Guide to the STEM Discovery Week & the Competition
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- Disseminate inspiring practice and investigate new models for schooling and learning
- Offer pedagogical and information services with European added value to schools in Europe
- Contribute to the development of technology-enhanced learning in schools.

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Introduction

Purpose of this guide
The purpose of this guide is to provide anyone interested in organising a STEM (Science, Technology, Engineering and Mathematics) Discovery Week with a campaign blueprint. This blueprint is meant to be used either as a step-by-step guide for organisations interested in organising such campaign or as a source of inspiration for future activities of this type.

Why STEM?
Over the past 20 years, there has been growing interest in Science, Technology, Engineering and Mathematics (STEM) education in most European countries, as well as around the world. Many policies have been initiated, usually having a dual purpose: to promote science literacy among all young people (and even adults); and to attract young people to science and the disciplines of technology in secondary and higher education, with the aim of encouraging them to move to science and technology professions and/or research-scientific careers.

The primary reason for this was the global shortage of science graduates. At the same time, increased attention has been paid to science education for girls and young people with vulnerable socio-economic backgrounds.

Skills in Science, Technology, Engineering and Mathematics (STEM) are becoming an increasingly important part of basic literacy in today’s knowledge economy. Science education can no longer be viewed as only elite training for future scientists or engineers. It is clear that only science-aware citizens can make informed decisions and engage in dialogue on science-driven societal issues.

There is a lot of literature on STEM education, its importance and advantages. The common understanding is that a well-developed STEM curriculum has a great deal to offer to students, teachers and parents. A selection of these advantages is listed below:

**STEM helps you stay current**
In a technology-based society, technology is forever changing. It is also used in almost every aspect of our lives. As workplaces change with updated software, and office equipment and machinery become more touch-screen, STEM knowledge is vital. Keeping up with technology, and not just the latest fashion trend or sitcom, is highly important.

**STEM allows you to be innovative**
Someone created an app that allows you to take a picture of a piece of clothing and generate similar looks through the Web.
Just think of the latest device you have in your hand or at the top of your wish list. STEM helps to transform new ideas into the best inventions.

You can make a difference
Building that shelter for dozens of people, finding that cure or inventing the best way for people to communicate, makes a huge difference and with a STEM education you can make that happen.

STEM promotes equality in education
Women today are taking over some of the top paying jobs. STEM education helps to promote diversity and can contribute to gender equality in the workplace.

STEM can land you a better job in many different industries (yes, even fashion)
Technology is merging with pretty much every other sector. Intelligent machinery, design software and e-commerce can basically bring any idea to life, and a good STEM education can be the ticket to all these careers.

STEM is a confidence booster
When you meet challenges you achieve tremendous boosts of confidence.

STEM gives you a higher income
STEM-related jobs can be financially rewarding. It is evident with a look at starting salaries in the STEM careers. Take a look at the numbers in your country and you will not be disappointed.

STEM provides better chances at landing a job
STEM occupations are continuously growing while unemployment rates for STEM professionals are much lower than those with Arts or Humanities degrees.

STEM is a growing field
Engineering qualifications are in high demand which is expected to increase even more. Besides engineering, other STEM fields are expanding more quickly than any other fields.

STEM is part of our daily lives
Science is the car we drive, the way we communicate, the picture we take when we travel. For us, technology today are the smartphones, smartboards, and tablets. The engineering we benefit from is the building of homes and shelters. We all use mathematics especially when payday comes or when we want to plan a holiday or go for shopping.
What is the STEM Discovery Week all about?
STEM Discovery Week is a joint international initiative of projects, organisations and schools across Europe and around the world, celebrating careers and studies in the fields of STEM.

Who is it for?
Public- and private-funded projects, non-governmental and governmental organisations, companies, universities and schools active in STEM education are cordially invited to join the STEM Discovery Week!

Where is it happening?
Building on the success of the previous editions, the STEM Discovery Week aims to facilitate the organisation of STEM events, reaching out to more and more schools in all European countries and beyond. There is no specific location – STEM Discovery Week activities can be organised anywhere in the world!

