ESA Education Programme
Primary and secondary school activities and classroom resources

CESAR Teacher Training 18 November 2021

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Education Office, STEM and Outreach Unit (TEC-PES)

ESA education programme: a diversified approach

School

STEM programme: Space is the context

Formal education, right into the schools, with:

- **teacher training**
- **classroom activities** to support the curriculum in an innovative way
- **school projects,** inter-disciplinarity in practice

Informal education, learning outside the classroom

University

ESA Academy: Space is the subject

Hands-on space projects

Satellite projects

Scientific instrumentation and experimentation

Technology demonstration experiments

+

Training & learning programme

Training courses on (all) ESA subjects of expertise (more than 50 courses a year)

ESA education objectives

1. Motivate and enable young people to enhance their literacy, skills and competences in sciences and technology (STEM disciplines)

2. Inspire and enable young people to consider pursuing a career in the STEM field, in the space domain in particular

3. Increase youngsters' awareness of the importance of space and its applications in modern society and economy

Never before did we face so many challenges in school education…

Emerging greater interest and engagement of youth is an opportunity and a challenge.

How can we improve how STEM is taught in schools?

- **Lack of interest and/or low uptake** in STEM, girls in particular
- **Diversity and inclusiveness** not systematically addressed
- **Different education systems** and curricula
- Curricula evolving often, quickly → **teachers not consistently supported**
- Need for **new skills and competencies** not (yet) always addressed
- ….

The strenghts of space in school education

- Space is a **modern myth** – a unique motivational context
- Space is a large part of the **solution to global challenges**
- Space is a source of **cutting-edge multidisciplinary scientific knowledge**
- Space is a real-life model of **inquiry/problem based scientific methodology**
- **All STEM subjects, skills and competences** can be linked to a space example and to a space career
- Space is a cradle for **creativity** and an enabler of **innovation** and **transformational processes**
- Space is a powerful model of international **collaborative dimension** and **dialogue beyond frontiers** - a contemporary educational behavioral value
- ….

Succeeding with space in school education

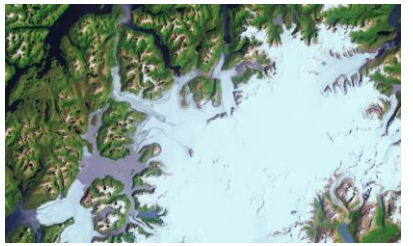
1 **Respect curricular needs**

- Subject knowledge
- Skills and competences
- Core values and attitudes

⇕

- Delivering methodologies
- Activity type
- Supporting tools

Space themes



Mostly as context

Sometimes as subject

2 **Be inclusive & embrace diversity**

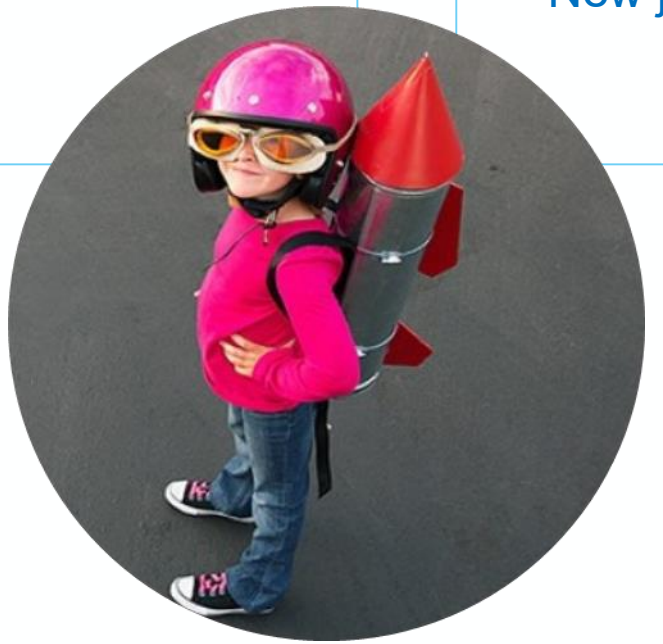
3 **Help curricula to evolve**

Challenges for School Education

Primary and Secondary education focuses on students of 4 to 19 years old

- **More than 80 million school-age pupils, 7 million teachers**
- **22 Member States and 4 Associate States**
- **> 17 languages**

- Different education systems and curricula…
- Lack of interest in STEM..
- New jobs … new skills, new knowledge…



ESERO: space for education goes national

European Space Education Resource Office

ESA's **main project** in support of
school education

The ESA STEM Programme: how we work

International component

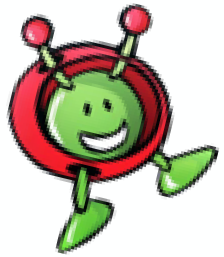
- Overall programme design & management
- Access to European space knowledge, data, facilities, expertise
- Steering according to programmatic/societal guidelines/trends
- Enabling (international) networking
- Optimisation (non-duplication principle, leveraging on commonalities, exchange of best practices & lessons learned, nurturing/promoting innovation in education)
- Inter-agency/institutional/international collaborations and forums

National component

- Addressing individual Member States needs:
  - Different education policies
  - Different education systems
  - Different languages
- Access to national space knowledge, data, facilities, expertise
- Permanent lab of innovation and experimentation in education
- Emerging: influencing education policy making at national level
- Bringing national education expertise and experience back into the European network

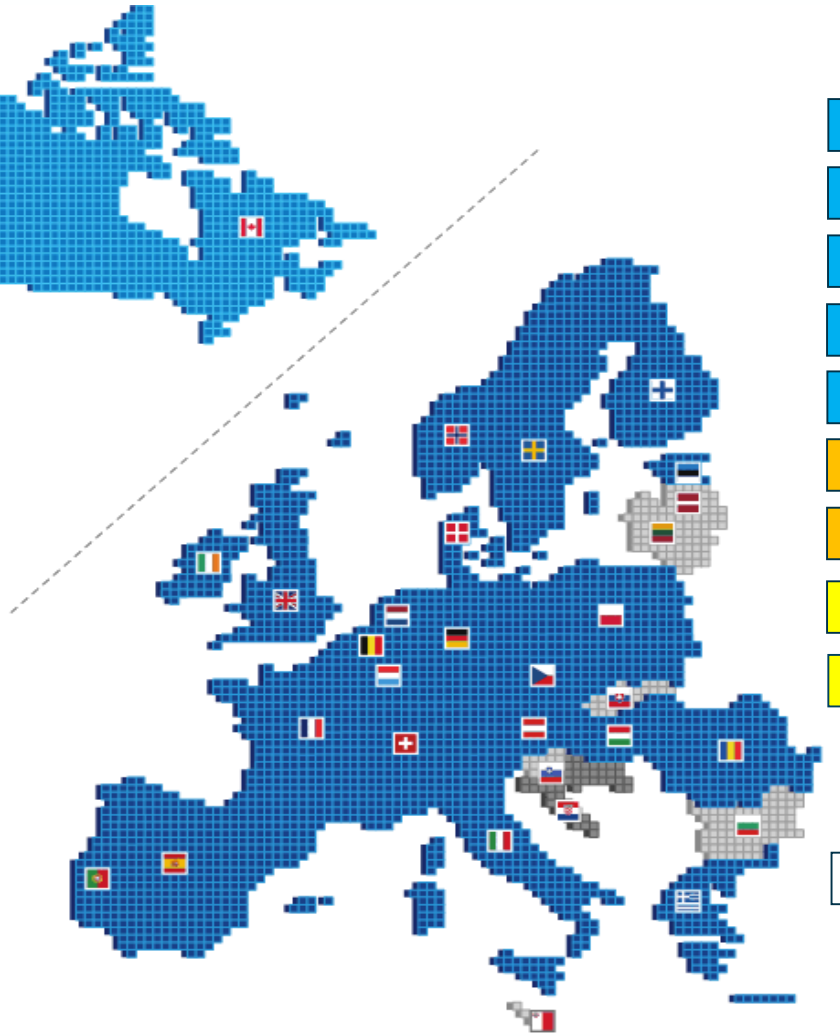
The ESA STEM Programme: what we do

	International component	National component
Formal	• Network-level R&D on didactics applications • International teacher trainings and interdisciplinary school projects • Access to sci-tech sector • Bilateral collaborations ‘of opportunity’	• National teacher training • Tailored classroom resources • National participation in ESA-led school projects • National school projects
Non-formal/informal	• ESA Kids • Various collaborations (e.g ECSITE,…)	• Various collaborations, e.g scouts and more



ESERO network – the expansion goes on

- Est. 2006
- **18 ESERO**
- +2 in 2021
- +2 in 2022



ESERO Austria
ESERO Belgium
ESERO Czech Republic
ESERO Denmark
ESERO Estonia
ESERO Finland
ESERO France
ESERO Germany
ESERO Ireland
ESERO Italy
ESERO Luxembourg
ESERO Netherlands
ESERO Norway

ESERO Poland
ESERO Portugal
ESERO Romania
ESERO Spain
ESERO UK
ESERO Sweden
ESERO Greece
ESERO Hungary
ESERO Latvia

ESERO Switzerland

Operational
In preparation
Launch in 2022
Interest received

Launch
end Nov 2021

The European Space Education Resource Office (ESERO) project

- **Targeting the teachers** to reach students
- Supporting primary & secondary STEM education using space as a learning context
  - **Accredited teacher training** through institutional partnerships,
  - **Supporting school curriculum – classroom resources, school projects, role modelling**
  - **Awareness-raising activities**
- Advocacy and true practice of innovation in STEM education with **innovative didactics** (learner centred, e.g. inquiry, project-based learning, etc.), to change teaching practices and bridge the gap between theory taught at school and the **real practice of science**

ESERO Ireland Careers Roadshow

The keynote speeches were available to stream directly from YouTube.

Digital breakout rooms where teachers/students could interact directly with speakers in Q&A sessions!

MOOC Teaching Climate

https://www.futurelearn.com/courses/teaching-climate-change

Apps | New Tab | Spotify Web Player | Sapienza Project M... | Dashboard ‹ ESA Ed... | Pulse Connect Secure | Pulse Connect Secure | ESA - How can spac... | Reading list

STEM LEARNING

UK esero

Ireland esero

Teaching Climate Change

★★★★★ 5.0 (10 reviews)

Learn how to teach climate change to students aged 11-14 years old and engage them with the ESA Climate Detectives project.

Join course for free

849 enrolled on this course

Support

ESERO Spain materials - in Spanish!

