “interact” with information. The STEAMY WONDERS Interactive Infographics contain digital resources that are embedded into the Infographic poster through the use of QR codes. When clicking on the QR codes in this Infographic, you will discover a variety of digital learning materials including educational videos, online magazine articles, online educational escape rooms, digital breakouts, games, quizzes, WebQuests. Therefore, a simple poster can easily be transformed and turned into an engaging educational resource that you can use with young employees or with VET learners.

By including an Interactive Infographic, you can guarantee that female learners considering a career in the STEAM sectors can become immersed with education materials at a time that suits them – perhaps during a coffee or lunch break, or between meetings or classes – wherever the learner can open thy Infographic, they can access the embedded learning materials embedded. For this reason, it is important that the Infographics are placed in locations that are easily accessible for female learners. To effectively use the Infographic, we would suggest that you print it out and display it in the hallways and canteen of your workplace, where employees and learners will have the opportunity to interact with the learning materials. Additionally, we would advise that you display these Infographics on community noticeboards, in community centres, libraries, and other information hubs in your community, where learners can open the digital learning content embedded in the poster. The Infographics can also be used in a facilitated session through classroom-based learning. We will return to this use for the Infographics later in this handbook.



Introduction to the topic

We will be using the following definition for science: “Science is the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence.” (<https://sciencecouncil.org/about-science/our-definition-of-science/>). We use science in every aspect of our lives, whether in preparing dinner or measuring out baking ingredients, calibrating the washing machine settings, or taking our daily vitamins. A degree in the Science sector opens up a plethora of new career opportunities. From a scientific researcher to a pharmacist, medical journalist to an astronomer, and so many others.

Unfortunately, the Science sector has often been dominated by male labour. On the bright side, however, in the last decade, the sector has seen a significant shift to open its doors to more women. According to the European Institute for Gender Equality, women made up 40.9% of scientists and engineers in the EU-28, in contrast to the 32.4% in 2009. However, this number is still wanting improvement and the gender gap continues to persist across the social, political, and economic landscapes of the sciences. It is sad, at the very least, to say that in the 2019 study published by Eurostat on the state of women in the sciences and technology sector across Europe, only 6 countries could boast of a percentage of and higher than 50. This includes Norway, Lithuania, Latvia, Denmark, Bulgaria, and Spain.

As a consequence of continued exclusion (whether purposeful or involuntary), condescending gender stereotypes surrounding women in STEM careers persist. These are a result of cultural, social and political factors demoralising women’s efforts to enter the sciences. In response to the criticism and stereotypes, the main objective of the STEAMY WONDERS project is to challenge the current dominating narrative instigating the position (or lack thereof) within STEM, by showcasing women role-models, who, despite the odds, succeeded in pursuing their STEM dreams. One of the common traits of these role models is vigorous motivation to fight the opposition, which we hope the female learners engaging with the current Interactive Infographics will develop by the end of the session.



Getting to know the Resources

In the following section, we will offer you a brief introduction to the digital resources and activities that we have embedded in this Interactive Infographic, together with researched tips and suggestions for how they can be used to develop the key skills, attributes, and qualities required for women to succeed in STEAM careers.

What is covered in the Explainer Video?

To use this Explainer Video with female learners in a group in a facilitated training session, you can decide to use it as an introduction to the activity before you deliver the Digital Breakout, Quiz and/or WebQuest activity with your group of learners. Using the video in this way will give learners a short but detailed overview of the topic, and they will begin to learn some of the key vocabulary and concepts that they will need, in order to complete the challenge-based learning resources that are embedded further in the Interactive Infographic.

What is covered in the Quiz?

The aim of the Quiz is to determine the female learners' aptitude and suitability for a career in the Science sector. As a trainer employed to support the career progression of your learners, it is important that you ensure that this quiz is completed by learners before they commence the challenge-based learning resources contained in this Interactive Infographic. This will give you the opportunity to assess whether the learner has a higher level of competence in one subject area, and you can use the results of the quiz to re-direct a female learner to one of the STEAM sectors that aligns with their highest aptitude.