When is it happening?
The peak of the STEM Discovery Week activities takes place during the last week of April but, with the participants’ and partners’ help, the whole of April is considered a STEM month! Although we encourage our participants and partners to make as much noise as possible about STEM during the last week of April, activities organised throughout April can be part of the campaign.

April has been chosen because of its proximity to the end of the school year which allows schools some flexibility in terms of the organisation of additional activities.
Getting started

STEM Discovery Week can be organised by any type of organisation interested in or related to STEM education. Non-profit organisations, companies, universities, schools (public or private), science museums and Ministries of Education are all good candidates for organising and running such campaigns.

Structuring your organising team

There are a few different options for structuring your organising team when the nature of your campaign starts taking shape. This will largely depend on what you want to do and the number of people who get involved and can take on organising roles. There are two main options, depending on the type and characteristics of the organising organisation.

Formal structure: You can create a structure and stick to it. For example, the structure that has so far been used included an overall manager, a communications specialist, a person responsible for the blog, etc. Each of these people will be in charge of a particular aspect of the campaign. This ensures that everyone is certain about what their role and responsibility is. It also means that there is little overlap and duplication.

Organic structure: Another approach is to let your team follow an organic structure. Create roles as they are needed or when someone with a particular area of expertise volunteers to assist. This structure needs good lines of communication and may require more physical meetings to ensure that everyone is on the same page with the planning. This structure can be really beneficial if you have a small number of volunteers, as it provides flexibility for everyone to pitch in with the tasks that are most pressing at a particular time.
Modes of involvement

Become a partner
To increase the visibility, outreach and credibility of your campaign, you can offer other organisations/schools/universities the opportunity to join as partners. To do so, potential partners need to fulfil some steps which are described in our Web guide [http://bit.ly/SDW18-guide].

A minimum of two partners, ideally one school and one organisation, would be ideal in order to launch the STEM Discovery Week campaign.

Publish your activity on the map
Once they decide on their course of action, STEM Discovery Week participants can add their activity on the dedicated map (see example in [http://www.scientix.eu/events/campaigns/sdw19]). To do so, they need to fill in the activity form that they can find on the campaign page. This map provides a visual of all the various events and activities that are organised before, during and after the STEM Discovery Week. In this way, partners and participants will be able not only to present their activities but to also get inspired by the various activities that other participants are organising.

Create a live map with multiple pins
If you want to display a map on your website that has more than one location plotted on it, you will need to create a live map. There are different websites and applications to do that, with for example Google Maps allowing users to create a map and then embed it in their website.

First, you will need to generate your map with the multiple locations plotted:
How to create a map with multiple points:

1. Go to www.google.com/maps
2. Make sure you're signed in - you can do so by clicking the Login button in the top-right corner.
3. In the top left corner, next to the search box, click the menu icon to expand the menu:

   ![Google Maps Menu](image1)

4. Click Your places, Maps and then click Create map to edit your map.
5. A new window will pop up. Give your map a title and description, then click Save.
6. You can now pinpoint locations manually by clicking the marker icon and placing it directly onto the map, or search for locations using the search box at the top of the screen.

   ![Google Maps Add Location](image2)

7. If you're adding locations manually, you can name the location and save to add it to the map. If you're searching and adding specific locations, a green marker will appear on the map and you can click the Add to map link.
8. You can also import data from a CSV file in order to avoid the manual work and have multiple locations displayed at the same time.

   ![Google Maps Add to Map](image3)

Once you have done that, save your map again and refresh the page. Now you'll need to add the map to your website page.
Embed a Google map on your website
Once your map is ready, you will need to publish it on your website. To do so, you need to do the following:

1. Make sure your map is public on Google Maps. You can do this by clicking **Share** beneath the map name.
2. Under **Who has access**, click **Change**, turn on the setting for **Public on the Web** and save.
3. Next, click the menu icon and click on the link **Embed on my site**.
4. The code will then pop up in a new window.
5. To use this, and depending on how your website is made, you will need to paste the code into an HTML fragment.
6. Finally, republish your website.

Contribute to the blog
When schools or partners fill in the activity form, they will be asked whether they wish to become a contributor to the STEM Discovery Week blog. The blog is a frequently updated online journal where contributors are invited to share news, updates, activity announcements and reports. It is a place where contributors can express themselves and share their thoughts and the progress of their activities, aiming both to learn from others and to inspire potential participants.

