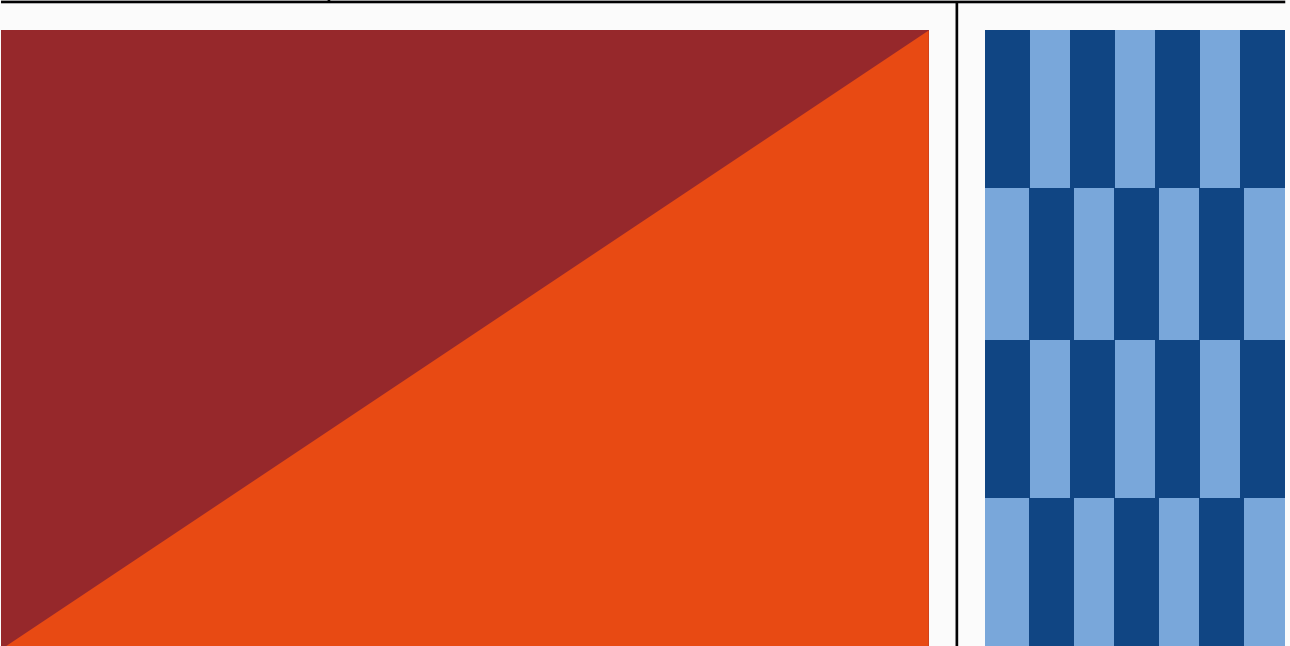
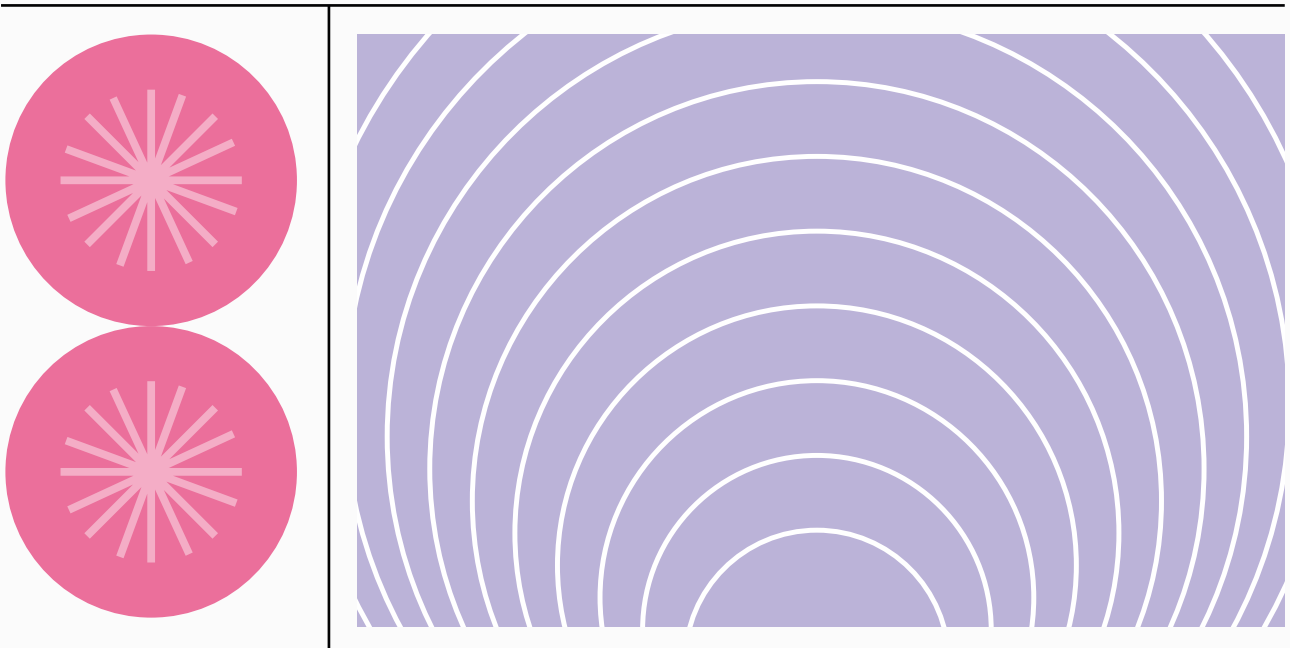
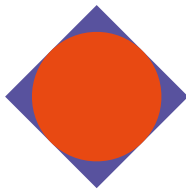


# CASE STUDIES

03



As mentioned earlier, despite the diversity of community-grounded solutions, there are several common patterns across OS Hubs which allowed us to cluster them in three main categories.



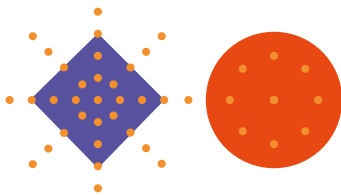
### School – based OS Hubs

OS Hub teams work together with schools with the objective of facilitating the integration of Open Schooling in the school institutional structure and culture, namely by working together with teachers and school heads, so that in the future schools become fully autonomous.



### School – supporting OS Hubs

These OS Hubs are normally based in a physical space with equipment and resources that schools, generally, don't have access to, and develop projects where schools create tangible solutions to community challenges through science, technology and fabrication techniques.



### School – connecting OS Hubs

These OS Hubs facilitate the establishment of new relationships and processes between schools and stakeholders that normally are not part of school's daily-life, opening-up student's horizons while contributing to the development of meaningful societal meaningful experiences.

Is it important to note that these categories are not closed, and several OS Hubs share features of several categories.