This quiz is based on an analysis of the competencies and theoretical knowledge necessary for pursuing a career in Science, specifically in one of the following career pathways: robotics engineer, forensic science technician, marine biologist, and astronomer. You will be provided with more insight as the details of each career and whether your personality traits match a career pathway, or another may be more suitable.





This quiz revolves around 6 questions, which can be used to assess the current knowledge and skill set of the participants and provide them incentive for further discussion and research into STEM careers.

Depending on how the learner performs in this quiz, you can then advise the learner to complete the challenge-based learning activities from one STEAM sector or another. In addition, you can also advise if the learners should complete the challenge-based learning resources autonomously, as part of a small group for peer-learning or directly with your support and instruction.

What is a Digital Breakout or an Online Educational Escape Room and how can you use it?

A Digital Breakout or an Online Educational Escape Room are very similar. For one, they are both challenge-based learning resources – in that they pose learners with a set of challenges that they need to solve, using their critical thinking skills, to be able to progress to the next level and to ultimately solve the overall challenge being posed to them. These are unique resources that force learners to reflect on their prior knowledge and experience, critically evaluate challenges that are presented to them, solve clues and puzzles, and ultimately overcome a series of mini challenges, in order to progress. These digital resources are learner-centered and engaging for learners of all ages and abilities. They are built using Google Forms, and can be timed, so that learners only have a set time to solve the puzzles and challenges posed to them. Learners, or teams of learners, follow a single storyline or scenario throughout the breakout, finding clues, cracking codes, solving puzzles, and answering questions. The purpose of a Digital Breakout is to teach learners about a specific topic or issue, in an engaging manner.

The Science and Motivation Digital Breakout Room

Digital Breakout Rooms can work both as an individual or group activity. You can choose to deliver the digital breakout in a group-work setting by having individual or small groups of learners completing the challenges and developing their own competence in relation to Science and Motivation. If using these resources in a group-work setting, ensure that you set





a time limit to complete the challenges – this will add an air of competition to the breakout sessions!

What will learners achieve?

By completing the challenges in this Digital Breakout Room, female learners will achieve the following learning outcome

Knowledge	Skills	Attitudes
<ul style="list-style-type: none"> • Theoretical knowledge of potential career pathways into science careers. • Theoretical knowledge of national and European career options in science. • Theoretical knowledge of national and EU programmes for women in science. • Theoretical knowledge of personal traits required for career success in this sector. 	<ul style="list-style-type: none"> • Discuss career options in the Science sector. • Self-evaluate personal compatibility to careers in this sector. • Self-assess skill limitations for a successful career in science. • Develop an education and profession plan for success in the Science sector. • Discuss different careers within science. • Research successful female role models in science. • Solve challenges to build resilience when planning a career in science. 	<ul style="list-style-type: none"> • Willingness to self-assess your motivation to pursue a career in science. • Awareness of the important role that women play in science. • Willingness to research career options in science. • Openness to share what has been learned and shared with other female professionals in a network. • Willingness to engage in the wider female networks in the science sector. • Readiness to self-evaluate to identify skills and attributes needed to succeed in science careers.



Debriefing questions

Once learners in your facilitated workshop have completed the Digital Breakout, you can pose the following questions to them in an informal group discussion, so that you can gauge what they have learned through this experience:

- Which questions did you find challenging/interesting? Why?
- Which of the tips or suggestions for improving your motivation did you find most helpful? Will you be applying this advice in your personal and/or professional life? Which one do you consider most useful?
- Are you more inclined to pursue in career in science after finishing this Digital Breakout?

What is a WebQuest and how can you use it?

A WebQuest is an inquiry-oriented activity in which most or all of the information used by learners is drawn from the internet. WebQuests are designed to utilise learners' time well, to focus on using information rather than on looking for it, and to support learners' critical thinking at the levels of analysis, synthesis, and evaluation. Every WebQuest has six parts that are considered vital. These include the introduction, the task, the process, the resources, the evaluation, and the conclusion. To support learners in accessing the information in a coherent manner, in the STEAMY Wonders WebQuests, we have fused the Process and Resources together, so that each step in the Process is followed by a range of useful links (Resources) to support learners to complete that step in the Process. WebQuests present a scenario in which a group of learners enhance and develop their knowledge and research skills whilst completing the objectives presented. WebQuests set learners a challenge and then provide links to reliable sources online where they can find information to support them to complete the challenge. By providing learners with these links, the aim of a WebQuest is to develop a deeper understanding of the topic being addressed among learners, because they are being asked to review information from different sources, analyse the content and then make up their own mind about the topic. WebQuests are also used to ask learners to develop their own projects or activities, so they take responsibility for their own learning.