Access to the blog can be open to all SDW participants interested in sharing their experiences and activities; it can also be related to the organisation of one of the competitions. Access to the blog is provided upon request.
SDW dissemination

SDW website
The STEM Discovery Week website is the heart of the entire campaign. It contains all information related to the scope and aims of the initiative, models of involvement, and competitions, and provides access to the blog, social media and dissemination material. In addition, the website is the place where participants come to submit their activities and have them displayed on the dedicated map.

SDW social media campaigns
Social media are a powerful tool in making your campaign known, spreading your message and inspiring schools and other stakeholders to join in.

Although the most recommended approach would be to create dedicated campaign accounts in the social media of your choice (e.g. Facebook, Twitter), this does not have to be your only course of action. Since it takes quite some time to build up your audience, you will need the support of established accounts that will help you make your campaign known. These accounts will post to their followers and networks about your STEM Discovery Week campaign and direct potential followers to your accounts. The social media accounts of your organisation, partner schools and other supportive organisations are all good places to start.
Another effective idea is a Twibbon campaign. Twibbon asks users to sign up and support your campaign by adding a small image (Twibbon) and posting a standard message to your Facebook or Twitter accounts. All this takes place at a fixed date and time aiming to raise the profile of your campaign and its outreach. Your Twibbon is then displayed across the profiles of every Facebook and Twitter user who supports your campaign while supporters will also automatically publish a link back to your campaign when they show their support, spreading your campaign virally across the Web.

![Figure 8 SDW 2019 Twibbon campaign](image)

**SDW chat**

Organising an open online chat that explains the main concept and activities of the campaign and answers all the questions that potential participants may have in relation to their involvement is another way of increasing the overall outreach. A chat of this type was successfully organised one month before the launch of STEM Discovery Week 2019. For one hour, after a short presentation of the campaign, two experts answered numerous questions from teachers. The main questions were about what kind of activities they could organise for the STEM Discovery Week, how they could disseminate the campaign and how to take part in its associated competitions. A few teachers also asked us for examples of activities of previous campaigns and ideas for different educational levels, e.g. kindergarten.

![Figure 9 SDW 2019 online chat](image)
Activities

To join the STEM Discovery Week campaign, teachers, schools, organisations and projects are encouraged to organise one or more STEM-related activities and join the STEM Discovery Week. Activities can be quite flexible in terms of type, content and duration, aiming to be as inclusive as possible and to match every organiser’s capacity, objectives and outreach possibilities. To help you understand the content and type of the activities that can be part of the STEM Discovery Week campaign, we present below a collection of activity types with some examples that we hope will serve as both a guide and a source of inspiration for more activities.

Chat / Webinar

Through online chats teachers and their students are invited to meet experts and gain new insights directly from their field.

To take part in a chat, teachers usually need to register their class in advance, as only a limited number of classes are admitted to join and slots are allocated on a first-come, first-served basis.

Teachers then need time to prepare with their class and get ready to meet experts and discuss with them and with other classes from all over Europe. Organisations are also encouraged to initiate chats and facilitate the communication between schools and experts.

For information on upcoming chats organised by different projects, you can visit:

http://www.scientix.eu/events

A webinar is a presentation, lecture or workshop that is transmitted over the Web. During a webinar, participants have the opportunity to interact remotely and in real time with the expert(s) leading it, by asking their questions, usually by typing them in.

To sign up to a webinar organised by a third party, teachers usually need to register through a link on the webinar page. As soon as the application is received, teachers will receive a confirmation email with the link to access the webinar. Information on planned webinars can be found through the Scientix events (see link above).

If a teacher wishes to organise his or her own webinar for his own class, then the clear scope and objectives first need to be determined. Once the speaker/expert is also identified then a script for the actual webinar needs to be prepared. Various tools can be used in order to host a webinar, from Skype and Google hangouts to WebEx and Adobe Connect.
Conference
A STEM-related conference is a great place for teachers to network, learn from and exchange with other teachers or STEM education professionals. Organising a conference on a STEM topic or collaborating closely with an existing conference is a larger-scale activity to promote STEM education in the community or among colleagues from different communities. Attending a conference of this type or contributing to its programme by presenting teachers’ work or STEM-related projects is also a great way to contribute to STEM Discovery Week.