The value proposition, approach, activities, relations and sustainability plan of each OS Hub depends on several variables, such as the surrounding context – geographical, socioeconomic, ethnic, and the institutional nature of the host institution – its mission, assets, human resources, funding, facilities and networks.

**Based on this, we propose the following clustering of OS Hubs:**

School – based OS Hubs	School – supporting OS Hubs	School – connecting OS Hubs
OS Hub – Ireland	OS Hub – Switzerland	OS Hub – The Netherlands
OS Hub – Portugal	OS Hub – France	OS Hub – Austria
OS Hub – Greece		OS Hub – Czech Republic

In this chapter, we provide the profile of each OS Hub, where we describe the respective value proposition, target public, approach and model by specifying their roles in the relations they established with their partner schools and communities.

# OSHUB IRELAND



**Trinity College Dublin**  
Coláiste na Tríonóide, Baile Átha Cliath  
The University of Dublin

## Trinity College Dublin

OSHub-IE is led by Trinity College Dublin (TCD), a research-intensive university, with expertise in several disciplines including nanotechnology, information technology, immunology, mathematics, engineering, education, psychology, politics and English. OSHub-IE started out as part of the education programme in TCD's former art-science public engagement space Science Gallery Dublin, and is now led by researchers in TCD's School of Education.

TCD is based in the heart of the capital city, with direct access to networks of researchers, innovators, educators and students, both locally and internationally.



OSHub-IE works as a community broker between schools, researchers and industry that promotes transdisciplinarity and active global citizenship, by providing or pooling networks of stakeholders that support teachers building student action out into local communities and vice-versa.

## Target public

Transition Year Students, particularly from communities at high risk of educational disadvantage.

Transition Year (TY) is a one-year programme that forms the first year of a three-year senior cycle in many schools in Ireland. TY provides an opportunity for learners to reflect on, and develop an appreciation of, the value of learning in preparing them for the ever-changing demands of the adult world of work, further and higher education and relationships. Hence, each school designs its own TY programme by taking into account the possibilities offered by local community interests, in a way that suits the needs and interests of its students, thus providing an ideal opportunity to activate students as active global citizens.

Although not exclusive to these schools, OSHub-IE places focus on schools with a DEIS (Delivering Equality of Opportunity in Schools) designation, meaning the students there are at the greatest risk of educational disadvantage, or Educate Together Secondary Schools, with a high proportion of students with Special Educational Needs.

## Approach

OSHub-IE developed a STEAM-focused year-long programme to empower students to become active citizens within their own communities. This programme aimed to spark inspiration through STEAM workshops, to identify challenges of local concern, to construct projects to tackle these challenges and to showcase their work beyond the classroom.

**The role of OSHub-IE throughout this process is the following:**

- to connect schools to experts and local stakeholders who assisted with workshops and provided guidance to students throughout their OSHub project development phase, placing these projects within a real-world context. Through these interactions, students gain relevant and real-world insight into the topics they are exploring and are encouraged to share their thoughts and opinions. In addition, it acts as inspiration for future career paths for the students;
- to prepare the sessions and inform the invited stakeholders of their role, ensuring clear communication between all actors involved;
- to evaluate the programme from the perspective of students, teachers and the hub itself, to make suitable improvements for the following year;

- to coordinate the project showcase, including organising a location, ensuring the physical design of informative panels and student projects, inviting the guests, and developing the programme;
- to ensure sustainability of the programme.

To support teachers in secondary schools facilitating this year-long programme, TCD organised teacher training workshops, and co-created the OSHub-Ireland: Teacher Handbook using teacher consultation, which outlines all elements of the programme and links to required resources, providing a means for teachers to adapt the material to suit their local context. Specifically, it includes relevant definitions, diversity equity and inclusion guidelines, a selection of transdisciplinary inspiration workshops and a series of guidance materials. These guidance materials include co-creation session outlines, how to build a research question, how to activate the research question as a project and finally tips and tricks for showcasing student work.

## Model

This programme consists of weekly sessions that bring the students through the process of formulating an idea to actualising it as a solution in a real world context.

### These sessions include:

- **Inspiration workshops**

Students are introduced to a number of science topics from the perspective of their relationship with a societal concept or challenge through workshops designed by OSHub-IE. The topics were Bias and Technology; Astronomy and Diversity; Sustainability and Future Cities; Mental Health and Wellbeing; Activism and Climate Change; Innovation and Ethics, Trust and Science. Experts in these topics would often be introduced during these workshops.

- **Ideation sessions**

Over 2 sessions, students collaboratively select a challenge topic and initial project ideas for an Open Schooling project. The rapid ideation approach is used to assist students with concept generation.

- **Accelerator session**

Students are introduced to a variety of experts related to their chosen topics, one or more of which are then paired with the school for the research and project phases. One aim of this session is to inspire possible pursuits of interest and make aware the career paths available to students.

- **Research sessions**

Students carry out research into their concept, guided by experts and local stakeholders to ensure real-world relevance.

- **Project development sessions**

Students develop project outputs that address their chosen issue, which are then later presented in the form of a physical or digital showcase.

The entire programme can be separated into milestones that teachers should aim for when planning their activities: Kick-off, Inspiration, Ideation, Accelerator, Research, Project, Showcase. However the programme is designed to be flexible around time commitments of TY, as well as adaptable to suit the resources of the school.

## Resources

- **Open Science Hub Ireland Teacher Handbook and associated presentations**

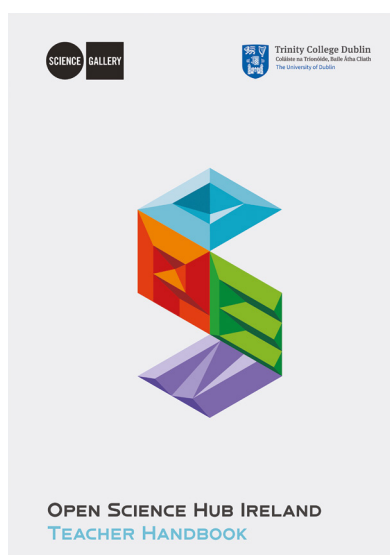
Developed in Summer 2021 and informed by the pilot programme feedback, the Teacher Handbook outlines all elements of the programme and links to required resources, providing a means for teachers to adapt the material to suit their local context. It is designed for a collaboration with Trinity College Dublin, but much of the pack can be reworked for another local context in a different country. The handbook is laid out in a way that the workshops can be given as stand-alone activities.

— Links for resources:

— *Suitable for devices*

— *Suitable for print*

— *Slides for Inspiration Sessions, that complement the OSHub Ireland Teacher Handbook*



- **Diversity and Astronomy**

An exploration of how diversity affects decision making and the selective sharing of knowledge based on dominant cultural identities, all through the lens of astronomy.

— The guidelines for this activity can be found in  
*Chapter 5 – Activity Handbook: Diversity and Astronomy.*

- **Sustainability and Future Cities**

An exploration into sustainable living and current and potential future challenges our world faces, how we can come together to tackle these challenges as local communities and a global society.

