SCIENCE4FUN GUIDELINES

The guide for teachers using the project in the pilot and how to proceed in a classroom

TABLE OF CONTENTS

1. Introduction

What is Science4Fun about?

The Erasmus+ project **Science4Fun** wants to enable young people to realize that learning science is an interesting and practical experience, which will help them acquire knowledge and skills that are relevant and important in the real world and also play a great role in their future. With this project we are also aiming to increase the interest and engagement of girls in learning science and creating science-based career. In Europe the number of women enrolled in higher education is in general higher than men. However, women graduate mostly in education, humanity and arts, social sciences, business and law, health and welfare.

EU countries are also facing with a significant lack of qualified engineers and scientific professionals and a surplus of graduates in humanity sciences. In general, young people are discouraged from studying science subjects due to their reputed difficulty. Therefore, this project offers a help by raising the awareness of youngsters that science is not boring and difficult to understand and can be accessed by everyone. To achieve this, the project partnership proposes to implement attractive and effective ways of teaching science by developing an e-learning platform that can be used by teachers and students. To create the better possible platform the project team will implement pilots in all partner countries – Spain, Netherlands, Belgium, Slovenia, Poland, Bulgaria, Czech Republic and Portugal.

2. Science4Fun Online Environment

The platform selected for the creation of the online environment was Moodle, as it is one of the most used e-learning platforms. This means that the majority of the users might feel that is very easy to use the Science4Fun e-learning platform, as they almost certainly have used Moodle before.

The teachers will have the opportunity to test their students (and also their progression or compare the results between their classes), to get training for themselves and access to training materials for their classes. By answering to tests the students will also provide very important information for their teachers, allowing them to improve their work, identify what to add or remove from their courses, the topics students' feel more comfortable with, what makes them want to be more involved, etc. This means that the online platform can identify training and learning gaps, through the use of analytical data and reporting.

During the project lifespan the partners invited a big number of schools to participate and to provide feedback on pilots and test the project products. After confirming the will to participate, the organisations only needed to provide the partners information regarding the contact person, and the number and identification of teachers and students. After this the project team created the users for teachers and students to be able to use the platform. The information collect in the process is stored in a way that only project partners have access and will only be used on the scope of the Science4Fun project.

After the end of the project the tools will continue to be available for free for all the organisations and teachers that want to use it on their learning activities.

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3. Tests (questionnaires)

In order for the students to do tests (in the form of a Moodle quiz), the partnership developed a group of questions on 6 subjects/areas, namely: biology, chemistry, physics, environmental resources, geology and astronomy. Each subject is divided into 4 subtopics, as detailed below:

1. Biology:	2. Chemistry:	3. Physics:
- botanic - zoology - cellular structure - genetics	- atomic structure - state of matter - chemical elements - organic / inorganic chemistry	- kinetics - gravity - mechanics - electromagnetism
4. Geology:	5. Astronomy:	6. Environmental resources:
- Earth structure - rocks, minerals and its formation - orogenic movement - hydrology	- planets - stars - satellites - celestial movements	- recycling - climate change - energetic sustainability - pollution

The questions, available in 9 languages (Bulgarian, Czech, Dutch, English, Flemish, Polish, Portuguese, Slovenian and Spanish), are distributed by the 3 first levels of the European Qualifications Framework (EQF) so that the students of each of these levels can have appropriate and adequate tests that suit the knowledge and competences they have learnt until that moment. Also, as the database of questions that was put together is big enough, there are 12 different tests for EQF Level 1, 9 for EQF Level 2 and 5 for EQF Level 3, meaning that during the school year the teacher can have several moments to assess or evaluate the learning of his/her students without repeating the test.