WebQuests are particularly useful for encouraging female learners to assess their competence, aptitudes and career opportunities in the STEAM sectors, as they allow for authentic learning experiences. By this we mean that learners are presented with a real-world scenario or problem that they may face in their daily lives, and they are supported to find solutions to address it. This means that their learning experience is grounded in developing practical solutions to problems they face, and so their solutions have a real-world application.

WebQuests also allow learners to reflect on their own skills and competences, and to identify how what they have learned through the WebQuest can be assimilated into their own skill set and used to enhance their career progression.

The Science and Motivation WebQuest

The Science and Motivation WebQuest will outline a series of steps to guide your evaluation of a scientific career in relation to your own personal and professional competences and goals. These competencies include competences of the self, competences of strength, horizons competences and network competences. The present WebQuest will provide the knowledge, skills and understanding of the art and culture sector and the opportunities available to them on a national and European level as well as the training necessary to build their careers within this sector on a national and European scale.

WebQuests work best as small group activities. When completing the WebQuest that is embedded in this Interactive Infographic, learners should ideally work in groups of 2-3. When developing the WebQuest, we did not prescribe a time limit for completing the challenge. Depending on the availability of the learners completing this challenge, you are free to set a suitable time limit that is realistic and suitable for the learners you are working with.

To complete the challenge, learners will need access to the internet, access to a laptop, PC or smart device and a printed copy of the WebQuest so that they can work through the challenges and the steps in the process on their own. Learners should work collaboratively on this task, but independent from your instruction; therefore, it is important that you are there to supervise what they are doing, but that you do not get involved in how they complete the challenge. Through the WebQuest, learners should develop their own understanding of the

topics covered, so it is important that they have the space and freedom to make sense of the topic for themselves.

What will learners achieve?

By completing the challenges in this WebQuest, female learners will achieve the following learning outcomes:

Knowledge	Skills	Attitudes
<ul style="list-style-type: none"> ● A theoretical and practical understanding of potential career pathways in the science sector. ● Theoretical knowledge of local, national, and pan-European career options in the science sector. ● Theoretical knowledge of local, national, and pan-EU programmes for women in the science sector. ● Factual knowledge of personal attributes and skills required for a successful career in the science sector. 	<ul style="list-style-type: none"> ● Being able to recognise and discuss career options in the science sector. ● Being able to discern personal character qualities in relation to careers in the science sector. ● Being able to evaluate personal skill limitations for a successful career in science. ● Being able to draw an effective education and career plan for success in the science sector. ● Being able to research available career options. ● Being able to research successful female role models in the science sector. 	<ul style="list-style-type: none"> ● Openness to critically analyse one's motivation to follow a career in the science sector. ● Evaluation of the vital role women hold in the science sector. ● Eagerness to research career options in the science sector. ● Willingness to discuss what has been gathered from other female professionals in the sector's network. ● Willingness to engage in female networks in the science sector. ● Adaptability to identify skills and characteristics





