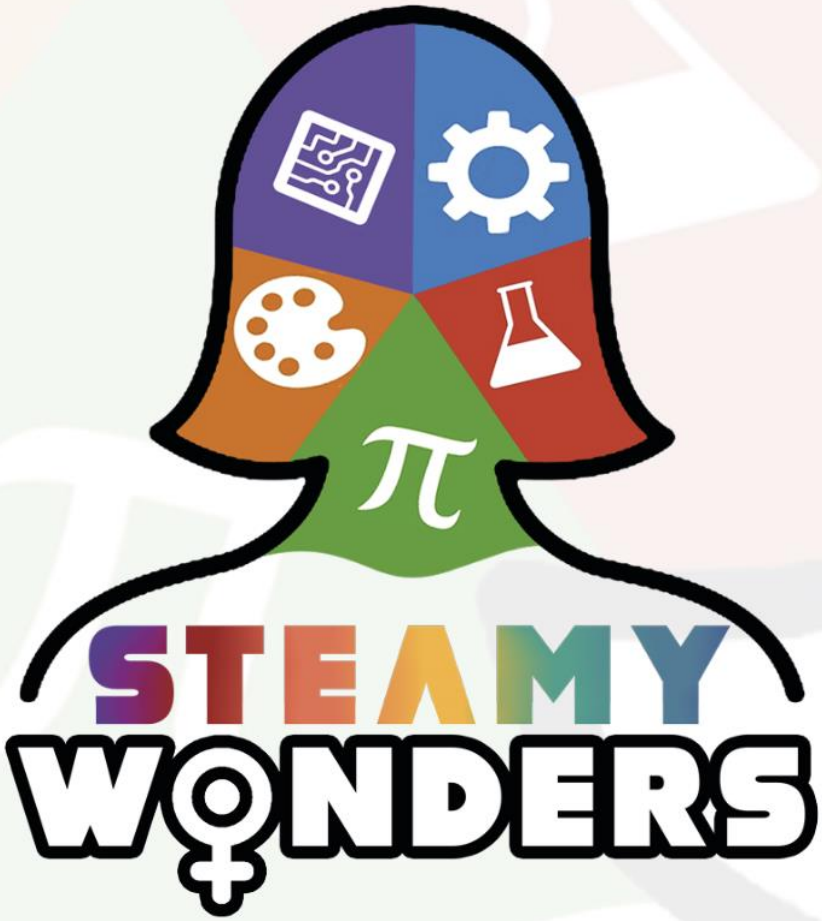
Tutor's Handbook

Engineering and Career Management Infographic



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STEAMY WONDERS Tutor Handbook – Engineering and Career Management 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:

- ✗ Science
- ✗ Technology
- ✗ Engineering
- ✗ Arts
- ✗ Mathematics

Each of the Interactive Infographics also addresses the following themes:

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

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

This handbook will help you to use one of these Interactive Infographics in your work with women. In this short handbook, you will be introduced to what an interactive infographic is,

a little about the topic that is being addressed in this Interactive Infographic and you will then gain an insight into the activities that are embedded in this Infographic and some guidance on how they can be used best in a group of learners.

This short handbook addresses an Interactive Infographic developed to support female learners to develop their skills and competences in relation to **Engineering and Career Management.**

What is an Interactive Infographic?

An Interactive Infographic is an engaging educational experience for learners. The Infographics consist of learning materials that engage the user to "interact" with information. The STEAMY WONDERS Interactive Infographics are comprised of digital resources that are embedded into the Infographic poster through the use of QR codes. If you click on the QR codes in this Infographic, you will find a range of digital learning materials including educational videos, online magazine articles, online educational escape rooms, digital breakouts, games, quizzes, WebQuests. In this way, a simple poster can be brought to life and turned into an educational resource that you can use with young employees or with VET learners.

Through using an Interactive Infographic, you can ensure that female learners considering a career in the STEAM sectors can engage with education materials at a time that suits them – perhaps on a coffee break, or when waiting for a meeting or class to start – wherever the learner can view they Infographic, they can access the learning materials embedded in it. It is for this reason that it is important that the Infographics are displayed in locations that are 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 engage with the learning materials. In addition, we would suggest that you display these Infographics on community noticeboards, in community centres, libraries and other information hubs in your community, where learners can access the digital learning content embedded in the poster.