— The guidelines for this activity can be found in  
*Chapter 5 – Activity Handbook: Sustainability and Future Cities.*

- **Innovation and Ethics**

This workshop expands learners' perception of what is considered ethically appropriate when engaging the public through art practices and scientific research, and how to innovate responsibly.

- The guidelines for this activity can be found in  
*Chapter 5 – Activity Handbook: Innovation and Ethics.*

- **Ideation Session**

This is a series of co-creation sessions designed to collaboratively select a challenge topic and initial project ideas for an Open Schooling project through the approach of rapid ideation.

- The guidelines for this activity can be found in  
*Chapter 5 – Activity Handbook: Ideation Session.*

- **Ethics Walking Debate Workshop**

The goal of this workshop is to provide an open and supportive space in which learners can voice their opinions and insights on societal topics that often pose challenging ethical questions.

- The guidelines for this activity can be found in  
*Chapter 5 – Activity Handbook: Ethics Walking Debate Workshop.*

- **An introduction to Zines**

Overview of how to make and implement zines as a creative and personal way for learners to reflect on their learning experience of any activity/workshop undertaken.

- The guidelines for this activity can be found in  
*Chapter 5 – Activity Handbook: An introduction to zines.*

# OSHUB PORTUGAL



OPEN SCIENCE HUB  
PLATAFORMA  
DE ESCOLA  
ABERTA  
PORTUGAL

FIGUEIRA DE  
CASTELO RODRIGO  
MUNICÍPIO

## The Municipality of Figueira de Castelo Rodrigo (MFCR)

The Municipality of Figueira de Castelo Rodrigo (MFCR) is located in the northeast of Continental Portugal, in a low density territory on the border with Spain. In 2017, the MFCR started a social innovation programme – Plataforma de Ciência Aberta – aimed at bringing together science, technology and innovation with local/regional communities, by using research and innovation as tools to tackle local challenges, like freshwater quality, agricultural innovation and circular economy. Plataforma de Ciência Aberta works as an education and innovation hub for the region, connecting multiple schools, universities, municipalities and civil society organisations, and has wide experience: 1) in the development and implementation of educational activities targeted at students; 2) development of implementation of teacher training programs; 3) development and implementation of initiatives and events for the general public in collaboration with multiple stakeholders of the territory; and 4) in the facilitation of community-based action research processes between local stakeholders.





**OSHub-PT supports and works together with schools in the co-creation and integration of relevant and sustainable strategies that promote the development of active citizens in addressing local challenges, through research and innovation projects in collaboration with relevant actors.**

## Target public

The school community as a whole, with more continuous actions targeted at teachers and students.

## Approach

OSHub-PT is based in the county of Figueira de Castelo Rodrigo, in a border, low density territory located in the northeast interior of Portugal, with a population density of 12 inhabitants/km. The population of this region has traditionally limited access to STEAM-related initiatives and the importance of community development has been identified by the EU programme Interreg V-A-Spain-Portugal (POCTEP). This is associated with low school performances and high rates of school failure, low innovation and reduced capacity for investment and entrepreneurship. On the other hand, it is a region that entails an immense potential regarding natural, archaeological and historical heritage, including two UNESCO World Heritage sites – the PreHistoric Rock Art Sites in the Côa Valley and Siega Verde and the Alto Douro Wine Region. Moreover, it is part of the Network of Historical Villages of Portugal and of the Douro River Cruises Route, receiving several hundred thousand tourists per year.

OSHub-PT has been working as a facilitating agent in the community, promoting open, inclusive and interdisciplinary processes in which citizens and community groups collaborate with researchers, professionals from enterprises and policy-makers to tackle community-defined problems at local and regional levels.

In particular, at school, OSHub-PT has been collaborating directly with school heads and teachers in providing structural support and an interface for the integration of Open Schooling approaches in the school organisational culture, so that schools become effective and autonomous drivers of community development and well-being.

### **The role of OSHub-PT in the establishment of this school-based OSHub model entails:**

- to liaison with the Municipality and other relevant partners so that this strategy can become a territory-wide approach (vs. a focal initiative at a school);
- to work directly with schools, supporting teachers and school boards in the integration of Open Schooling approaches, in both formal and non-formal settings, including:
  - co-designing, developing and implementing curricula/projects based on best practices;

- documenting and evaluating the process and practices;
- facilitating the dialogue with community stakeholders;
- ensuring a continuous training program for teachers and school heads;
- to advocate for the importance of Open Schooling with school boards and decision-makers, facilitating its integration at the school organisational culture.
- to foster the development of local networks amongst schools and community stakeholders to exchange knowledge /experience;

## Model

With the objective of providing schools with the support to integrate open schooling approaches in their daily-life and organisational culture, OSHub-PT works together with the school community in the following:

- **Continuous professional development activities, which can range from:**

**Long (25h)** training programs for teachers and school heads on how to develop and implement open schooling projects co-creatively with students. This training program promotes a project based methodology settled on equity, inclusion and democracy, which guides educators through the following steps: tackling local challenges/opportunities, collaborating with stakeholders, sharing with the local community and evaluating the impact of the project. This training program, as well as the supporting practical manual, was developed together with teachers from the School Cluster of Figueira de Castelo Rodrigo.

**Short (2h to 6h)** training sessions for educators and school heads about the development of projects based on youth-identified local challenges in collaboration with community partners.

Follow-up sessions for teachers, individual or in group, to support them in the daily-implementation of open schooling practices.

- **Facilitated sessions inside the classroom**

Although the focus of OSHub-PT's approach is to support teachers increasing their knowledge and confidence to use open schooling practices in their daily-life, whenever necessary or requested, the OSHub-PT team also works directly with the teachers inside the classroom, either by aiding in the implementation of specific dynamics, following groups of students in the development of their projects, establishing specific contacts with stakeholders.

- **Brokerage events between the school community and stakeholders, including:**

Practical workshops to promote/strengthen connections and foster collaborative work, projects and activities between teachers and external stakeholders, while at the same time creating the opportunities and conditions for the beginning of effective partnerships between the school and their communities.