Debate
The topic of a STEM debate depends on the age of the students. To start with, teachers need to identify an interesting topic to really get their students engaged. Here are a few topic ideas that can serve as inspiration, but teachers should not forget that the final choice of the debate topic will depend on students’ age and maturity.

- animal experimentation
- clinical trials
- energy use and sources
- recycling
- space exploration
- organ donation

Example: During STEM Discovery Week 2019, the Systemic project organised a webinar, with a STEM professional focusing on the IT and Cybersecurity industry. Students and teachers who joined this online chat asked questions about the specific careers, the skills needed, their daily activities and the challenges and opportunities in these STEM jobs.

After the controversial topic of interest is chosen, teachers either have to present this topic and both sides to their students, or have the students take the topic and research both sides of it to decide which side they take. Students should then be divided into groups. They can then discuss their thoughts on the issue.

The easiest way for students to prepare for a class debate is to get their thoughts on paper. They can write an essay where they write supporting arguments and show their evidence. Another option is to write a position paper where they take a position and must support it with factual evidence.
A third option is to use a graphic organiser to find their particular position on a topic. With this option, students must develop arguments both for and against the topic. On the debate day, they must choose which side they most strongly are for or against. A final option is to create an argument outline, which is a basic outline of their position on the topic with supporting evidence. A small guide on how to organise a debate is available here:

Exhibition
Science exhibitions provide innumerable benefits to students, which encourage both their educational and social development. Perhaps one of the most valuable is the chance for students to show, explain and talk about their projects to others. It is particularly rewarding for fellow students, parents and the wider community to have an opportunity to see and appreciate students’ many weeks of hard work. A very useful guide on how to organise a science exhibition at school level:

Festival
A science festival is a festival that showcases science and technology using the freshness and liveliness that one would expect from an arts or music festival. A science festival can be the umbrella for various activities including lectures, exhibitions, workshops, live demonstrations of experiments and discussions. The core content is that of science and technology, but the style comes from the world of the arts. Science festivals can be organised as part of a whole-school activity or extend to the local community.

Example: The Regional Directorates of P&S Education of Greece invite participants to take part in a festival, where students from around Greece will present digital projects and exchange ideas with various STEM education stakeholders on the responsible use of technology.
Lecture / Presentation
A lecture is an oral presentation typically delivered via a talk or presentation by the instructor. The topic can vary from STEM careers to the use of a specific resource or the presentations of research results.

Seminar
Seminars on very specific STEM topics are often organised either by teachers, academic institutions or professional organisations. They usually bring together small groups for recurring meetings, focusing each time on some particular subject, in which everyone present is requested to participate. This is often accomplished through dialogue with a seminar leader or instructor, or through a more formal presentation of research. Within a school, seminars on subjects of interest to students can be organised in collaboration with visiting professionals or in preparation for visits to local companies or industries.

Exhibition Example: For Earth Day, Liceo Majorana in Italy organised an interactive exhibition about the effects of human activities on Earth and about issues of sustainability. Students are the exhibitors: they prepare posters, STEM experiments and games for visitors.

Visit to company / university / organisation
Through company visits, students and teachers would get a better idea of the nature and operation of different STEM-related industries, ranging from IT and telecommunications to space and chemicals.
Although visits of this type can be very rewarding, there are some issues, e.g. possible health and safety risks, highly sensitive and very expensive equipment, that need to be considered during the planning phase. The following guidelines will help ensure that any site visit goes as smoothly as possible:

**Seminar Example:** Ivano-Frankove secondary school in Ukraine organised a seminar for teachers on the use of IBL (Inquiry-Based Learning) with the aid of online laboratories (Go-Lab repository).