ESA-ESERO impact 2020

Activity	Students	Teachers
National (ESERO)	1,662,325	410,727
International	121,504	6,549
Total impact	**1,783,829**	**417,276**

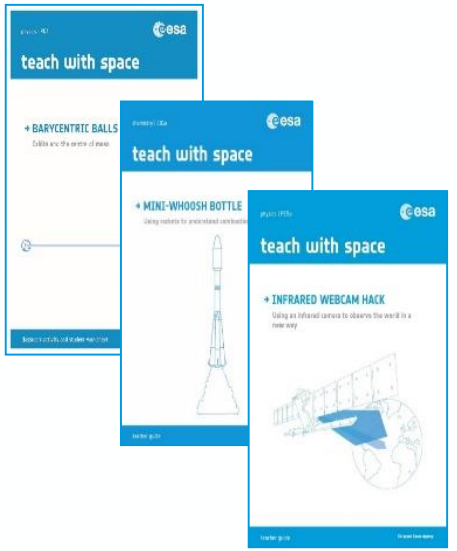
International school-level activities - I

International teacher training

- ESA Summer and Autumn Teacher Workshops (in the NL)
- e-technology lab teacher training, (in BE), 2 workshops per month

Classroom resources: Teach with Space collection

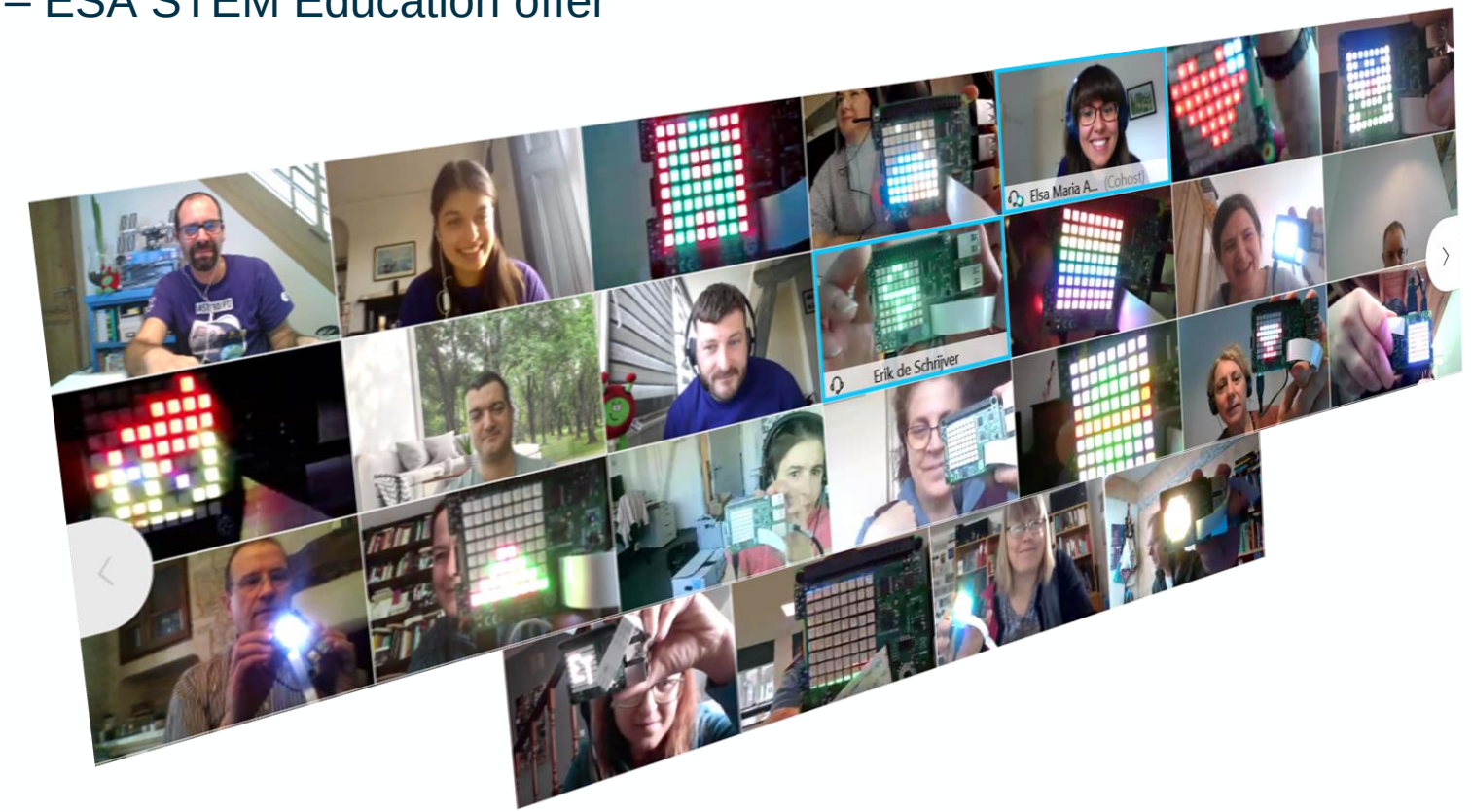
- http://www.esa.int/Education/Classroom_resources



Teacher Training Opportunities – Online

Online teacher training

- Started in January 2021 to adapt to the globally imposed sanitary measures
- Will be part of the future – hybrid – ESA STEM Education offer
- Different kind of events
  - Training courses
  - Workshops
  - Conference



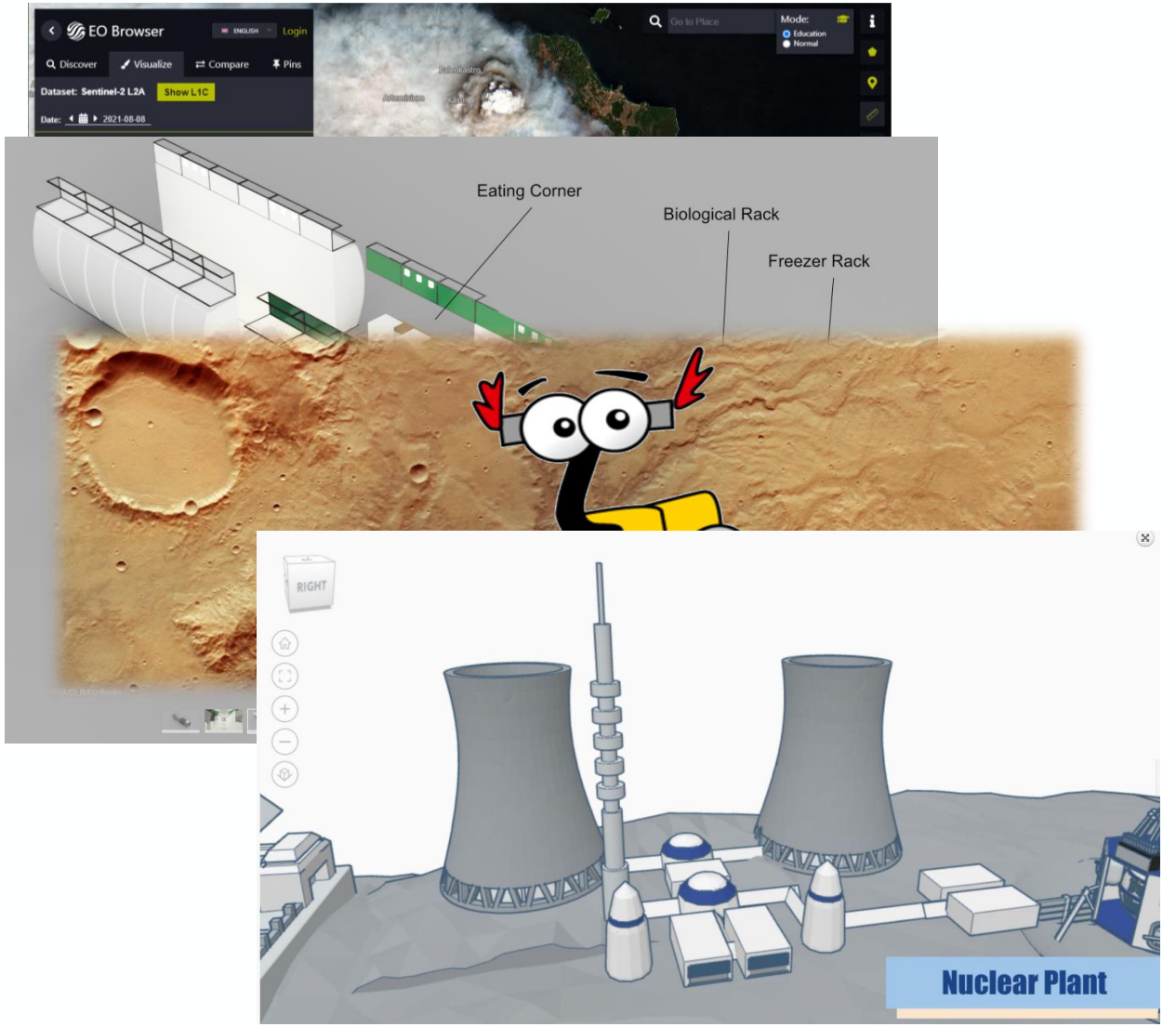
Online Teacher training

- Teach with Earth from space:
  become a climate detective

- 3D design in education with Fusion 360
  - Joint training course with Airbus Foundation

- Code your mission to Mars:
  Artificial Intelligence in the classroom
  - Joint training course with Fraunhofer Institute for Intelligent Analysis and Information Systems (IAIS)

- 3D design in education for beginners with Tinkercad



Online Teacher training schedule

September-December 2021

Dates	Title	School level	Registrations
October 20 & 27	Teach with Earth from space: become a climate detective	Upper primary and lower secondary	27 September – 11 October
November 10	3D design in education with Fusion 360	Secondary	27 September – 1 November
November 17 & 24	Code your mission to Mars: AI in the classroom	Secondary – Vocational Education schools	27 September – 25 October