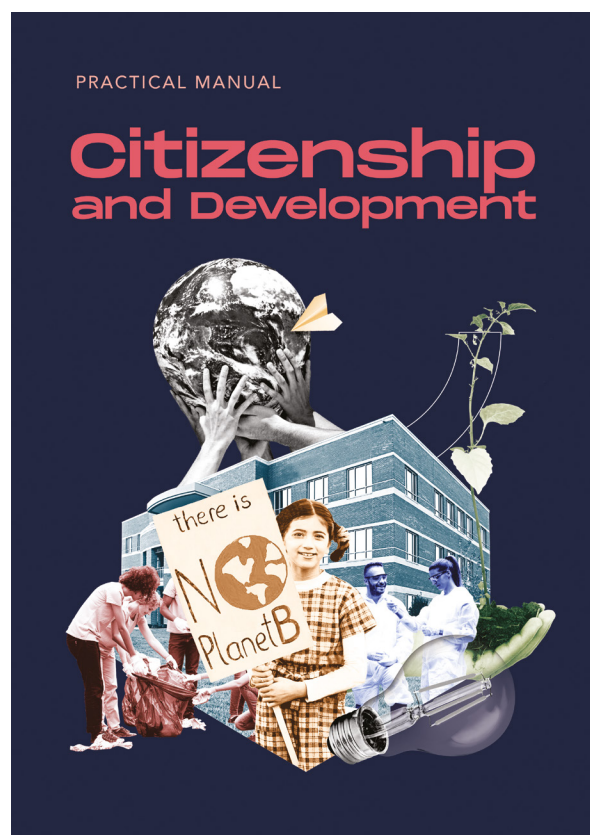
Informal discussions about open schooling and democratic education approaches between educators and professionals working in the field, with the objective of creating a community of practice, while sharing real experiences, good-practices and challenges.

## Resources

- **Citizenship and Development | Practical Manual**

Practical experience/evidence-based manual aimed at integrating Open Schooling in the Citizenship and Development discipline. This resulted from the collaborative work with 17 teachers in 2019 and 2020.

— [Link for the manual](#)



- **Integrating Open Schooling in the daily-life of schools: A teacher training program**

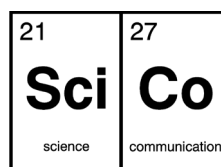
Training program for teachers on how to develop and implement an Open Schooling project co-creatively with students. This training program promotes a project based methodology settled on equity, inclusion and democracy. The main characteristics of this methodology are focused on: tackling local challenges/opportunities, collaborating with stakeholders, sharing with the local community and evaluating the impact of the project.

— The guidelines for this teacher training program can be found in *Chapter 5 – Activity Handbook: Integrating Open Schooling in the daily-life of schools: a teacher training program.*

# OSHUB GREECE



OPEN SCIENCE HUB  
**SCICO**  
**MAKER LAB**  
GREECE



## SciCo (Science Communication)

SciCo (Science Communication) is a non-profit organisation, based in Athens, that communicates scientific issues to the general public through innovative, interactive and entertaining activities, from talks and workshops, corporate training, events and festivals, to STEM education and citizen science. SciCo has extensive experience in STEM education, having been awarded by the Mariano Gago Ecsite Awards in 2019, under the category Sustainable Success. Over the past years, SciCo has reached more than 400.000 people all over Greece. It has also reached audiences outside Greece by expanding some of its own projects internationally and by participating in EU Programs and Networks.



**OSHub-GR supports and works together with schools and the surrounding community to establish school-led community hubs that enhance STEM education and hands-on learning in a way that is integrated in the local reality.**

## Target public

The educational community as a whole (school heads, teachers, students, parents, local community), with more continuous actions targeted at Information and Technology teachers and students (12-18).

## Approach

OSHub-GR | SciCo Maker Lab was established in the island of Limnos. Limnos is a Greek island, with approximately 17,000 inhabitants, located in the Northeastern side of the Aegean sea, very close to Turkey. Due to its geographical location and proximity to Turkey, it is considered as a remote island and has a severe army presence (multiple army camps, air force hubs and soldiers on the island). Schools, students and communities in such geographically isolated locations, usually have fewer opportunities to engage with innovative participatory programmes and lack staff and resources in education. On the other hand, the island of Limnos has a notable environmental and cultural wealth, as well as rich biodiversity. In addition, it experiences an increasing influx of visitors and tourists over the past years, leading to continuous development. It is also home to the Department of Food Science and Nutrition of the Aegean University.

More specifically, OSHub-GR established a school-based OSHub model, which has a physical space that works as a maker lab, where the educational community develops science and technology projects to tackle local relevant challenges and/or opportunities. It is led, namely, by teachers and students, which then, depending on the specificity of the projects, form networks and liaisons with the local community and local stakeholders (university, municipality, parents, local organisations, other schools) who can serve as collaborators, consultants or end users.

Some examples of projects that emerged from this approach include: students developed a smart stick with smart goggles for visually impaired or a smart feeder for the stray animals on the island, by using coding and programming, tinkering with sensors and microcontrollers and recyclable materials; or developed applications for locals and visitors to use in case of emergency, or to showcase the island's biodiversity and the nutritional elements of local products, based on the programming environment MIT App Inventor.

### **The role of OSHub-GR in this process is multi-fold:**

- to liaison with the Municipality and other relevant partners so that this strategy can become a territory-wide approach (vs. a focal initiative at a school);
- to provide training and continuous support to educators, promoting confidence and autonomy to lead science and technology based projects that tackle local relevant challenges;

- to support schools establishing their own makerspaces;
- to foster the development of local networks amongst schools and community stakeholders to exchange knowledge /experience;
- to connect local schools and communities with global initiatives and networks, allowing to disseminate the work being done locally and, at the same time, creating opportunities for local to global collaborations.

## Model

In order to establish a meaningful and sustainable school-based OSHub, where school projects meet real-life challenges and learning takes place within the community ecosystem, the educational community is guided through a series of steps:

- **Community-based decision making sessions:**

The objective of these sessions is to bring together the local municipality and the school heads of the existing schools to discuss the project, its objectives and respective impact, and to jointly define the general strategy of OSHub-GR. On average, these meetings happen once a year, a couple of months before the start of the new school year (to define future strategies but also to evaluate previous actions).

- **Co-creation workshops:**

By guiding school heads, teachers and key stakeholders through a co-creation process, these workshops are aimed at setting a common vision and goals for the coming school year. On average, these workshops happen once a year, before the start of the new school year.

- **Train-the-trainer approach:**

The scope of this approach is to increase teacher's knowledge and autonomy with technological tools, such as 3D Design & Printing, Arduino and AppInventor, so that teachers can use them in a confident and independent way together with their students. Once learners get to grips with the basics of these tools, they are guided through a co-creation process to identify local issues or opportunities that can be tackled through science and technology projects. This is an ongoing process, grounded on inquiry-based and hands-on learning. The ultimate goal of this approach is to develop inclusive, hands-on educational methods and a curriculum based on real life-issues, which will engage and motivate students, while providing them with knowledge and important skills, like problem-solving and collaboration.

- **Student training workshop:**

Throughout the school year, the OSHub-GR team also keeps regular contact with students to ensure that the projects are on track and to gather feedback and ideas for improvement. On an ad-hoc basis it also provides specific training on particular themes of interest or specific tools.

- **Science communication workshops:**

Particularly when there are academic partners involved, the organisation of workshops about science communication methodologies and tools is very relevant to demonstrate the importance of reaching out to the general public and to the local community, and to share the research processes and outcomes happening at universities and research institutes. In the specific case of OSHub-GR, these workshops triggered the interest of the Aegean University, and its students, to collaborate in the organisation of the first Aegean Festival in the island of Limnos.