The aim is to close the gap between industry and education sectors and to raise pupils’ and teachers’ awareness of STEM careers and to promote STEM jobs. A practical guide on how to initiate and organise such a visit is available here:


http://www.stemalliance.eu/pgbs

**Workshop**

A workshop is a single, short (although short may mean anything from 45 minutes to two days) educational programme designed to teach or introduce to students’ practical skills, techniques or ideas which they can then use in their studies. Computer science is already part of everyday life and students are active in many social networks. The goal is to orient their interest in using technology creatively and securely.

**Professionals going back to school**

The idea behind this activity, inspired by the STEM Alliance scheme, is to have company professionals (technicians, scientists, engineers, researchers or employment and recruiting managers) visit schools and participate in collaborative activities for one hour to half a day or more.

**Example:** 32nd Science Projects Workshop in the Future Classroom Lab, organised by Scientix and 3Rs project

http://www.scientix.eu/spw32-at-fcl-after
Competition

Participating teachers, schools, organisations and projects are invited to submit their STEM Discovery Week activities under one of the competition categories offered. Every year, different projects organise competitions focusing on specific types of STEM activities or pedagogical approaches. These competitions are usually part of the specific projects’ work and their connection to STEM Discovery Week gives them more visibility and outreach.

Who can enter?
The competitions are open to schools (primary and secondary), organisations and projects. Depending on the project, some competitions might have restrictions when it comes to the countries or educational levels they address. Organisations and projects compete only against other organisations and projects, not against schools.

How to proceed
Competitions run from February 1st at 00:01 Central European Time to April 30th at 23:59 Central European Time.

In the activity submission form, and when asked to, participants need to choose and indicate clearly the competition they wish to participate in. Once they implement their activities, and depending on the competition, participants are asked, usually by email, to provide additional information regarding the content of their activity, the resources they have used and the impact on their students.

Selection of winners
At the end of the competition period, a jury specific to each competition selects one or more submissions as winners based on pre-defined criteria.

Timeline
The most important dates related to the competition and the STEM Discovery Week month are:

- Launch of the competition: mid-February
- Deadline for submissions: end of April
- Evaluation of submitted entries: 1st week of May
- Contacting competition winners by email: 2nd week of May
- Public announcement of competition results: end of May

Tips for teachers/schools organising activities
Organising a STEM-related activity is intensive work but the results can be very rewarding not only for a teacher and his or her class but for the entire community. Below, we list some tips that can help teachers during this process.
• **Plan ahead:** The sooner teachers start planning their activity the easier it will be to anticipate and sort out any upcoming issues.

• **Manage expectations:** Before proceeding with the actual planning of the activity, spend a bit of time defining the main goals and aims of the activity along with the desired target audience.

• **Involve students:** From coming up with the basic activity concept to its actual planning and organisation, keep the communication open with students. Getting their continuous feedback and considering their ideas and input will ensure both the realisation of your initial goals and also students’ engagement in the actual activity.

• **Involve the entire school:** When it comes to the organisation of a STEM-related activity, it is always useful to share your plans with the school headmaster and fellow teachers. Practical support, external contacts, further development of the original activity or the organisation of follow-up events related to the original activities are only some of the positive outcomes of such practice.

**Tips for Organisations contributing to activities**

Organisations taking part in the STEM Discovery Week have a unique opportunity to connect with schools and teachers and raise awareness not only on the STEM topic of their interest but also in relation to STEM careers. To ensure maximum outreach and success for these activities we provide some tips that can help organisations during their preparations.

• **The expert is a role model:** Any ambassadors to a school should always be aware that they are role models for the children and young people. As a result, they must always behave appropriately. This includes avoiding any attitude that might be perceived as offensive or outrageous, such as provocative clothes. They should also take care to be punctual.

• **Always comply with local child protection laws:** This may include ambassadors being checked by the Criminal Record Bureau, or its equivalent. Never seek financial gain. During the activity, its preparation or its follow-up, the ambassador should not seek to gain any kind of financial advantage for themselves or their organisation. They should not, for example, actively promote their company’s products or services, or give out samples.

• **Report any conflict of interest:** If, for any reason, potential conflicts of interest are identified, these must be reported as soon as possible to both the school authority and the visiting organisation. Participants in any collaboration need to specify who any conflict of interest should be reported to.
SYSTEMIC
SAY YES TO STEM IN THE CLASSROOM
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