



**Fostering a young,  
creative and inclusive  
European Space Community**

## **SpaceEU Teacher Training Programmes**

# **How to spark interest of young people in STEAM?**



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 821832. The content of this document reflects only the author's view and does not represent the opinion of the European Commission (EC) or the Research Executive Agency (REA). Neither the EC nor the REA are responsible for any use that may be made of the information this document contains.

<b>Country:</b>	Poland
<b>Organization:</b>	Kepler's Science Centre – Venus Planetarium (Centrum Nauki Keplera – Planetarium Wenus)
<b>Target audience:</b>	Primary and secondary teachers
<b>Place:</b>	Online, face to face
<b>Period of implementation:</b>	August – November 2020

# Course description

## Introduction

*This training programme has been developed in the framework of the spaceEU project. Many European countries conduct STEAM classes in their national languages. This may cause a certain limitation in the access to the latest didactic materials for both students and teachers. Many of them, in particular primary school students and some teachers, do not know English language at a level that enables them to use it freely. Therefore, in order to prevent a specific exclusion due to the limitations of English language skills, we have created a training, that will combine the possibility of language development of young people and teachers with the simultaneous awakening of their passion and knowledge in the field of STEAM subjects.*

## Main Course description

*One of the biggest accusations against most education systems is that they do not leave a lot of place for creativity or arousing passion in an innovative way. We are constantly trying to recreate top-down patterns, to implement national education programs, forgetting about the need to look for cause-effect relationships while putting emphasis on interdisciplinarity. Teaching science, however, can be carried out not only in school desks during physics, chemistry or mathematics lessons, but also during foreign language classes.*

*We meet and talk to many students and teachers, listening to what they have to face every day. At the same time, we are fully aware that a number of exceptionally inspiring and creative materials that can help to awaken passion and love for Space related aspects are currently published in English.*

*Therefore, bearing in mind a number of difficulties faced by Polish teachers, teaching a number of things on their own subjects, without any cross-subject correlation, we decided to create a workshop that will allow you to combine various fields of study so that young*

people gain the opportunity to expand their knowledge in the field of STEAM subjects with the latest and highest European and world didactics standards.

We are fully aware that each of the target groups has its own rules, but nevertheless we are convinced that it is not difficult for anyone who wants to do this or that. Therefore, we decided to propose a workshop in the field of modern methods of teaching Science aimed at a group of foreign language teachers from primary schools in Zielona Gora, Poland.

The main assumptions of this workshop were created in collaboration with the employee of the Institute of Astronomy at the University of Zielona Gora.

## Placement / practicum / assignment

Each of the elements of this workshop was carried out during a 3-hours face to face session with English language teachers.

## Follow-up

The teachers were asked to complete two questionnaires – before and after the training. In addition, we provided them with our e-mail addresses so that they can stay in constant contact with us also in the future.

# Training materials

## Schedule and structure

I. Welcoming and talking briefly about spaceEU. (~ 10 min)

II. Let's get to know each other. (~ 15 min)

- few words about ourselves;
- asking a few introductory questions:
  - What associations come to your mind when you hear the word 'cosmos'?
  - Do you know what school subjects are called STEAM?

III. Open discussion. (~ 15 min)

- Do you, as people dealing with teaching foreign languages, see the possibility of investing in the development of future scientists? If so, what are they?
- Do you have an opportunity to analyse STEAM issues in your education programs?

- What ideas come to your mind about what and how you could do to help science teachers invest in the scientific development of their students.

#### IV. Why we have created this training. (~ 10 min)

Presentation of the most important assumptions that guided the creation of this training.

1. *Lack of cross-subject correlations* in polish schools.
2. *Limited access* to modern teaching materials in Polish language.
3. *Limitations* resulting from the lack of knowledge of English language among polish teachers of STEAM subjects.
4. Willingness to combine business with pleasure – *teaching STEAM subjects along with the English language.*
5. Willingness *to show new opportunities for education* in Polish schools based on experience and teaching aids from professionals of large research centers.
6. Willingness *to fight against the divisions into science and humanities* – showing the paths of their development and areas of mutual cooperation.

#### V. Presentation of valuable sources of knowledge in the field of science, with particular emphasis on aspects related to space technologies in English.

(~ 15 min)

The pages available online, contain a large number of materials, which on the one hand focus strictly on concepts and issues in the field of science, while on the other hand many of them present their historical aspects. Thanks to this, we can find a number of correlations or interdisciplinary relationships.

#### VI. The fascinating world of satellites (~ 20 min)

Showing the possibility of using materials related to space science in the implementation of the fascinating world of satellites, with particular emphasis on navigation satellites.

Discussion about the satellites.

1. What kind of objects we call 'satellites'?
2. How are natural and artificial satellites different?
3. For what purposes do we use satellites on a daily basis?

4. On what orbits around our planet can they move?
5. Do satellites actually "fly"?
6. How do we communicate with the satellites?
7. How many satellites are currently moving around our planet?

### VII. Navigation now and in the past (~ 20 min)

Many people say that one of the basic uses of satellites is satellite navigation. This is a great way to reflect on how enormously navigation satellites make our daily life easier.

Discussion.

#### **Navigation now:**

1. In your opinion, has the development of technology translated into the development of ways to determine the position of people on Earth?
2. Where are navigation satellites most often used?
3. How many and which satellite navigation systems are used by us nowadays?

#### **Navigation in the past:**

1. How did humans determine their position on the globe in the past?
2. What instruments were used then?
3. Has the importance of having accurate knowledge of the location of different bodies on the globe increased over the centuries?

### VIII. Inspire! (~ 15 min)

Even if you are not a specialist in STEAM subjects – you can help in the development of young people in this field.