- **Establishing a makerspace at the school:**

OSHub-GR created a simple guide to support schools setting-up their own makerspaces, which includes information about material, equipment, tools and safety. This document is updated on a continuous basis based on the experience of the participating schools.

## Resources

- **SciCo Maker Lab – Equipments, tools, materials and safety**

A set of guidelines that include basic materials, tools and equipment, as well as safety recommendations, to establish a SciCo Maker Lab. The first one was created in the secondary school of Livadochori Limnos and then reapplied to the Vocational School of Myrina.

— These guidelines can be found in *Chapter 4 – Physical Spaces*.

- **Raspberry Pi Gaming Console**

Creating a gaming console with retro games by using open source technologies.

— The guidelines for this activity can be found in *Chapter 5 – Activity Handbook: Raspberry Pi Gaming Console*.



# OSHUB SWITZERLAND



OPEN SCIENCE HUB  
CITÉ  
DE SCIENCE  
OUVERTE  
SWITZERLAND



## Onl'Fait

Onl'fait is the first educational Fab Lab in Geneva, a space open to everyone around digital craftsmanship, which provides its community with technical, technological and human resources. The goal is to offer a diverse community of enthusiasts and professionals the tools to repair, create, share, develop, design a prototype or a product, while facilitating an intergenerational and multicultural meeting place to reflect on an ecological, citizen-led and sustainable approach to science, technology and consumption.

Onl'Fait offers a portfolio of events and activities, namely on science and technology education, that promote the spirit and mindset shared by scientists and makers: analyse, research, create, modify, solve; encourage inclusion, from children to scientists, by contributing to the democratisation of science and sharing of scientific and technological knowledge; facilitate science learning by offering hands & minds-on programmes with a special attention to children and disadvantaged communities; and support the open hardware and software movement to share, take ownership of, and contribute to science and technology knowledge and culture.





**OSHub-CH offers a methodology and practical tools to place schools at the centre of community projects about sustainability, science and technology by providing support to teachers and students.**

## Target public

Secondary school students from pre and vocational schools (>15 years-old), teachers, Department of Public Education.

## Approach

**The scope of OSHub-CH | Cité de Science Ouverte programs are two-fold:**

- on one hand, to demonstrate to young people the multidisciplinary of societal challenges, offering the possibility to meet and work together with experts from many different areas (e.g. natural sciences, electronics, communication, european relations, stakeholder facilitation);
- and on the other hand, how to develop technological solutions for these societal challenges, namely in relation to sustainability, through research-based practices grounded on community relevant issues. Throughout this process, students and teachers are acquainted with the knowledge to better understand the problem and with the technical tools to design and make a technical device.

These projects are developed at Onl'fait, which due to its Fab Lab nature is equipped with the necessary technical skills and resources, and connected to several different networks and people from science, technology and innovation.

**More specifically, throughout this process, the role of OSHub-CH is the following:**

- to organise co-creation sessions with experts and/or students and/or local stakeholders to identify the community issues to tackle;
- to connect schools to experts to understand the importance of science and technology for sustainability, define the "research questions" related to the identified issue and discuss the role of scientific research in society;
- to connect schools to local stakeholders to gain relevant and real-world insight about the identified issue, namely by investigating its complexity and how public and private institutions are dealing with it;
- to offer a workspace, materials, tools and machines to develop the chosen technical solutions;
- to support teachers during the development of the project at school and to identify tasks that suit the different profiles of students;

- to promote the work of students in collaboration with the local community and different stakeholders.

Additionally, OSHub-CH also plays an advocacy role targeted at policy-makers, namely the Department of Public Education, by demonstrating the strengths of maker education, open schooling and transdisciplinarity.

## Model

This programme consists of weekly sessions that bring the students through the process of formulating an idea to actualising it as a solution in a real world context.

### These sessions include:

- **Co-creation workshops:**

Students and/or teachers and/or relevant stakeholders are guided into a co-creation process to identify the issue to tackle and understand the role of each stakeholder to implement the programme. The topics that have been identified and developed are related with freshwater in the Geneva region, COVID-19, climate change, food waste and healthy soils.

- **Research sessions:**

Experts working on the identified topics are invited to provide a scientific contextualization of the theme, talk about recent developments and perspectives, set the research questions, as well as discussing technical constraints. After this, students start by doing their own research about the topic, guided by their teachers, before focusing on the technical solution to the problem.

- **Maker sessions:**

Over several sessions (5-10), students prototype and implement a technical solution using the tools, machines and materials available at Fab Lab Onl'fait.

- **Sharing session:**

Students are asked to share their work using different communication formats (e.g. social media, presentations, exhibition) and by presenting it in different contexts (e.g. at a students' symposium, the Natural History Museum of Geneva or at their school).

- **Evaluation sessions:**

Students and teachers are asked to self-reflect and evaluate the programme and the activities, providing OSHub with relevant information to improve the implementation of Open Schooling programmes.

Importantly, in addition to the steps above, OSHub-CH also invests several hours in one-to-one meetings with teachers, thus creating trust and empathy relationships that are pivotal for the legacy of these programs.

Finally, the programme described is flexible and can range from a month-long activity to two years of continuous work. The number of students, their personal profile, the school curriculum, and the time available are key elements to consider while co-designing the programme with teachers.

## Resources

The activities of OSHub-CH, including hardware and processes, were documented and made openly available according to the Fab Lab chart regarding open source and open access. These resources can be found in the website of Onl'fait and, in particular, in the links below:

- **Freshwater monitoring**

- *Github*
- *Wiki*

- **CO<sub>2</sub> monitoring**

- *Wiki*
- Building a CO<sub>2</sub> sensor: the guidelines for this activity can be found in *Chapter 5 – Activity Handbook: Building a CO<sub>2</sub> sensor*

- **Biomaterials**

Food waste and biomaterials: Give a second life to food waste and fabricate biomaterials that can be used to produce small objects and accessories.

- The guidelines for this activity can be found in *Chapter 5 – Activity Handbook: Food waste and biomaterials*
- *Materiom project website*

- **Open Science Hub Board**

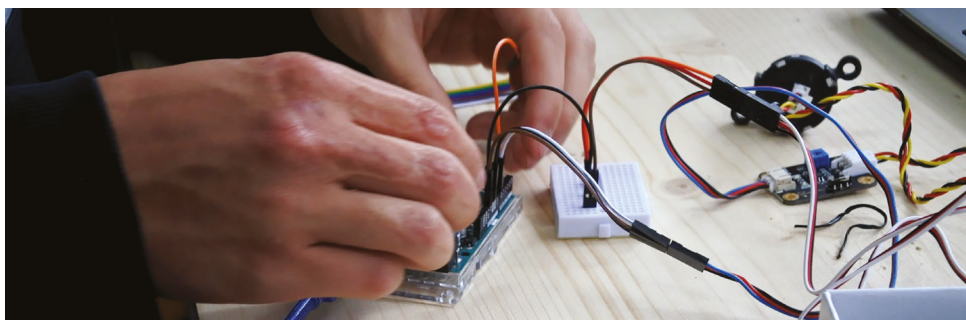
A co-creation tool to get familiar with the Open Schooling methodology and to identify themes, resources and stakeholders involved in implementing a programme in the local community. The tool has been adapted from the Full Stack Tool Board, developed by IAAC, Barcelona.