The Infographics can also be used in a facilitated session through classroom-based learning. We will discuss this use for the Infographics in this handbook.

Introduction to the topic

Engineering is the application of science and math to solve problems. Engineers figure out how things work and find practical uses for scientific discoveries. In order to accomplish this, The tasks of an engineering include designing, evaluating, developing, testing, modifying, installing, inspecting and maintaining a wide variety of products and systems. They also recommend and specify materials and processes, supervise manufacturing and construction, conduct failure analysis, provide consulting services and teach engineering courses in colleges and universities. With the evolution of technology, the Engineering sector has expanded exponentially, including a great variety of specialties such as mechanical, electrical, civil, chemical, computer, industrial, environmental engineering and others.

At the same time, the demand for emerging technologies, as well as the technological advancements being made every day make a career in engineering an all more important and exciting one. Despite the field having been historically male-dominant, emerging trends across the EU, indicate a year-on-year rise of 254,500 female scientists and engineers in the EU in 2020, according to the latest report by Eurostat. Notwithstanding the varying proportion between EU Members States and specialties within the Engineering sector, such figures are indicative of a more welcoming era for women in the sector, with opportunities to progress in their careers and sustain the longevity of their current job.

Getting to know the Resources

In this section, we will provide you with a brief introduction to the digital resources and activities that we have embedded in this Interactive Infographic, and we will also give you some tips and hints for how these can be used to develop the key skills, attributes and attitudes 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, Online Educational Escape Room 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 this quiz is to determine the female learners' aptitude and suitability for a career in the Engineering sector. As a trainer working to support the career progression of these 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 allow you to assess if the learner has a higher level of competence in one subject area, and you can use the results of this test to re-direct a female learner to one of the STEAM sectors where they have the highest aptitude.

The Engineering and Career Management Quiz

This personality test is based on an analysis of the skills and competences necessary for pursuing a career in Engineering and particularly in one of the following professions: Mechanical Engineer, Chemical Engineer, Civil Engineer and Environmental Engineer. This quiz gathers personality traits and key competences required for the aforementioned careers, in order for female learners to find out which is more fitting for them.

This quiz consists of 6 questions, which can be used to assess how the educational background, competences, personal characteristics, ideal working environment and aspiring type of company of the female learners make them suitable to work as a Mechanical Engineer, Chemical Engineer, Civil Engineer or Environmental Engineer.

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 similar types of resources. 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 Engineering and Career Management Digital Breakout

The Engineering and Career Management Digital Breakout aims to help women working in the field of Engineering to reflect on the way they manage their career. Steering one's career in the desired direction can prove challenging, especially in a field as male-dominated as Engineering. To counteract the distraction and/or fear women may feel towards future-proofing their careers within the sector, this Digital Breakout Room will provide the tools that are essential to manage and sustain a successful career within the Engineering sector.

Digital Breakouts 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 Engineering and Career Management. 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, female learners will achieve the following learning outcomes:

Knowledge	**Skills**	**Attitudes**
• Theoretical knowledge of potential career pathways into Engineering careers. • Theoretical knowledge of national and European career options in Engineering. • Theoretical knowledge of national and EU programmes for women in Engineering. • Theoretical knowledge of personal traits required for career success in this sector.	• Discuss career options in the Engineering sector. • Self-evaluate personal compatibility to careers in this sector. • Self-assess skill limitations for a successful career in Engineering. • Develop an education and profession plan for success in the Engineering sector. • Discuss different careers within Engineering. • Research successful female role models in Engineering. • Solve challenges to build career sustainability competences when managing a career in Engineering.	• Willingness to self-assess your motivation to continue a career in Engineering. • Awareness of the important role that women play in Engineering. • Willingness to research career options in Engineering. • 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 Engineering sector. • Readiness to self-evaluate to identify skills and attributes needed to succeed in Engineering 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 though this experience:

- Which questions did you find challenging/interesting? Why?
- Can you recall the Kenworthy's three drivers of good career management? Which one do you consider most important? Which ones do you pursue/will you be pursuing in your professional life?
- Are you more ready to sustain your career in Engineering 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 Engineering and Career Management WebQuest

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?