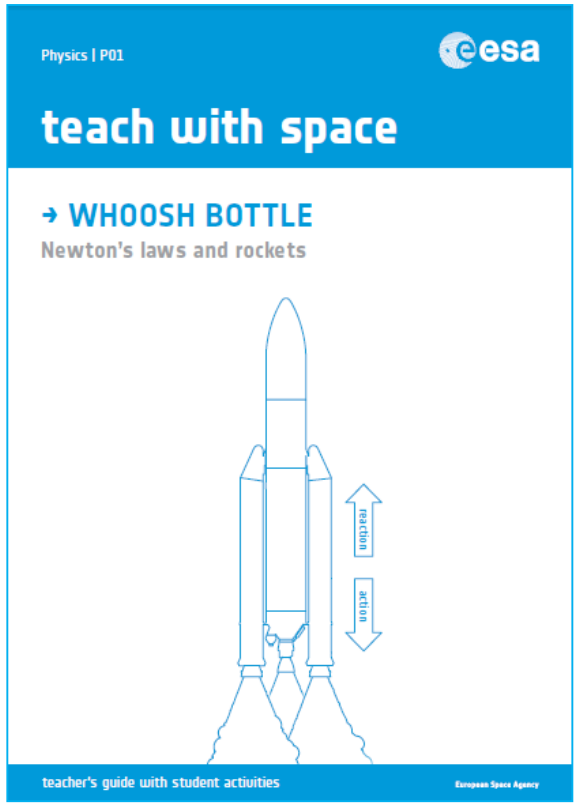
First insights into 2022

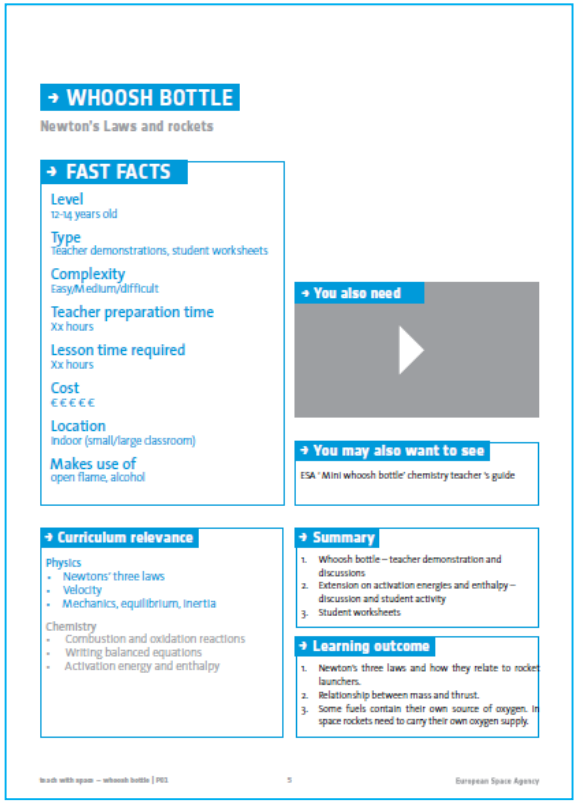
January 19 & 26	3D design in education for beginners with Tinkercad	Upper primary and lower secondary	27 September 2021 – 10 January 2022
…	…	…	…
July 5-7	ESA Teach with Space Online Conference	Primary and secondary	27 September 2021: Pre-registration

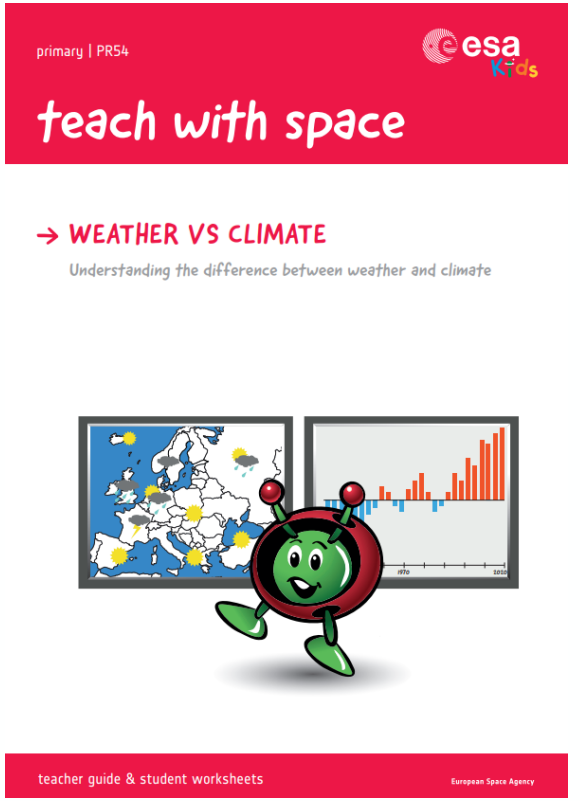
ESA Education Classroom Resources

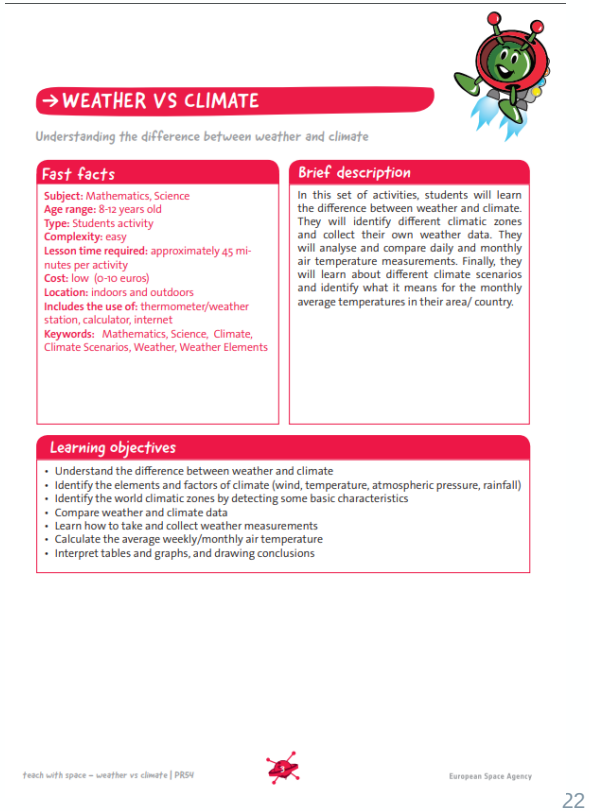
Teach with space

https://www.esa.int/Education
https://www.esa.int/Education/Teachers_Corner/Teach_with_space3









AGENCY

Primary classroom resources

Teach with space - primary classroom resources

ESA / Education / Teachers' Corner

The primary school level classroom resources range from 6 to 12 years of age. They cover a wide range of curricular topics related to science, mathematics, technology, engineering and arts. Each classroom resource is composed of a teacher guide and student worksheets with practical activities.

AGENCY

Secondary classroom resources

Teach with space

ESA / Education / Teachers' Corner

The secondary school level classroom resources are produced for the 14 – 18 years old age range (secondary, middle and upper school level) and they cover a wide range of curricular subjects such as: physics, chemistry, astronomy, mathematics, biology, etc. Each classroom resource is composed of a teacher guide and practical activities dedicated to the students.

International school-level activities - II

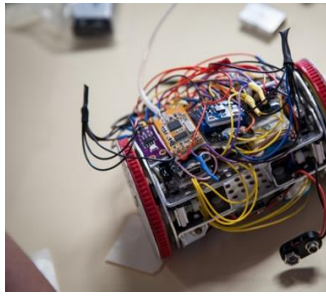
- Multidisciplinary school projects
- Recurring every school year!

→ MISSION X

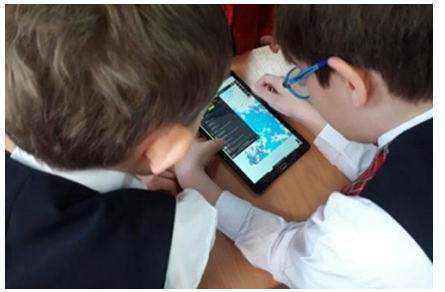
TRAIN LIKE AN ASTRONAUT

ASTRO PI

→ CANSAT



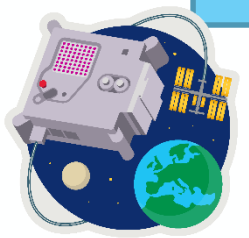
CLIMATE DETECTIVES



→ MOON CAMP

Interdisciplinary School Projects

ESA members + CA, SL, LV, LT, MT



ASTRO PI

ESA members + CA, SL, LV, LT, MT

CLIMATE DETECTIVES

ESA members + CA, SL, LV, LT, MT

CANSAT

Open Worldwide

MISSION X

Open Worldwide

MOON CAMP

Mission X: train like an astronaut

Open Worldwide

An international educational challenge, focusing on fitness and nutrition, that encourages students to train like an astronaut!

Walk to the Moon Challenge runs annually from January - May

Target: 8-12 years old

Coordinated by **ESA & UKSA,** facilitated by the **ESERO network & National Organisers**

Walk to the Moon Challenge

Open Worldwide

Teams of students or families complete **Mission X activities** to earn points. Points are translated into steps which help the Mission X mascots, Luna and Leo, walk to the Moon!

Pre-Challenge

- registration opens
- training dates for teachers/leaders announced*

Teacher/leader preparation:

- determine the dates your team will implement the challenge (suggested 6-9 weeks)
- create a plan of action for your team
- gather materials for the challenge

Walk To The Moon Challenge

Website opens for activity submissions. Complete your Mission X activities and earn points

Website Closes For Activity Submissions

Post-Challenge

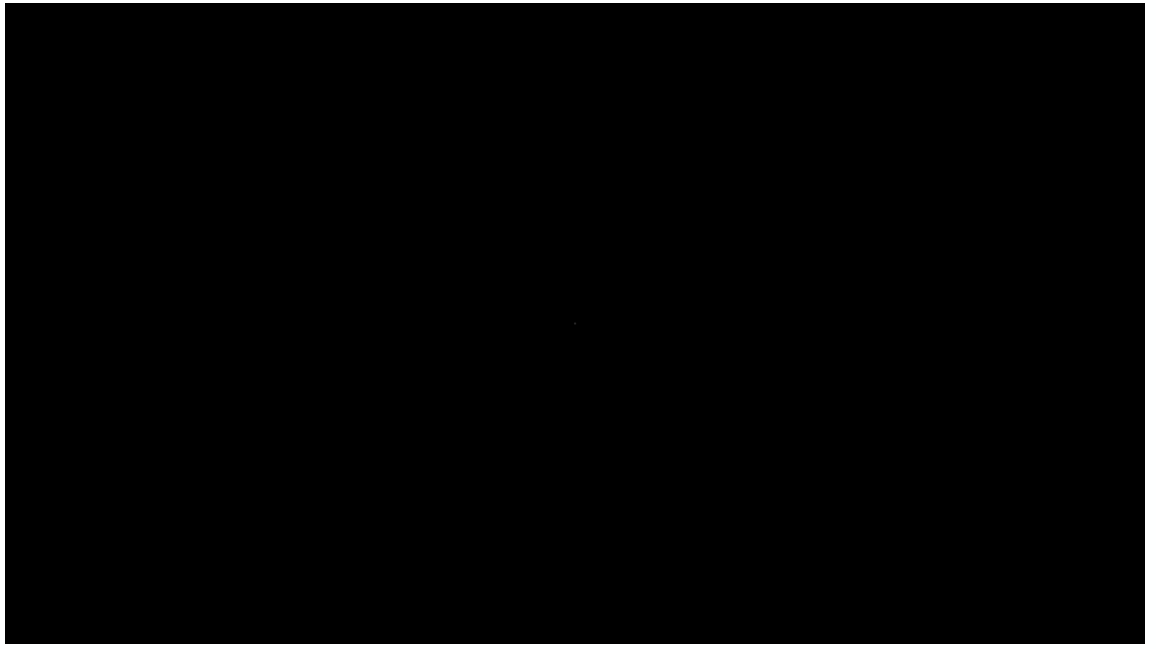
- Closing events
- Certificates of completion released

Activities - Examples

Open Worldwide

Peak Lift-off

Bionic Hand



How to Implement Mission X in the Classroom

Open Worldwide

Step 1

- **Register** on the website
- Country not listed? No problem! Our UK National Organiser will manage your registration

Step 2

- View the **Welcome Guide** for teachers
- See if your country hosts **Teacher Training**

Step 3

- Download the **Mission X Activities**
- Download the **Student Logbook**
- Plan of action

Step 4

- Complete activities and **earn points**!