- The guidelines for this activity can be found in *Chapter 5 – Activity Handbook: Open Science Hub Board.*

- **Onl'fait – Educational Fab Lab | Equipment, management plan and safety**

Set of guidelines for establishing and running a Fab Lab, including materials, tools and equipment, as well as safety recommendations.

- These guidelines can be found in *Chapter 4 – Physical Spaces.*



# OSHUB FRANCE



OPEN SCIENCE HUB  
**OSHUB**  
ESPACE DE SCIENCES OUVERTES  
FRANCE

## LA CASEMATE

## La Casemate

La Casemate, the centre for scientific, technical and industrial culture (CCSTI – Centre de Culture Scientifique, Technique et Industrielle) of Grenoble, was the first structure of this kind created in France, being now part of a network of around forty CCSTIs. Its main mission is to promote scientific, technical and industrial culture to all populations. La Casemate building includes an exhibition space and a fablab/makerspace, where a multidisciplinary team, from the fields of culture, science, journalism, communication, mediation and project engineering, develops interactive exhibitions, science workshops, digital publications, Science Festivals, public debates and participatory events with stakeholders.

Within the OSHub project, La Casemate has chosen to settle at the heart of the Villeneuve neighbourhood of Grenoble, and to open the OSHub space – Espace de Science Ouverte – within La Machinerie, to work closely with the local inhabitants.



**OSHub-FR works as a community hub that supports teachers and students developing new practices and projects using digital fabrication tools, to improve science and technology teaching, empower student's agency in their communities and promote connections and collaborations between local partners and schools.**

## Target public

Teachers and students, particularly from Villeneuve, a low socio-economic background neighbourhood from Grenoble.

## Approach

OSHub-FR is a collaboration between La Casemate – CCSTI Grenoble and the third place La Machinerie located at Villeneuve, a low socio-economic background neighbourhood from Grenoble. La Machinerie works as a concierge and meeting place in the heart of the neighbourhood, where it hosts an open space for meeting and learning by doing, promoting the exchange of know-how and local initiatives by residents and actors from the neighbourhood (DIY, repair, homemade, reuse, digital, etc.). In addition, it provides access to several digital fabrication tools, such as 3D printers or laser cutters, allowing to develop and prototype projects and to create all kinds of objects.

As such, the collaboration between La Casemate and La Machinerie works as an effective synergy, where La Machinerie brings the space and mindset for community collaboration, and La Casemate the open science framework, tools and resources, thus creating the conditions to develop projects based on relevant issues together with the local inhabitants (youngsters, families, associations, etc.), by using a multidisciplinary STEAM approach and digital fabrication skills and tools. Furthermore, this participatory space also provides training and resources for educators, and organises workshops, meetings and events, bringing together the different kinds of local actors.

### **The role of OSHub-FR is to promote teacher's autonomy and skills that allow them to:**

- develop and implement a project-based learning approach in a Fab Lab, creating opportunities for their students to explore, invent and transform abstract ideas into tangible objects by using digital technology;
- create new resources and tools that can be easily shared, adapted and used by the teacher community.

For that, OSHub-FR uses a combination of approaches, which comprise intensive training programs for teachers and/or in-class follow-up sessions.

## Model

Below we describe the process of supporting teachers integrating a project-based learning approach in a Fab Lab together with their own class. This process includes a set of sessions, where a facilitator from OSHub-FR guides the teacher, in a real setting with their students, throughout each stage of the project, guaranteeing that the teacher gains the necessary competences to develop it autonomously.

**Before starting, it is important to make sure that the following points are met:**

- The objects that will be created are aligned with the educational objectives of the teacher and are integrated in a class project, that needs to be feasible in terms of skills, equipment and materials;
- The teacher acknowledges that, in addition to producing the objects, a fundamental part of the process is also learning how to design the objects using 2D or 3D design softwares. As such, before starting, it is important to define which parts will be designed and which software is needed;
- The teacher has connections with other teachers in the school and the technology teacher will be involved in the project,
- It is key to establish a calendar that includes the main project steps and the amount of time needed, and possible, to work with the students.

After this, the teacher and the OSHub facilitator make a project plan and define the type and number of workshops that will be implemented with the students.

This is highly dependent of the project that will be developed, but, as a starting point, one can consider the following general reference:

- Presenting and discussing the project with the class and how the OSHub facilitator will be helping  
*1 session*
- Training students on a design software program  
*2 to 3 sessions*

It is important to make sure that students have time to learn how to 2D/3D design depending on their age. If needed, alternatively one can search for files that have already been designed by others, or to use pictures or handmade drawings;

- Deciding on the type of machines needed.  
*1 session*
- Making test prototypes with recycled materials  
*1 session*

The exact number of sessions needed for the fabrication steps depends on the kind and size of the project, thus being difficult to define a precise number. However, the important point is to have students actively participating in ideation and drawing, so that they understand how to go from an abstract idea to creating the actual object, by experiencing the different stages of prototyping and testing.

## Resources

- **Mathematics pedagogical kits**

Resource pack to support teachers to use the Fab Lab to prototype the design of tools to teach mathematics to children aged between three and eleven years, and to test out how to use these tools in the classroom.

— Resources available in *La Casemate's website*

- **Make your own kite**

Discover air and its properties and learn how to make your own kite with recycled materials and tools in a Fab Lab.

— The guidelines for this activity can be found in *Chapter 5 – Activity Handbook: Make your own kite.*

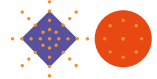
- **How to engage and support teachers developing pedagogical practices and activities using Fab Lab tools**

A set of guidelines on how to establish a small Fab Lab / Tinkering Lab, including information about materials, safety and troubleshooting, based on the experience of OSHub-FR.

— These guidelines can be found in *Chapter 4 – Physical Spaces.*



# OSHUB THE NETHERLANDS



Universiteit  
Leiden  
The Netherlands

## Leiden University

Leiden University is a public research university in Leiden, Netherlands, founded in 1575. The university has seven academic faculties and over fifty subject departments, housing more than 40 national and international research institutes. It has a campus in both Leiden and The Hague, with around 8 000 staff members and 35 000 university students.

Relevant to this context, in the most recent Leiden University Strategic Plan 2022-2027 – Innovating and Connecting, one of the primary focus is on making stronger connections, with a strong emphasis on the connection between the University and society: “Increasing our impact in society requires more interaction and collaboration between the University and the world around us, based on the issues that are relevant to that world.” In particular, the University is working towards increasing their share in societal debates, enhancing their integration within society, while at the same time offering more opportunities to students to gain experience with research and teaching with a central focus on societal challenges.