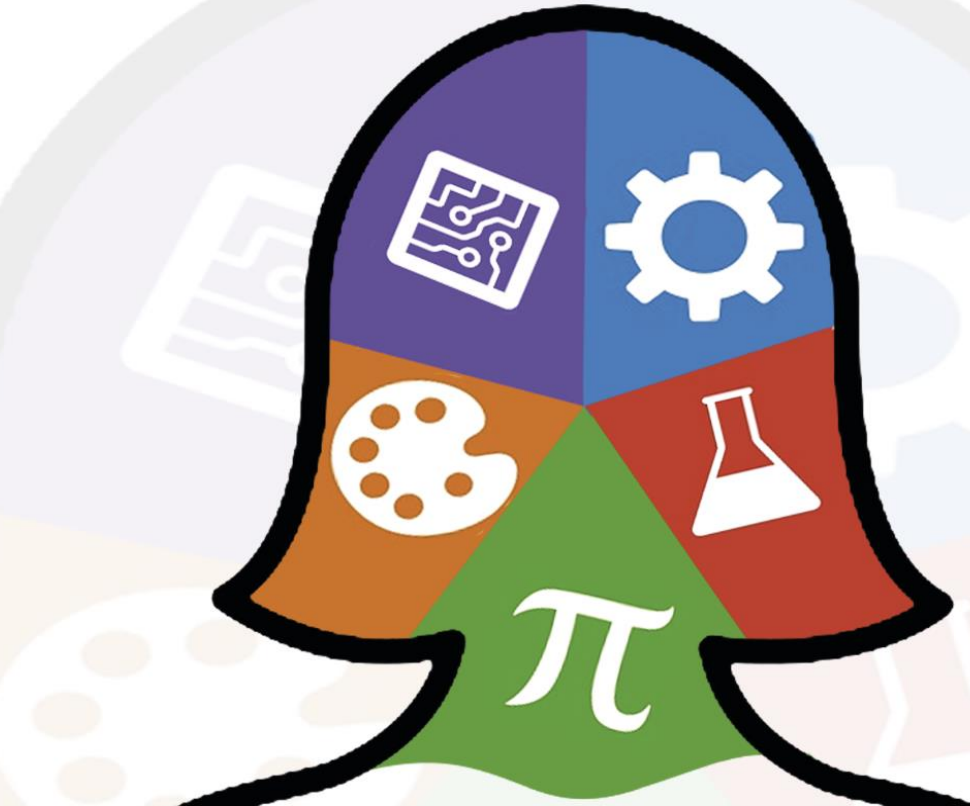
By completing the challenges in this WebQuest, female learners will achieve the following learning outcomes:

Knowledge	Skills	Attitudes
• A factual and empirical understanding of potential career pathways in the Engineering sector. • Factual knowledge of local, national, and pan-European career options in the Engineering sector. • Factual knowledge of local, national, and pan-EU programmes for women in the Engineering sector. • Factual knowledge of personal attributes and skills required for a successful career in the Engineering sector.	• Being able to recognise and discuss career options in the Engineering sector. • Being able to discern personal character qualities in relation to careers in the Engineering sector. • Being able to evaluate personal skill limitations for a successful career in Engineering. • Being able to draw an effective education and career plan for success in the Engineering sector. • Being able to research available career options. • Being able to research successful female role models in the Engineering sector. • Being ready for challenges in order to develop confidence when planning a career in the Engineering sector.	• Openness to critically analyse one's capacity to sustain a career in the Engineering sector. • Evaluation of the vital role women hold in the Engineering sector. • Eagerness to research career options in the Engineering 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 Engineering sector. • Adaptability to identify skills and characteristics necessary to find success in an Engineering career.

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 though this experience:

- Who are some inspiring women within the 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 who are sustaining their careers for continued effective management?
- 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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