Step 5

- Receive your **certificate**
- See if your country hosts a **Closing Event**

Resources

Open Worldwide

Teacher Resources

Resources

Open Worldwide

Teacher Resources

Videos

Resources

Open Worldwide

Teacher Resources

Videos

Bonus Activities

Try at home!

Resources

Open Worldwide

Teacher Resources

Videos

Bonus Activities

Social Media Community

Why participate?

Open Worldwide

- Students will learn about **health**, **biology** and **fitness** through fun and interactive activities.
- Activities are **modular** and **easy to use**; can be used in science or PE classes, no minimum or maximum participation, flexible timing, open to families.
- This school project is **collaborative** and **encourages international interaction** through our social media community.

More Information

Open Worldwide

trainlikeanastronaut.org

missionx@trainlikeanastronaut.org
@trainastronaut
#missionx22

Moon Camp Challenge

Open Worldwide

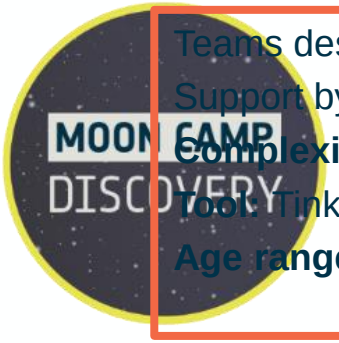
- **Design your own Moon Camp** using the 3D modelling software Tinkercad or Fusion 360
- Learn about the extreme **Moon environment** and the difficulties **astronauts** face when living in space
- Improve your **problem solving and project skills** using their **creativity** and a motivating **3D design** software tool.
- This school project is supported by a set of **interdisciplinary, curricular classroom resources** covering different STEAM subjects from Science, Physics, Biology, Chemistry, Technology, Programming, Geology and Arts.

Moon Camp Challenge - Categories

Submissions Open: 15 September 2021 - 21 April 2022

Open Worldwide

Teams design **one** component of the Moon Camp.
Support by teachers and / or parents. Teams of 1 to 6 students. Non competitive.
Complexity level: Beginners
Tool: Tinkercad
Age range: up to 19 years old, recommended for 6 to 14 years old



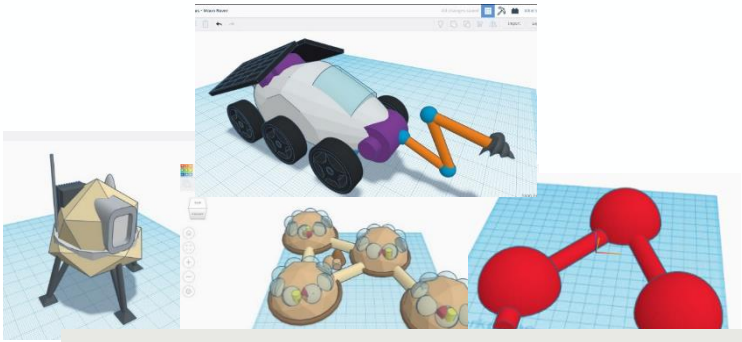
Teams design the complet p and submit a rep
Support by teachers. Te lents. Compete Prize.
Complexity level: Inte
Tool: Tinkercad
Age range: up to 14 yea

Teams design the complete Moon Camp and submit a report.
Support by teachers. Teams of 2 to 6 students. Compete for the Pioneers Prize.
Complexity level: Advanced
Tool: Fusion 360
Age range: 15 up to 19 years old

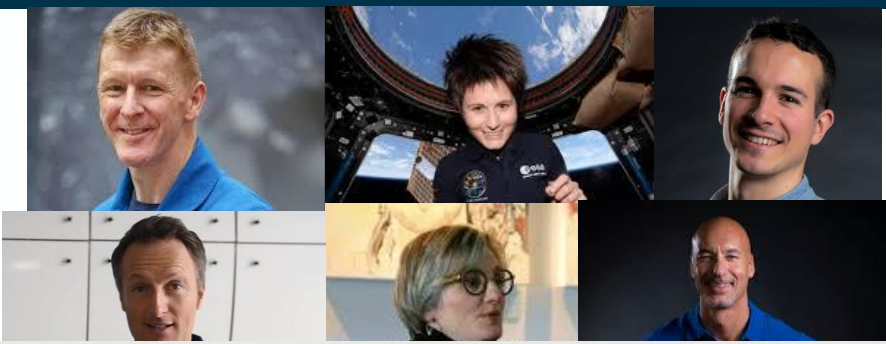
Supporting Resources

Open Worldwide

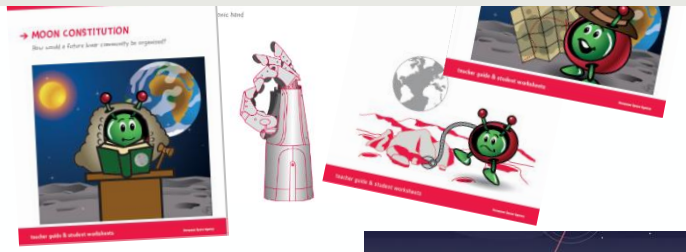
Classroom resources



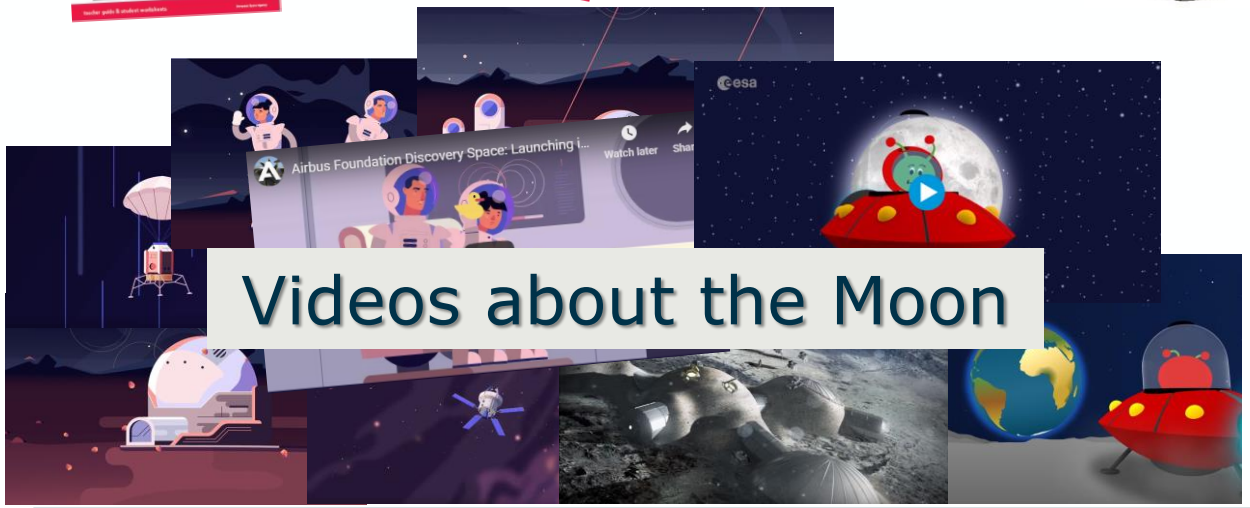
3D Design tutorials



Videos with space experts



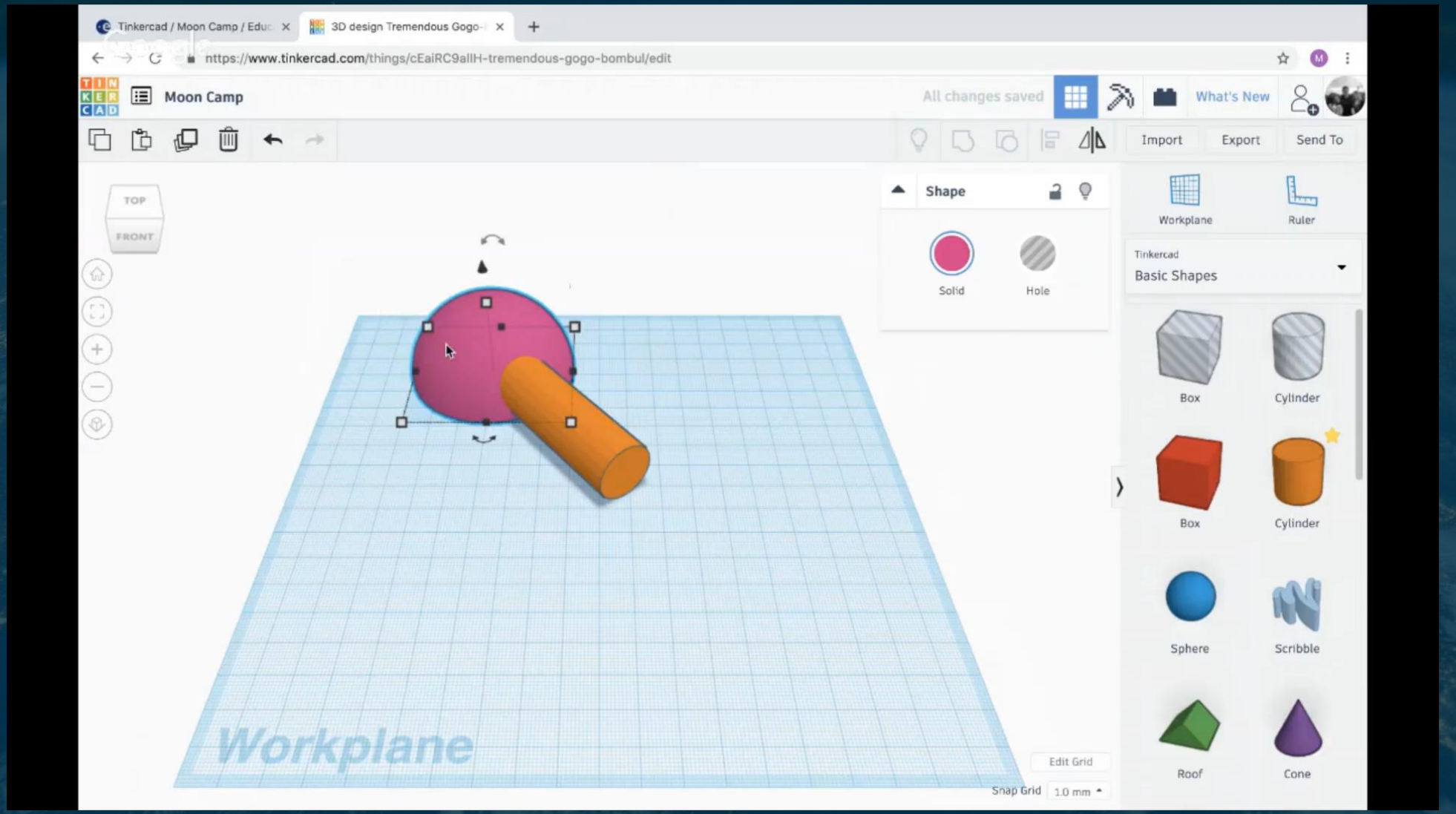
Videos about the Moon



Games, infographics and more...