**OSHub-NL increases educational opportunities for all students, by fostering collaboration between schools and universities, thus opening up schools to new community members while promoting educational careers for university students.**

## Target public

Students from primary to secondary school, students from University students, teachers, school directors, school boards, parents.

## Approach

Universities are hubs for knowledge, connection and creativity. Through a community of teachers, students and scientists, all closely connected with stakeholders – from alumni to other universities, society and businesses – regionally, nationally and internationally, universities seek to unveil the frontiers of knowledge and, ultimately, contribute to community development, both through knowledge creation, but also, by equipping students with the skills and networks to become the professionals and citizens of tomorrow.

As such, university students are well-positioned and have the skill set to help universities opening-up and to create, strengthen and sustain meaningful and functional connections with society. On one hand, university students have the academic knowledge and a critical and inquisitive mindset, are able to take on leading positions, are entrepreneurial and can work in partnership with colleagues from different disciplines and backgrounds. And on the other hand, as citizens, they experience and engage with today's societal challenges and feel the motivation and responsibility to use their skills to find solutions.

Hence, the mission of OSHub-NL | Het Open Leerplein is to work together with the academic community to provide meaningful educational, social and professional experiences to university students, that simultaneously allow them to contribute to society's educational challenges while opening-up their horizons regarding their future careers.

For that, OSHub-NL plays a leading role in incubating and accelerating projects aimed at this goal, which includes the following steps, that we describe in more detail below: 1) identifying the challenge; 2) gathering partners and co-creating the project; 3) piloting and implementing; 4) evaluating; 5) creating conditions for sustainability

## Model

To demonstrate the approach described earlier, we provide here the real example of the project *Studenten voor Educatie*, which started in the beginning of 2020.

- **Identifying the challenge**

Educational inequality and teacher shortage in primary schools are two of the main educational challenges in the Netherlands, being the latter a key contributor to the first one. During Covid-19 outbreak, this situation got even worse, leading to an increase in the number of students falling behind in their academic, creative and emotional development.

Considering this scenario and the approach described before, OSHub-NL defined as a goal to support schools reducing the workload of primary school teachers and increasing the educational opportunities for all students, by increasing the collaboration between primary schools and universities, while at the same time promoting educational careers for university students. Importantly, there was a particular interest to work in The Hague (where Leiden University also has a campus), given the high social and educational demands prevalent in some neighbourhoods.

- **Gathering partners and co-creating the project**

Right from the beginning, OSHub-NL contacted the Municipality of the Hague, with whom quickly set up a network of relevant educational partners – Stichting Brede Buurtschool and the School Boards from the Hague – to devise a plan to tackle this challenge.

This gave rise to the *Studenten voor Educatie* project, whose essence is to match university students with primary schools based on the student's assets and on the school's needs, so that university students can provide an extra force at schools, by working as tutors of primary students, while gaining relevant experience in teaching and being involved in meaningful societal experiences.

Importantly, in order to ensure professional support, university students receive dedicated training, both from teachers and school heads working on the ground, as well as from professionals from Leiden University working on the fields of education and inclusion.

- **Piloting and implementing**

OSHub-NL led the piloting and implementation of the project, where it acted as a broker, coordinating and facilitating the work between all partners, schools and university students. In addition, was also responsible for identifying the needs of schools as well as recruiting and training university students and matching them to the different schools.

- **Evaluating**

A key aspect of the *Studenten voor Educatie* project was the establishment of a monitoring and evaluation programme, in collaboration with the University of Applied Science from The Hague, to keep track of the project's progress, evaluate its effectiveness and adjust it where necessary, on an evidence basis. Again, OSHub-NL was responsible for recruiting the research group and working with the researchers in the co-design of the monitoring plan, as well as liaising between the different project partners, namely the School Boards.

- **Creating conditions for sustainability**

*Studenten voor Educatie* started as a pilot with 4 schools and 8 mentors in the spring of 2020, and it has become today a citywide facility with over 50 primary schools. In addition, it is anchored within The Hague's educational agenda until 2026 and receives municipal support. For this, the experience, expertise and connections of the partners involved, as well as the involvement of the Local Councillor since the beginning involvement, were fundamental to create the conditions for ensuring both financial and institutional sustainability.

## Resources

- **Art-based mapping**

The art-based mapping evaluation method was implemented in the context of the Studenten voor Educatie as one of the research instruments of the Monitoring and Evaluation Program developed by the Centre of Expertise in Global and Inclusive Learning at The Hague University of Applied Science.

- The guidelines for this evaluation method can be found in *Chapter 5 – Activity Handbook: Art-based mapping*.



# OSHUB AUSTRIA



OPEN SCIENCE HUB  
CREATE  
YOUR WORLD  
AUSTRIA

 ARS ELECTRONICA

## Ars Electronica Linz GMBH

OSHub-AT is part of Ars Electronica Linz GmbH, an Austrian cultural, educational and scientific institute, founded in Linz in 1979, which represents a comprehensive approach in the confrontation with techno-cultural phenomena. It works as a hub for contemporary developments in the field of technology, science and arts, and the discourse about its meaning for society. It is based around the Ars Electronica Center, which houses the Museum of the Future, in the city of Linz. In addition, it runs the annual Ars Electronica Festival, manages a multidisciplinary media arts R&D facility known as the Futurelab and confers the Prix Ars Electronica awards, amongst many other activities.

This multi-armed ecosystem keeps alive a network of scientists, artists, peers and other experts working in the technology field, which inspire and drive these developments.

Importantly, Ars Electronica has an in-house education and content development department with wide experience in non-formal / informal education and state-of-the-art cultural mediation, which is influenced by the create your world initiative, which provides a framework to discuss the Ars Electronica topics from the perspective of young people.



**OSHub-AT brings into schools the perspective of society on contemporary science & technology developments through the lens of art, by brokering and curating a collaborative process between artists, scientists and technologists from the Ars Electronica network and teachers.**

## Target public

Students (10-18 years-old) and teachers from all school types, with a focus on students from rural areas or from low socio-economic urban backgrounds.

Workshop leaders who embody a professional position from STEAM field, with a priority on those at an early stage of their careers and with non-formal education background.

## Approach

The scope of OSHub-AT programs, with the umbrella designation of “create your world Tour”, is to stimulate into the formal school education system contemporary and relevant topics, developments, issues, discussions and views in the intersection of science & technology with arts and society that would not have flown into the classroom by itself.

This is achieved through quick and agile 2-4h workshop modules run by experts, specialists, artists or interesting thinkers about the future – so called inspirators – where the topic and content is quite unrestricted and the only “must” is to be relevant for students now or in their future.

Thinking together about what’s actually going on behind the moon, chatting about our own expectations of artificial intelligence with a programmer in English class, becoming part of a fantastic universe with a visual artist and slipping into the role of a cyberpunk activist, or getting creative with new software and hardware – these are some workshop examples that can be brought into the classroom.

