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STEAMY WONDERS

Tutor Handbook - Science

Tutor Handbook

STEAMY WONDERS Tutor Handbook SCIENCE

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 centre. 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 workplace. 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 address 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: **Science**

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

This interactive infographic focuses on the area of **Science** and aims to encourage girls' participation in science careers. For this reason, we have chosen a world-renowned female scientist as the thread of the infographic: **Rosalind Franklin**. She, directly or indirectly, will present the 4 resources included that are available by reading the QR codes.

In the explainer video, Rosalind Franklin explains the concept of Natural Science, describing it as those sciences that deal with the prediction, description and understanding of the phenomena and laws that govern nature. Besides, while the personality quiz exposes different branches of science from which girls can choose, the Digital Breakout focuses on Rosalind's life to promote the transversal skill of this infographic: **Confidence**. Finally, the WebQuest encourages young women to investigate and to ask questions, as it is an important part of being a scientist. Moreover, the WebQuest finishes sharing a link with the science careers that can be studied in Spain: https://www.educaweb.com/nf/cursos-de/ciencias/ .

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 and 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 Science 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.

This quiz is based on the DISC. This personality test exposes 4 different branches of science so that the user, based on her preferences, can identify which branch of science she is most interested in.

This quiz consists of 6 questions, which can be used to assess users preferences based on 4 areas of science: physics, chemistry, biology and astronomy.

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.

Rosalind Franklin's life to encourage young women to study Science.

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 Biology. 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**
• Factual knowledge of available career pathways into the Science sector.	• Research successful female role models in the Science sector. • Discuss career options in the science sector.	• Willingness to assess one's own motivation to pursue a career in the Science sector. • Awareness of the important role that women play in the Science sector.

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:

- Who is Rosalind Franklin?
- What discovery did she make?
- What do you know about her discovery?
- What happened to her?
- How does it make you feel?
- What can you do to make sure it doesn't happen again?
- Would you be interested in being the future Rosalind Franklin?

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 importance of investigating in Science.

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
• Factual knowledge of available career pathways into the Science sector. • Factual knowledge of national and European career options in the Science sector. • Theoretical knowledge of personal attributes required for career success in this sector.	• Discuss career options in the science sector. • Develop an education and career plan for success in the Science sector. • Research successful female role models in the Science sector. • Solve challenges to build resilience when planning a career in the Science sector.	• Willingness to assess one's own motivation to pursue a career in the Science sector. • Awareness of the important role that women play in the Science sector. • Openness to exploring career options in the Science sector. • Willingness to share what has been learned with other female professionals in a network. • Openness to engaging in female networks in the Science sector.

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:

- How important is research in science?
- What is more important, the answer or asking a good question?
- What is the process of doing research?
- How can I involve women in the research process?
- Do women researchers have visibility?
- Is there equality in the sector?
- How does it make me feel?
- What can I do?
- Would I like to do research?
- What would I like to do research on?
- What science career do I need to study to follow this path?
- What skills do I have to study that career?
- What skills might I lack?

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Project Number: 2020-1-HR01-KA2020-077758