3.1. How is it working?

Each of the tests developed for the 3 EQF levels, is composed of 24 multiple choice questions divided by the 6 beforementioned topics, i.e., one question per each of the subtopics. For each of the questions the students will have 4 possible answers and they have to choose the correct
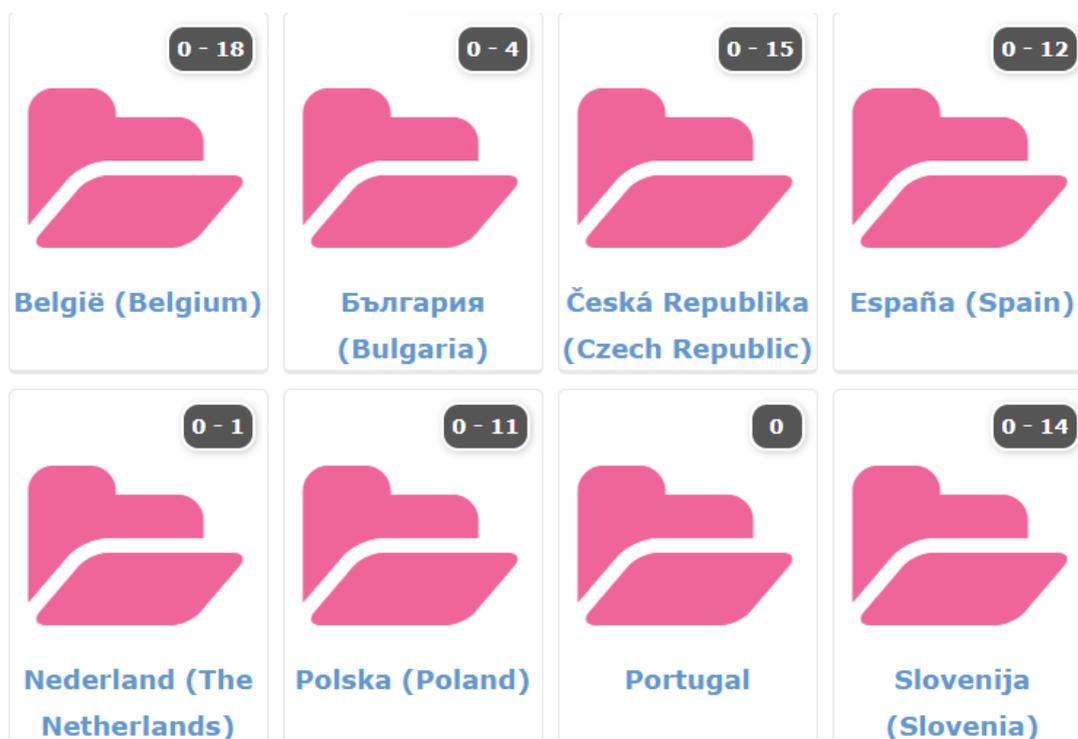
one. At the end of the tests, the teachers will have the opportunity to get a report with the results that can be presented either by individual student, or for the class as a group.

This means that the online platform can identify training and learning gaps, through the use of analytical data and reporting. After the first test is completed, the baseline is created, and the teacher can provide the students the access to learning materials and after some time do another test to check the evolution.

It is recommended that the tests are implemented three times in the same school year with an interval of 3 to 4 months, but of course the teacher might decide to implement it more often, as there are 12 different tests for EQF Level 1, 9 for EQF Level 2 and 5 for EQF Level 3. By accomplishing this, teachers will get a feedback on the evolution of the learning by their students.

In the Moodle platform are 8 folders, one for each partner country, where teachers can find tests and proceed in a class with enrolled students.

0 - 18	0 - 4	0 - 15	0 - 12
België (Belgium)	България (Bulgaria)	Česká Republika (Czech Republic)	España (Spain)
0 - 1	0 - 11	0	0 - 14
Nederland (The Netherlands)	Polska (Poland)	Portugal	Slovenija (Slovenia)

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3.2. Implementation of the tests

In order to test and improve the platform where needed, between August and September of 2020 the partners from Czech Republic, Netherlands and Slovenia organized a preliminary testing session of the platform, with 43 students and 4 teachers from 4 schools divided as follows:

	Schools	Teachers	Students
EQF1	1	1	9
EQF2	3	3	34
EQF3	-	-	-

After this, and until the elaboration of this document all the partners started to contact schools on their countries and the numbers have greatly rose, as stated on the table below:

	Schools	Teachers	Students
EQF1	7	8	280
EQF2	11	16	446
EQF3	4	6	163

The aim of testing is not only to evaluate students' knowledge in science subjects but also to contribute to the innovation and enhancement of the methodology of science pedagogy. It is important to promote a methodological change in teaching to increase the general motivation of young people including a change in evaluation processes, to use more reflective methods.
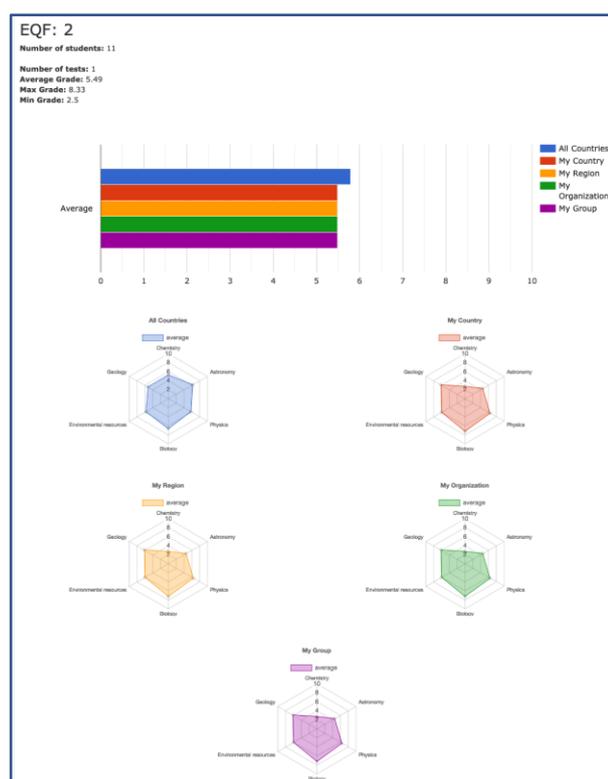
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Picture 1: Pilot in Slovenia