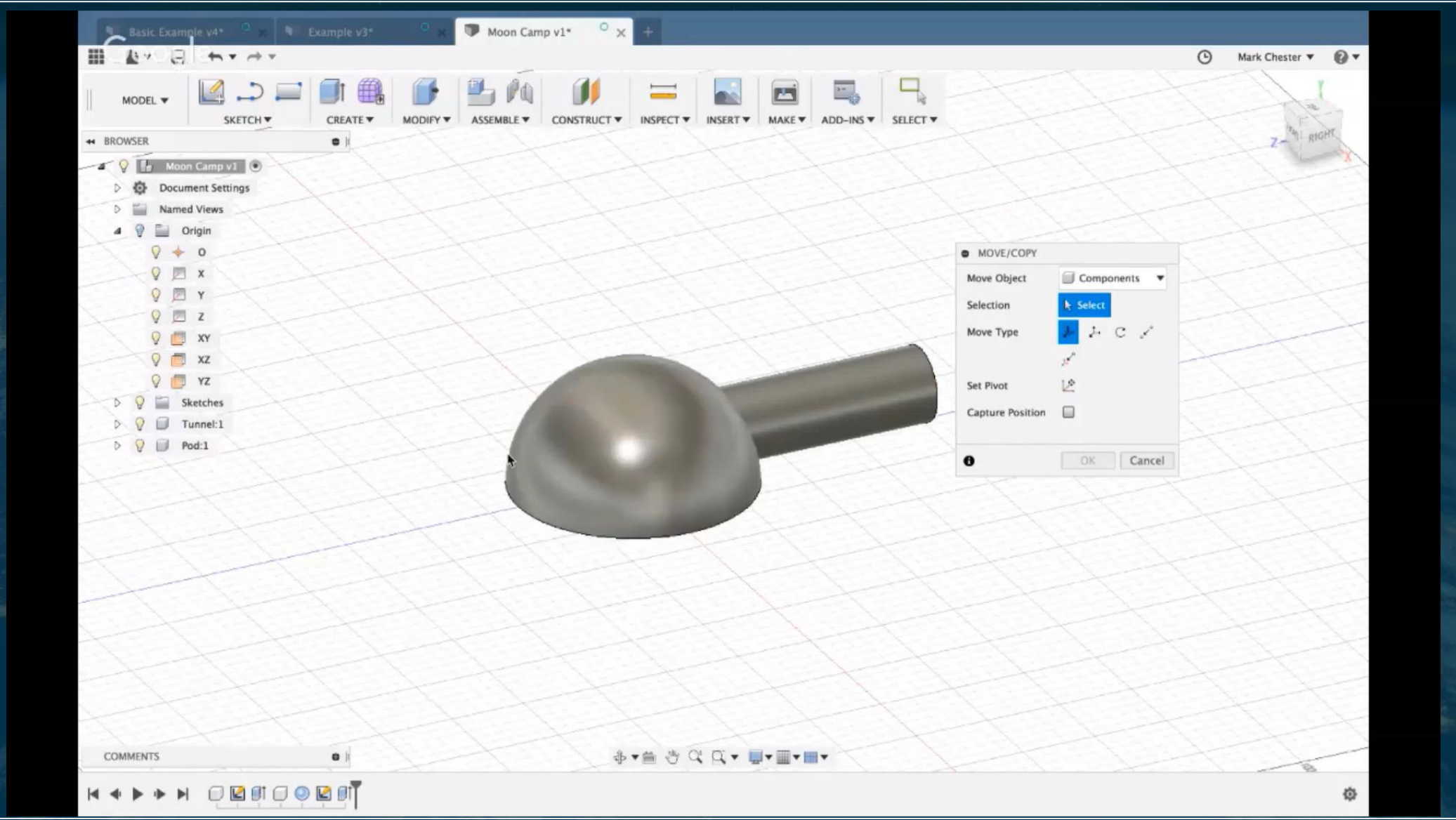
Designing with Tinkercad

Open Worldwide



Open Worldwide

Designing with Fusion 360



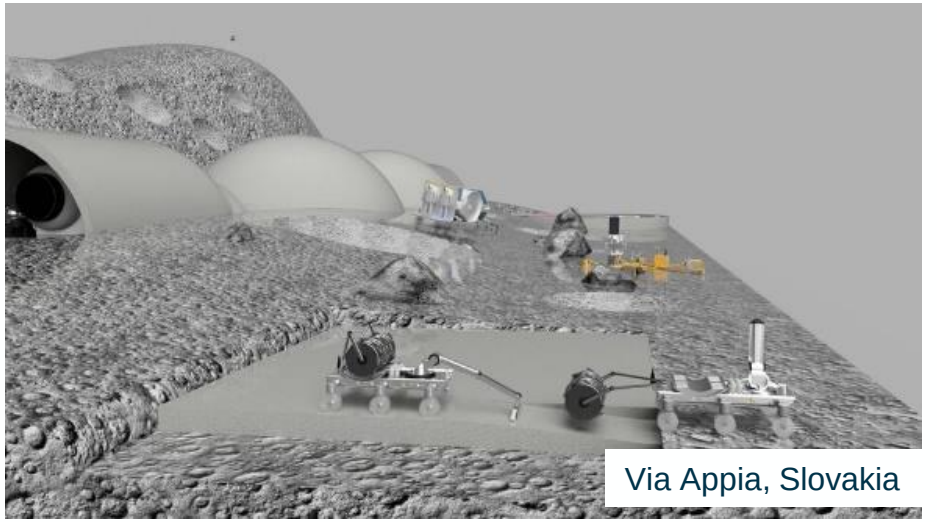
Winning Teams Moon Camp 2020-21

Open Worldwide

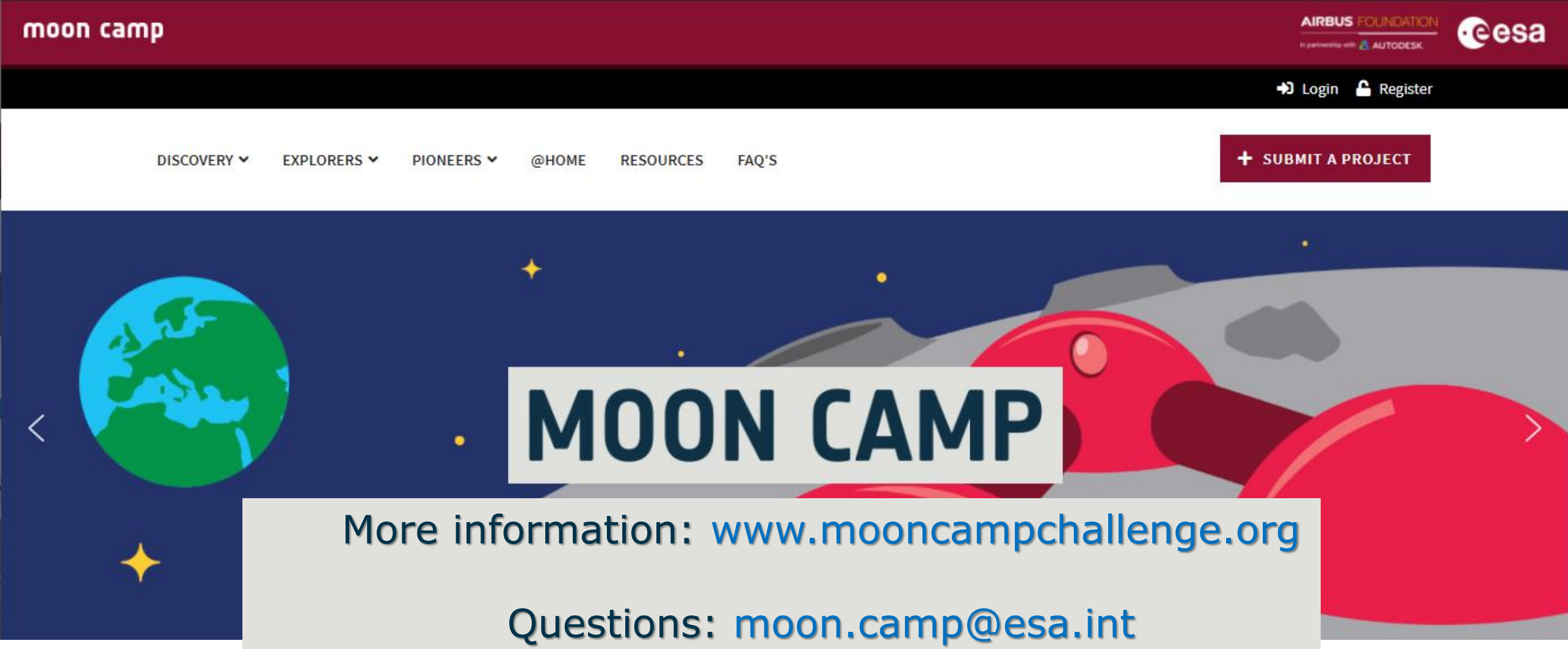
Moon Base Kernel, Poland

AMAR, Czech Republic

Mona Astra, USA



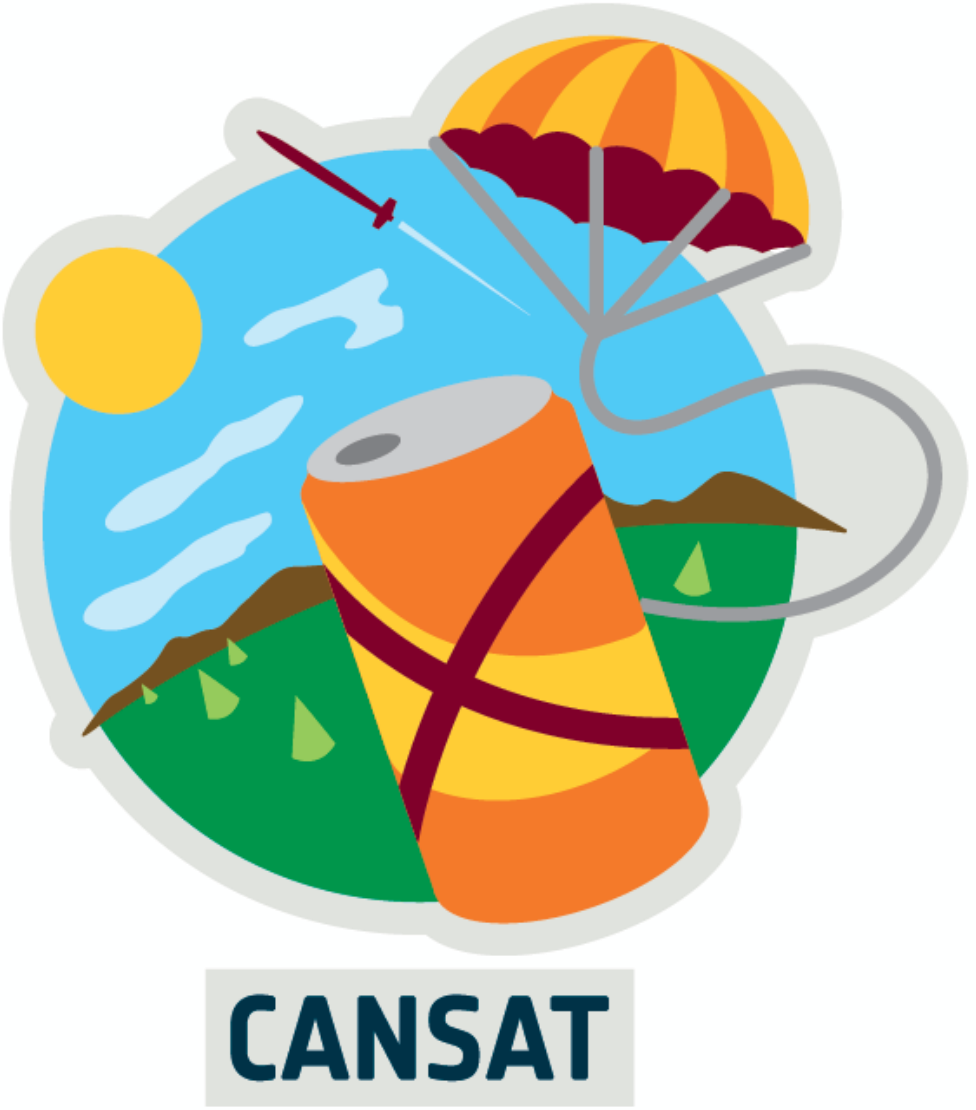
Via Appia, Slovakia



More information: www.mooncampchallenge.org

Questions: moon.camp@esa.int

Registrations open until 21 April 2022


CANSAT

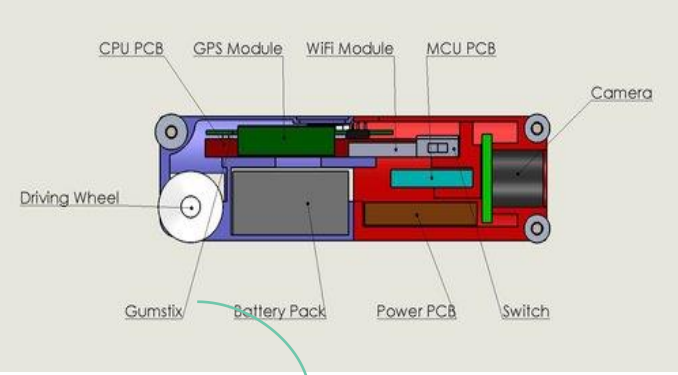
CanSat

Objective: Imagine, design, test and launch your mini satellite the size of a soda can

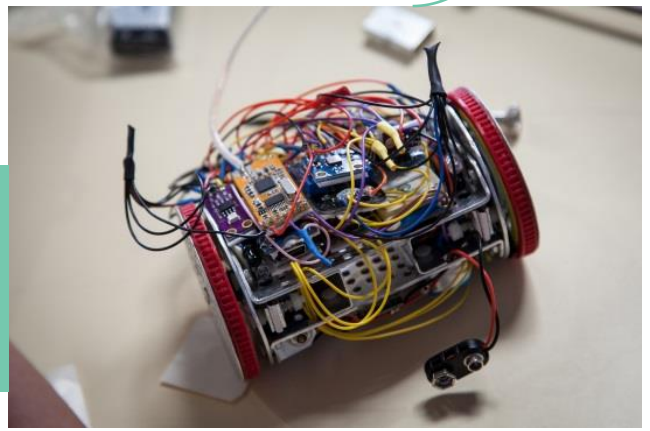
- **Complexity level:** Intermediate/advanced
- **Target**: 14-19 years old
- **Open to**: ESA Member States, Canada, Latvia, Lithuania, Malta and Slovenia
- **Registrations:** open until 3 December 2021
- **Tool:** Microcontroller or mini computer of choice (e.g Arduino and Raspberry Pi) + sensors, radio module, antenna, parachute