The role of OSHub-AT in this process is to mediate between the world of the workshop inspirators and the world of schools, by aligning the workshop inspirator’s offer with the needs and perspectives of the school’s daily-life, thus ensuring that each workshop is fit for each school’s context.

For that, OSHub-AT, through the Ars Electronica network – which provides access to state-of-the-art knowledge and experience of hundreds of experts – starts by approaching artists/experts to curate their workshop ideas. After this, OSHub-AT initiates and coordinates a co-creation process between individual teachers and the respective workshop inspirator, to tailor a customised version of the workshop concept according to the school needs, the specific setting, the context of the subject and how the workshop will be contextualised within the teacher’s narrative.

## Model

It is important to mention that OSHub-AT itself does not develop, facilitate or offer the workshops. Although this could have been a path to establish a sustainable and stable system of educational offer, as it happens, for example, at the Ars Electronica Center, this framework was not the chosen one for the create your world Tour. The underlying reason is the focus on high agility and contemporaneity by exploring the rich potential of the Ars Electronica network.

**This implies that, throughout this process, OSHub-AT plays both the role of a knowledge broker, between the workshop inspirators and schools, and of a curator, which includes the following steps:**

- **Establishing contact with schools**

After the workshops are set, schools, school heads and teachers are contacted individually via email or phone, as an attempt to reach those who normally do not have access or follow Ars Electronica via the standard communication channels. Complementary, some contacts can also be established via existing educational communities, e.g. for primary schools or middle schools. Then, for the teachers or school heads that show interest about a given workshop topic, the information about the corresponding workshop is sent directly to them.

- **Matching schools and workshop inspirators**

After the teacher or the school head communicates their interest for a specific workshop, OSHub-AT asks the respective workshop inspirator whether she/he is interested in facilitating the workshop at that school, and after this sets up the contact between the teacher and the host (usually via mail). This direct contact between the teacher and the workshop inspirator allows to define logistical aspects (e.g. schedule) but, very importantly, also to discuss the content and format of the workshop.

- **Adapting the workshop to the school context**

This adaptation step can be seen as a co-creation process within a certain range between the workshop inspirators and the teachers. Importantly, the workshop proposal presented by the inspirator is not a final and closed product, but more like a scaffold which can be adapted to the specific school situation, as such: the content can be framed and provided with focal points that align with the material that is being covered in the classroom; or the time and number of participants can be adjusted.

In order to be a relevant and sustainable inspiration, it is key that the workshop goes beyond the single shot event, by integrating, contextualising and discussing the underlying topics, in the classroom, both before and after the workshop. This adaptation step is also the moment to prepare the process before and after the workshop and to define on how to integrate it with the teacher's curricular subject and objectives.

- **Implementing the workshop**

Now it's time to bring the workshop to life and to experience it with the students.

- **Post workshop-follow-up**

After the workshop, there is an additional contact with the teacher to provide any additional support that might be needed regarding the follow-up and to gather feedback about the overall process and workshop.

## Resources

- **Sound of Insects**

Through the process of creating a film with sound, learners understand the value of insects within our ecosystem by sharpening their senses for their auditory and visual appearance.

- The guidelines for this activity can be found in *Chapter 5 – Activity Handbook: Sound of Insects.*

- **Story-Telling and Content Revision**

Learners use story-telling methods to structure, revise and engage with learnt content.

- The guidelines for this activity can be found in *Chapter 5 – Activity Handbook: Story-Telling and Content Revision.*

- **Free Flow Writing**

A creative way of getting started and finding unique approaches.

- The guidelines for this activity can be found in *Chapter 5 – Activity Handbook: Free Flow Writing.*



# OSHUB CZECH REPUBLIC



## SCIENCE IN

SCIENCE IN is a company specialised on creative interpretation of various scientific topics. Activities of SCIENCE IN spread from leading accredited educational programmes, designing and manufacturing interactive exhibitions, developing applications to, for example, producing educational TV films. SCIENCE IN also formally collaborates with important bodies responsible for the development of national Curricula, such as the Ministry of Education and the National Pedagogical Institute of Czech Republic.





**OSHub-CZ facilitates the collaboration within the local community to creatively deal with interesting/important daily-life challenges.**

## Target public

Members of local communities, especially students, teachers, parents/families and local actors, such as municipalities.

## Approach

OSHub-CZ implemented a decentralised approach by establishing a network of OS Hubs across different regions of Czech Republic, based on existing local premises/entities – with their own facilities, teams, equipment. More specifically, local OS Hubs have been established at: Kovarska, Ore mountains, managed by the NGO Do Krajin; Trebon, Trebon lowlands, managed by a local section of the Czech Union of Nature Protectors; foothills of the Sumava mountains, managed by the Elementary School – Zdikov.

This approach aims to strengthen the role of OS Hubs as centres for knowledge-based local development, thus increasing the resilience of local communities and ensuring long-term sustainability.

Despite their different contexts, all local OS Hubs share the common objective of using real-life issues/topics to increase the interest of local communities in scientific processes and tools, while promoting the development of local networks that contribute to community development.

In addition, SCIENCE IN, the coordinator entity of OS Hub-CZ, also develops programs and activities with national reach, as we describe below.

## Model

The programs and activities of the local OS Hubs are designed specifically according to their needs and capacities and have the specific objectives of developing strategies to tackle local relevant problems, increasing their visibility in the region and establishing new collaborations or strengthening existing ones. For example, OS Hub Zdikov focused on the issue of air quality, which is the main environmental problem at this location, by developing strategies with local schools to periodically monitor air pollution and to generate public discussion with the local community; OS Hub Kovarska uses their expertise on producing film documentaries to boost the interest of children, teachers and their families to discover their territory through the creation of their own film documentaries; and OS Hub Trebon works with local schools transforming the knowledge

acquired during educational field experiences and adventures into graphically impressive layouts, which can then be used by other schools and the local community).

Although these approaches are based on the specific context of each local OSHub, the activities are easy to replicate by other similar institutions (NGOs, schools).

The national coordinator, SCIENCE IN, on the other hand, focuses on the development of initiatives with national reach. An example of such initiatives was the production of a TV series – Koumando TV series – , together with the national Czech Television and the Czech Technical University, about how kids discover interesting everyday life topics, like public space, drought, new wilderness, landscape memory etc. The episodes were nationally broadcasted from April to June 2022, and are now on the portal of the *Czech Television*.

Importantly, these episodes have been used to stimulate local communities' interest about important real-life challenges, such as drought, sustainability, air pollution, public space, through scientific experiments and creative activities, which are then discussed during public meetings and school-led seminars.

Additionally, the experiments of the Koumando TV series are currently being transformed into educational programmes that will be placed at the CT-EDU, the educational portal of the Czech Television (and one of the most used educational e-portals in the country) supporting schools and extra-school education.

## Resources

- **Koumando TV series, 9 episodes**

Set of guidelines for establishing and running a Fab Lab, including materials, tools and equipment, as well as safety recommendations

— Available in the portal of the *Czech Television*.