4. Results from the tests

At the end of the implementation of the tests, the teachers will have the opportunity to get a report with the results that can be presented either by individual student, or for the class as a group. The platform has a section dedicated to Statistics to this purpose, where the teacher can easily get the desired results from the subsection Reports, as shown by the image below:

Statistics section location	Example of results from a group of students

Based on the results, teachers can understand the evolution of their students and if needed change the way they are passing knowledge to students and the activities they are implementing. In order to help this the project makes available a repository that includes a set of resources and learning materials, with written text and videos in English and in all the partner languages and also training courses for the teachers.

5. Training materials

The project team came up with a set of training materials either for teachers and students, that include courses for the teachers (named In service e-training programs for science teachers) that are translated in all the partners languages and also a set of resources and learning materials (called Repository), with written text and videos in English and in all the partner languages and also training courses for the teachers.

5.1. In service e-training programs for science teachers

The project Moodle platform makes available, for teachers, five learning courses, in English and the partner languages (Dutch, Portuguese, Spanish, Polish, Czech, Slovenian, Bulgarian) dedicated to the following topics:

In service e-training programs for science teachers
New evaluation models
Changing the learning paradigm
Women in science
Internet tools for teaching science
Problem based learning
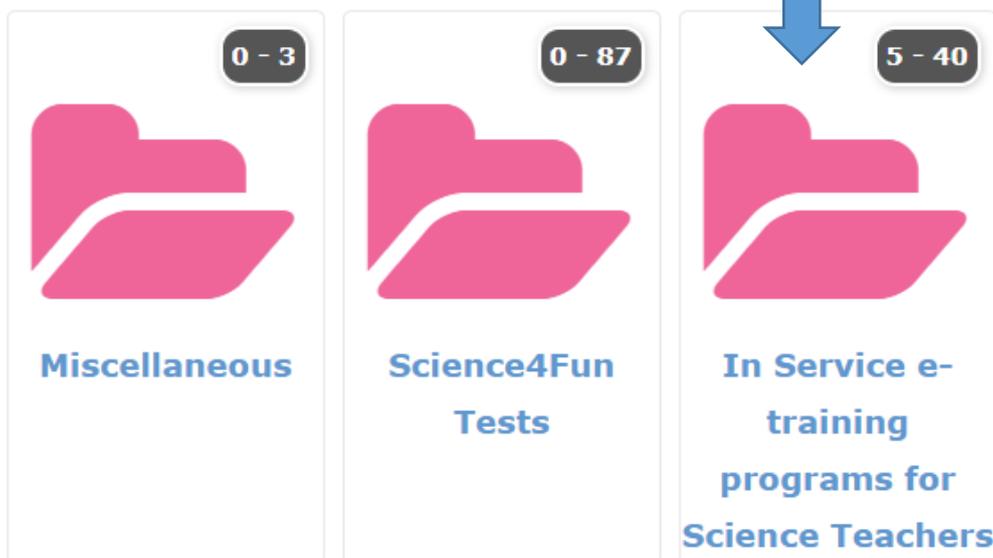
These courses intend to give more information to the science teachers, not only for them to increase the knowledge in science related topics but also to learn new methodologies that they can apply during their teaching activities.

5.2.   Repository

All the resources and practical scientific experiments created by partners are stored in a repository (available at http://repository.science4fun.eu/index.php?lang=en) and indexed so that they can be searched easily and effectively. The resources may have different formats, but all of them have a specific guide on how to use it in the classroom. Each partner also found and added to the repository a big variety of external links and existing online resources for STEAM subjects in all partner languages (Dutch, Portuguese, Spanish, Polish, Czech, Slovenian, Bulgarian) and English.

Resources can be found by searching with keywords or using the advanced search function that has the following criteria: resource type, EQF level, organization, European basic skills, education level, VET browse, copyright and language.

▾ Advanced Search ...

Resource Type Media Library	⌄
EQF	⌄
Organization	⌄
European Basic Skills	
Education Level	
VET Browse	
CopyRight	⌄
Language	⌄

SEARCH

New and existing STEAM resources can boost students' engagement with science subjects, science learning and exploration.