The European CanSat Competition

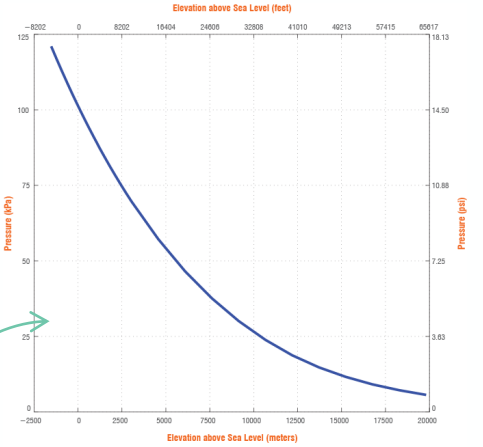
Phase 1: Imagine your CanSat



Phase 2: Build your CanSat



Phase 3: National Competitions

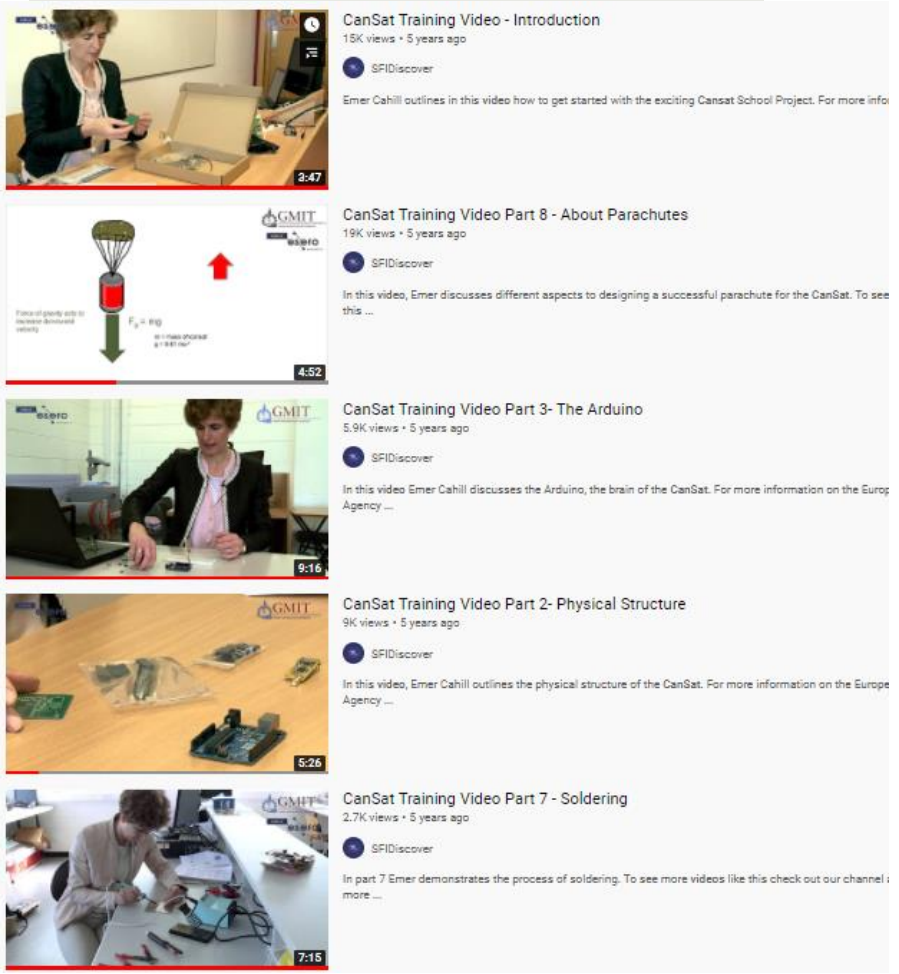


Phase 4: European Launch Campaign

Phase 5: Final report

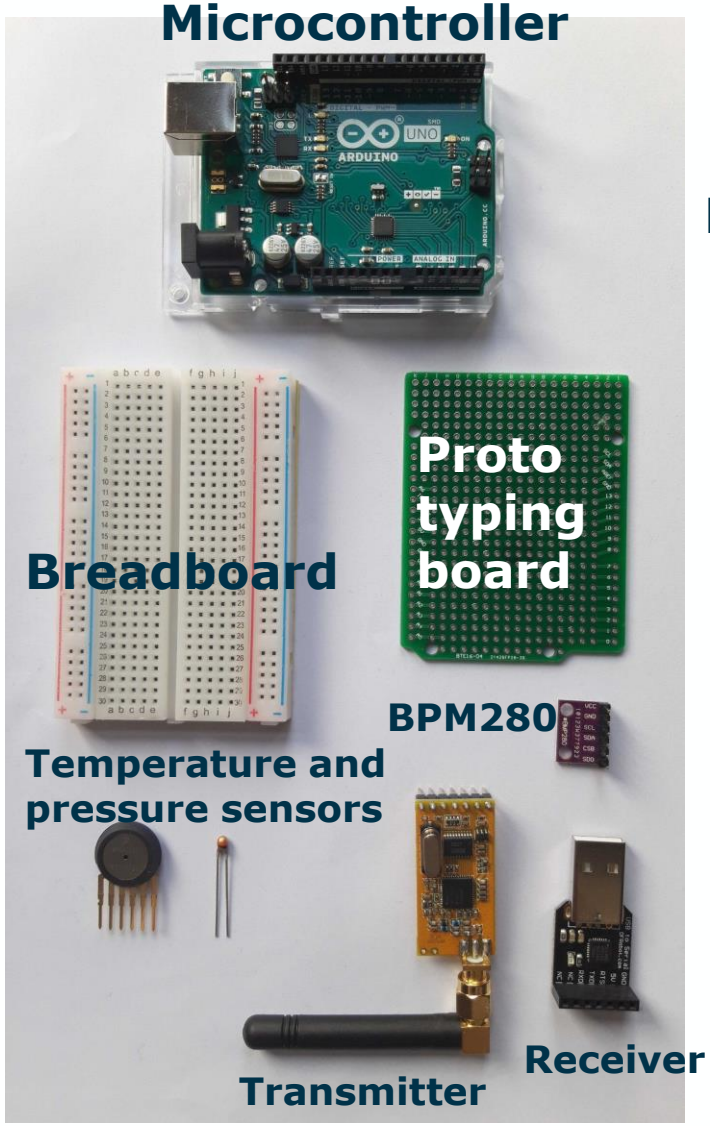
Supporting resources

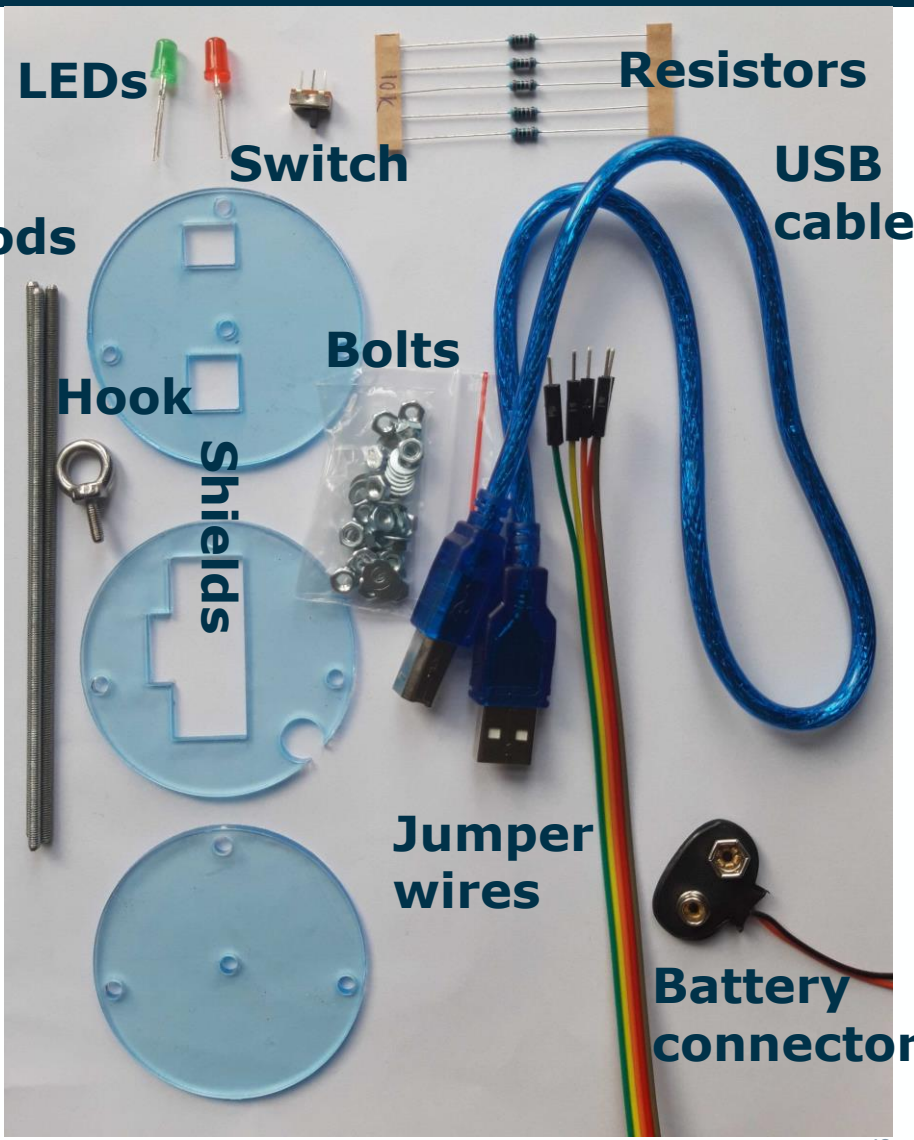
Video tutorials



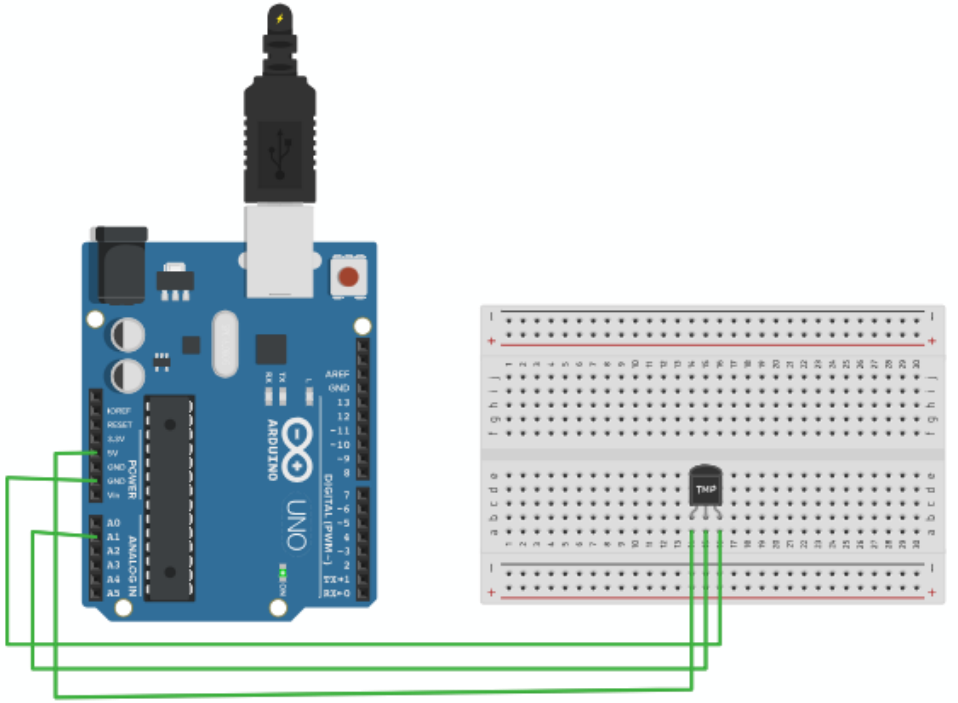
Classroom resources

CanSat Kit contents





Objective: Program the primary mission of your CanSat by measuring temperature and displaying it every second



- **Complexity level:** Intermediate/advanced
- **Target**: 11-15 years old