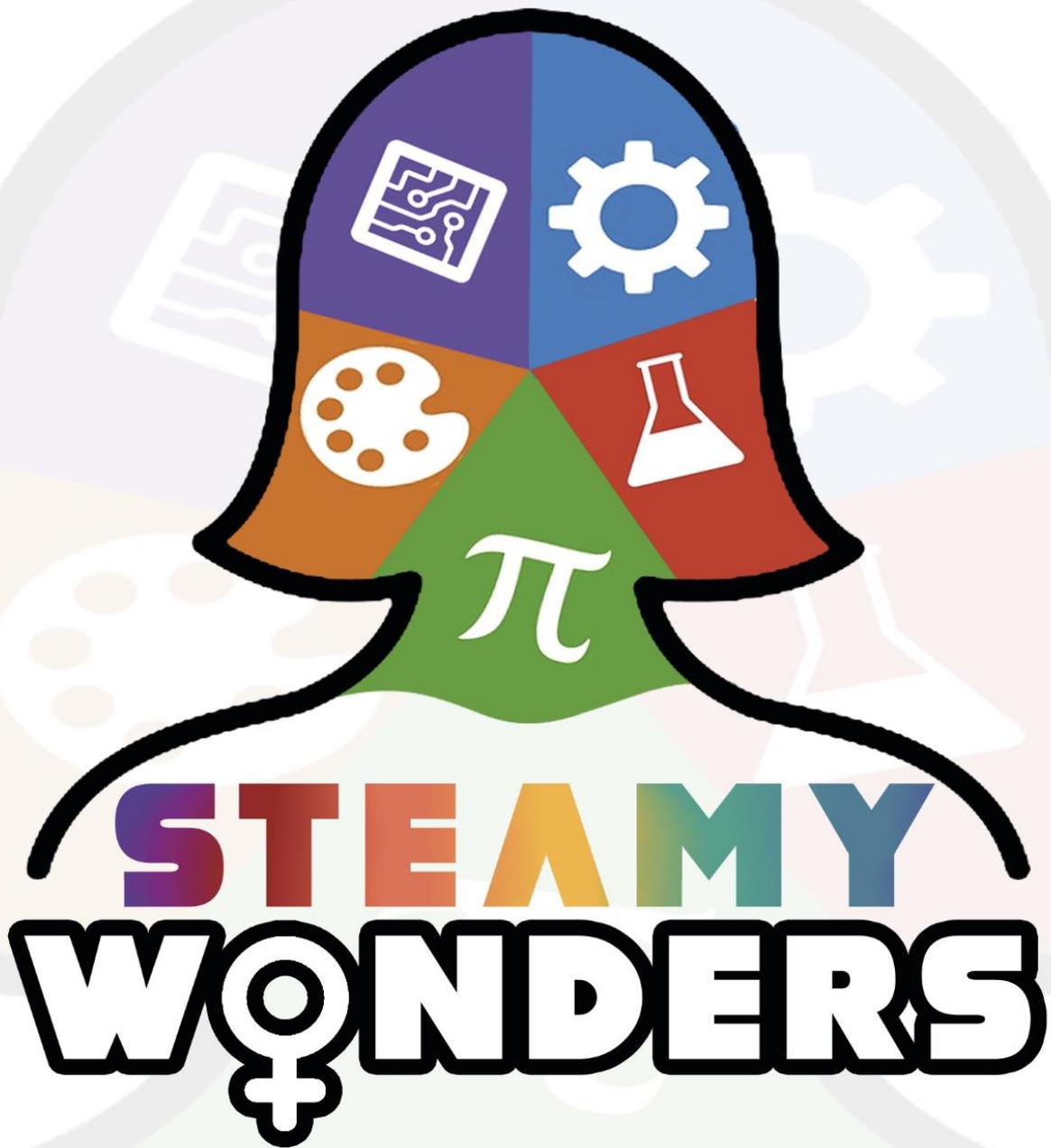
	<ul style="list-style-type: none">• Being ready for challenges in order to develop confidence when planning a career in the science sector.	necessary to find success in a science career.
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Debriefing questions

Once women in your facilitated workshop have completed the challenges as part of the WebQuest, you can pose the following questions to them in an informal group discussion, so that you can gauge what they have learned through this experience:

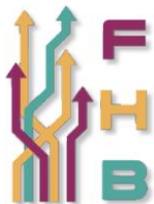
- Who are some inspiring women within the science sector? How did they build their career in their respective industries? What difficulties/challenges did they face climbing the career ladder? What steps did they take to overcome these challenges?
- What personal and professional challenges do you see yourself facing pursuing your chosen career? What steps will you be taking to overcome these challenges?
- What tips or suggestions do you have for other women just starting their careers for building an effective career plan?
- Which of the resources/articles/videos of the previous activities did you find most useful/motivating/inspiring and why? How will you apply the knowledge you have gathered from these activities to your life and career?
- We are coming to the end of our WebQuest. What have you learnt about yourself and your career choice? Are you confident now to take the necessary steps to move forward in your career?





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