1. How are we able to inspire young people to want to deal with aspects related to the development of space technologies in the future?
2. What specialists does the space industry need?
3. As a high school student, are we able to expand knowledge of space technologies through its actual application in the implementation of a specific project?

You are able to become their mentor while they try to be a part of one of the international competitions listed: AstroPI, CanSat, MoonCamp Challenge, Climate Detectives, CubeSat.

### IX. Language skills (~ 10 min)

Showing the possibility of using the linguistic development of young people, which is extremely important in planning their future professional career thanks to taking part in the implementation of International Competitions:

A lot of valuable information, from which each teacher or educator is able to create his own idea for promoting activities related to the development of space technologies. It is worth emphasizing that it is absolutely not true that it is very difficult to deal with this subject.

<http://www.space-awareness.org/el/careers/webinar/webinar-4-path-space-careers>

### X. Reflections! (~ 10 min)

## Resources and materials description

### Links to resources and materials<sup>1</sup>

#### ***V. Presentation of valuable sources of knowledge in the field of science, with particular emphasis on aspects related to space technologies in English.***

- |                                       |                         |
|---------------------------------------|-------------------------|
| 1. spaceEU:                           | www.space-eu.org        |
| 2. Space Awareness:                   | www.space-awareness.org |
| 3. Scientix:                          | www.scientix.eu         |
| 4. European Space Agency – Education: | www.esa.int/education/  |

#### ***VI. The fascinating world of satellites***

- |                               |   |
|-------------------------------|---|
| 1. Introduction:              | www.esa.int/Education/1._Introduction   |
| 2. Orbits:                    | www.esa.int/Education/2._Orbit  |
| 3. The geostationary orbit:   | www.esa.int/Education/3._The_geostationary_orbit  |
| 4. The polar orbit:           | www.esa.int/Education/4._The_polar_orbit  |
| 5. Sensors:                   | www.esa.int/Education/5._Sensors  |
| 6. Passive sensors:           | www.esa.int/Education/6._Passive_sensors  |
| 7. Active sensors:            | www.esa.int/Education/7._Active_sensors   |
| 8. Types of orbits:           | www.esa.int/Enabling_Support/Space_Transportation/Types_of_orbits                             |
| 9. Satellite frequency bands: | www.esa.int/Applications/Telecommunications_Integrated_Applications/Satellite_frequency_bands |
| 10. Stuff in Space:           | www.stuffin.space   |

---

<sup>1</sup> If you intended to share any pictures or videos with us, that might be part of the material, please make sure you have received formal (signed) permissions from all persons appearing in the pictures/videos, otherwise please make sure no persons can be recognised on this visual material.

## **VII. Navigation now and in the past**

### **Navigation now:**

- |                                |  |
|--------------------------------|--|
| 1. What GNSS is?:              | <a href="http://www.gsa.europa.eu/european-gnss/what-gnss">www.gsa.europa.eu/european-gnss/what-gnss</a>   |
| 2. About satellite navigation: | <a href="http://www.esa.int/Applications/Navigation/About_satellite_navigation2">www.esa.int/Applications/Navigation/About_satellite_navigation2</a>       |
| 3. How does it work?           | <a href="http://www.esa.int/Applications/Navigation/How_satellite_navigation_works">www.esa.int/Applications/Navigation/How_satellite_navigation_works</a> |
| 4. Where I am?:                | <a href="http://www.space-awareness.org/en/activities/6003/where-on-earth-am-i/">www.space-awareness.org/en/activities/6003/where-on-earth-am-i/</a>       |
| 5. More about Galileo System:  | <a href="http://www.usegalileo.eu/">www.usegalileo.eu/</a>   |
| 6. GNSS:                       | <a href="http://www.gsa.europa.eu">www.gsa.europa.eu</a>   |

### **Navigation in the past:**

- |                                |  |
|--------------------------------|--|
| 1. How to use globe?:          | <a href="http://www.space-awareness.org/en/activities/1609/how-to-travel-on-earth-without-getting-lost/">www.space-awareness.org/en/activities/1609/how-to-travel-on-earth-without-getting-lost/</a>               |
| 2. About celestial navigation: | <a href="http://www.space-awareness.org/en/activities/1645/navigation-in-the-ancient-mediterranean-and-beyond/">www.space-awareness.org/en/activities/1645/navigation-in-the-ancient-mediterranean-and-beyond/</a> |
| 3. Navigation by the Sun?:     | <a href="http://www.space-awareness.org/en/activities/6001/the-sun-compass-of-the-vikings/">www.space-awareness.org/en/activities/6001/the-sun-compass-of-the-vikings/</a>   |
| 4. What is longitude?:         | <a href="http://www.space-awareness.org/en/activities/6002/britannia-rule-the-waves">www.space-awareness.org/en/activities/6002/britannia-rule-the-waves</a>   |
| 5. The Kamal:                  | <a href="http://www.space-awareness.org/en/activities/6004/navigating-with-the-kamal/">www.space-awareness.org/en/activities/6004/navigating-with-the-kamal/</a>   |

## **VIII. Inspire**

- |                        |  |
|------------------------|--|
| 1. CanSat:             | <a href="http://www.esa.int/Education/CanSat/">www.esa.int/Education/CanSat/</a>   |
| 2. AstroPi:            | <a href="http://www.astro-pi.org">www.astro-pi.org</a>   |
| 3. Moon Cam Challenge: | <a href="http://www.esa.int/education/">www.esa.int/education/</a>   |
| 4. Climate Detectives: | <a href="http://www.esa.int/Education/Climate_detectives/">www.esa.int/Education/Climate_detectives/</a>                       |
| 5. CubeSat:            | <a href="http://www.esa.int/Education/CubeSats_-_Fly_Your_Satellite/">www.esa.int/Education/CubeSats_-_Fly_Your_Satellite/</a> |