- **Open to**: ESA Member States, Canada, Latvia, Lithuania, Malta and Slovenia
- **Registrations:** Open soon!
- **Tool:** Tinkercad circuits (online)

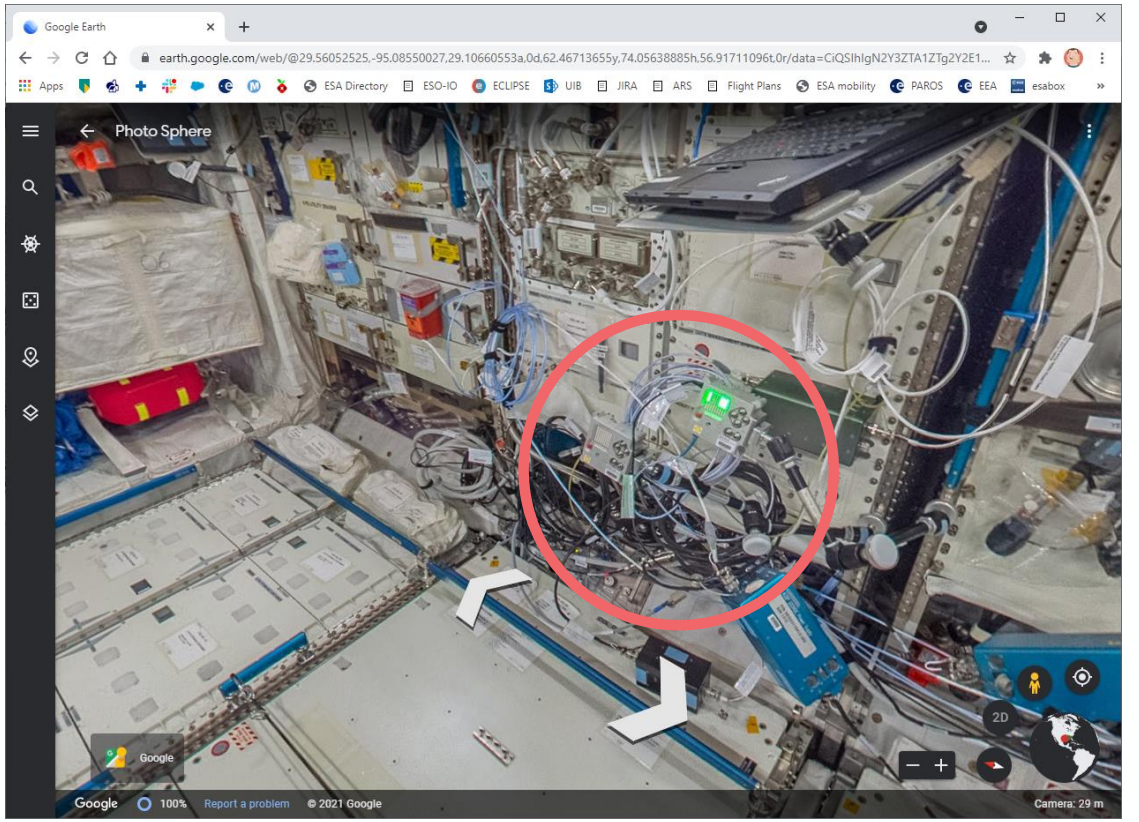
What is the European Astro Pi Challenge?

- The European Astro Pi Challenge is an ESA Education project, run in collaboration with the Raspberry Pi Foundation, to give young people the amazing opportunity to conduct a scientific investigation in space.
- Open to students in full time education in all ESA member and associate member states.
- Up to 19 years of age
- Participation is free
- Registration open now

How is this possible?

European Columbus Laboratory

Google: street view international space station



What is an Astro Pi computer?

- A space hardened Raspberry Pi 4B computer with integrated camera and range of sensors
- 12 Megapixel camera with changeable lenses
- Machine Learning Accelerator (co-processor)
- Temperature
- Pressure
- Humidity
- Accelerometer
- Gyroscope
- Magnetometer
- Light / colour
- Passive infrared motion

We’re upgrading the hardware on ISS *this year*

Astro Pi mark I (Raspberry Pi 1B+)

Astro Pi mark II (Raspberry Pi 4B)

How can I get involved?

https://astro-pi.org/

Suitable for beginners and primary school children

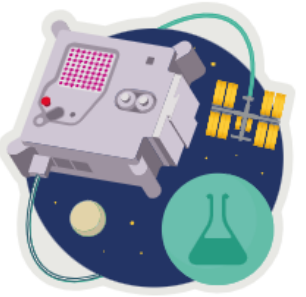
MISSION ZERO

Send a message to the astronauts onboard the International Space Station!

1 hour

Age under 19

Choose Mission Zero



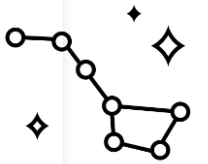
MISSION SPACE LAB

Conduct a scientific experiment in space!

6 months

Age under 19

Choose Mission Space Lab



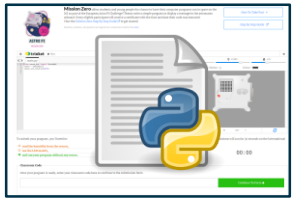
Columbus

ISS window

Project timelines

Mission Zero

Project timeline 2021/2022



Challenge launch

13 September 2021

Young people can start working on their Mission Zero programs. Our submissions form opens on **trinket.io**.

Challenge end

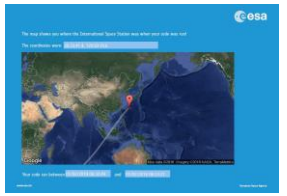
18 March 2022

Programs must be submitted by this date to run on the ISS.

Confirmation of flight status

May 2022

Submissions are uploaded and run on the ISS.



Participation certificates sent to participants

June 2022

If the submission meets the participation rules and is deemed an official submission, the team certificate will show the location of the ISS when the program was run!

Mission Space Lab

Project timeline 2021/2022

Phase 1: Design

13 September - 29 October 2021

Design an experiment to be run on an Astro Pi computer on the International Space Station.

Phase 2: Create

18 November 2021 - 24 February 2022

Teams that pass Phase 1 of the challenge write their programs. Teachers/mentors submit their team's completed program. Astro Pi HQ will test the programs on Earth to determine the viability of the experiments.

Phase 3: Deploy

April - May 2022

The best experiments will be deployed to the ISS.

Phase 4: Analyse

May - June 2022

Teams receive their experimental data from the ISS for analysis and write their final reports. Teachers/mentors submit their team's report. The ten best reports are selected as the Astro Pi Mission Space Lab winners!

What’s in the Astro Pi kit?

Teams can keep this after the challenge

Crew ambassadors over the years

Climate Detectives

Objective: Teams of students have to **identify and investigate** a local climate problem using Earth Observation satellite data or making their own ground measurements; and propose ways to '**make a difference**'

- Developed in collaboration with the **ESERO network**
- **Target**: 8-15 years old
- Open to ESA Member States, Canada, Latvia, Lithuania, Slovenia, and Malta

Climate Detectives - Overview

14 September – 25 November 2021

Phase 1 - Identify a climate problem

- Students identify a local climate problem to investigate as Climate Detectives
- Submit an investigation plan with Project title, Research question, short summary and data to be analysed

1 December 2021 – 4 April 2022

Phase 2 – Investigate your climate problem

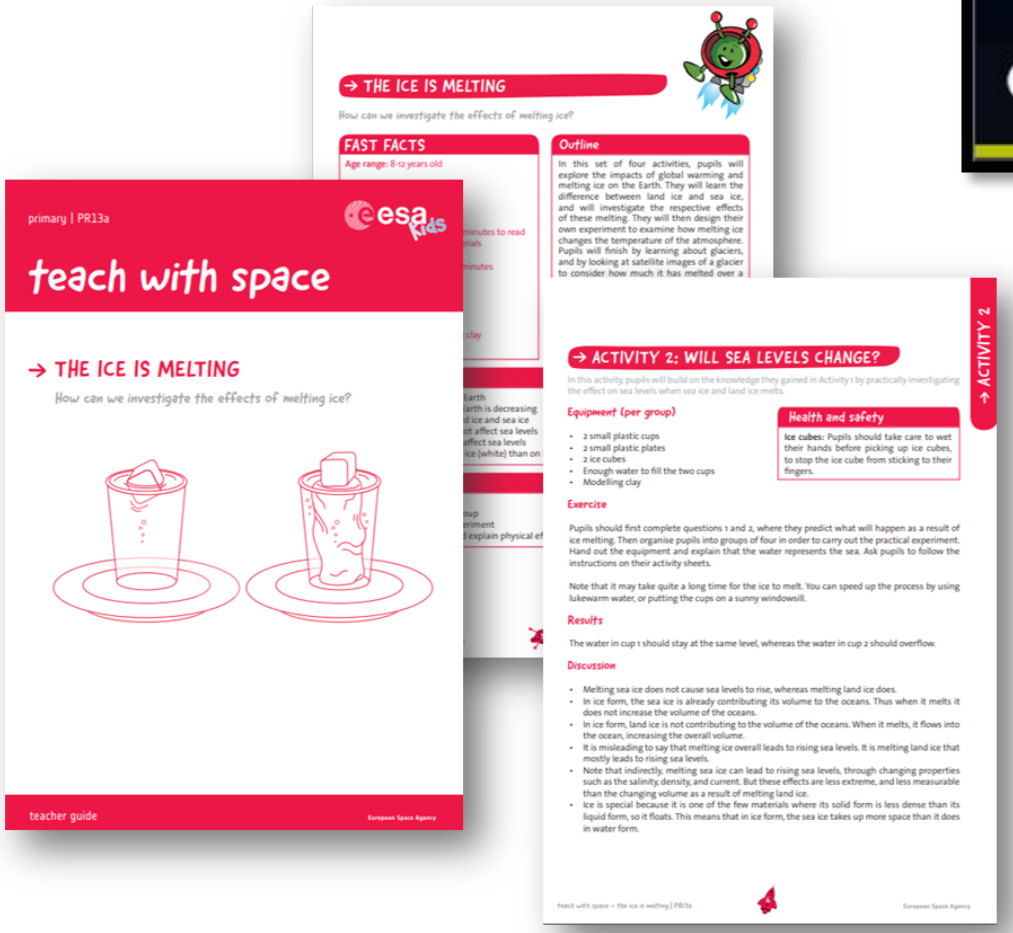
- Students collect data
- Organise and manage data
- Analyse their findings
- Draw conclusion

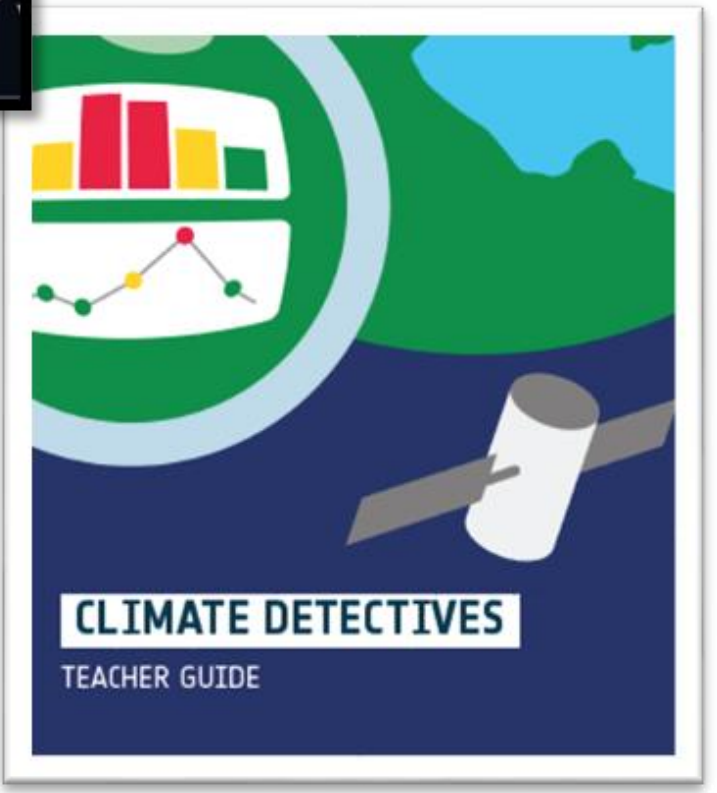
5 April 2022 – 25 April 2022

Phase 3 – Share results and make a difference

- Students decide on any actions to be taken
- Communicate and share their work

Climate Detectives- Supporting resources

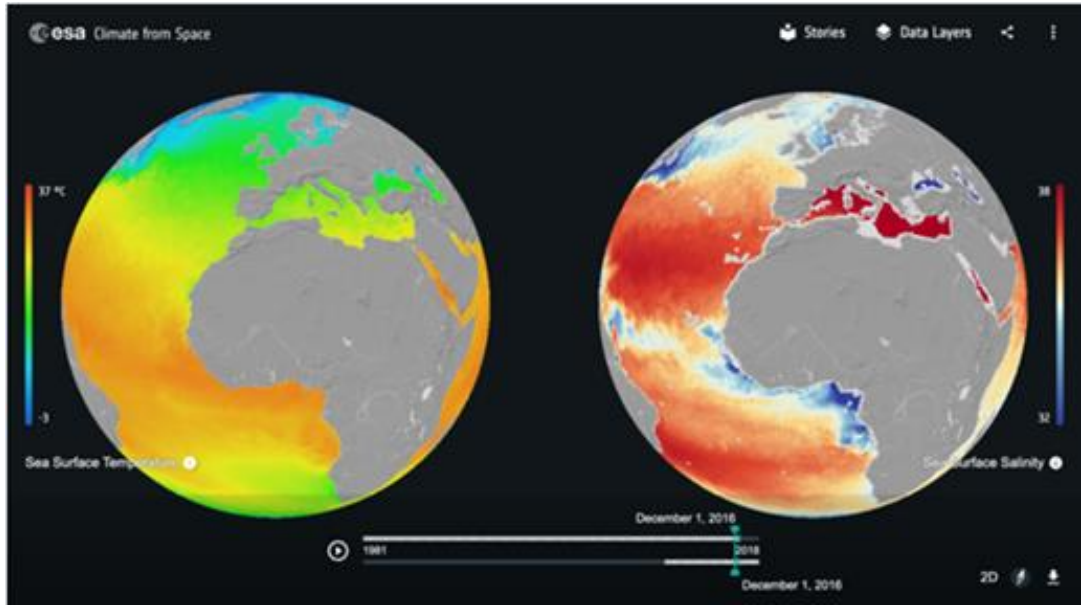




Climate Detectives – Access Satellite Data

Climate from Space

An interactive website that uses 3D globes and maps, to visualize climate data records generated by ESA's Climate Change Initiative.



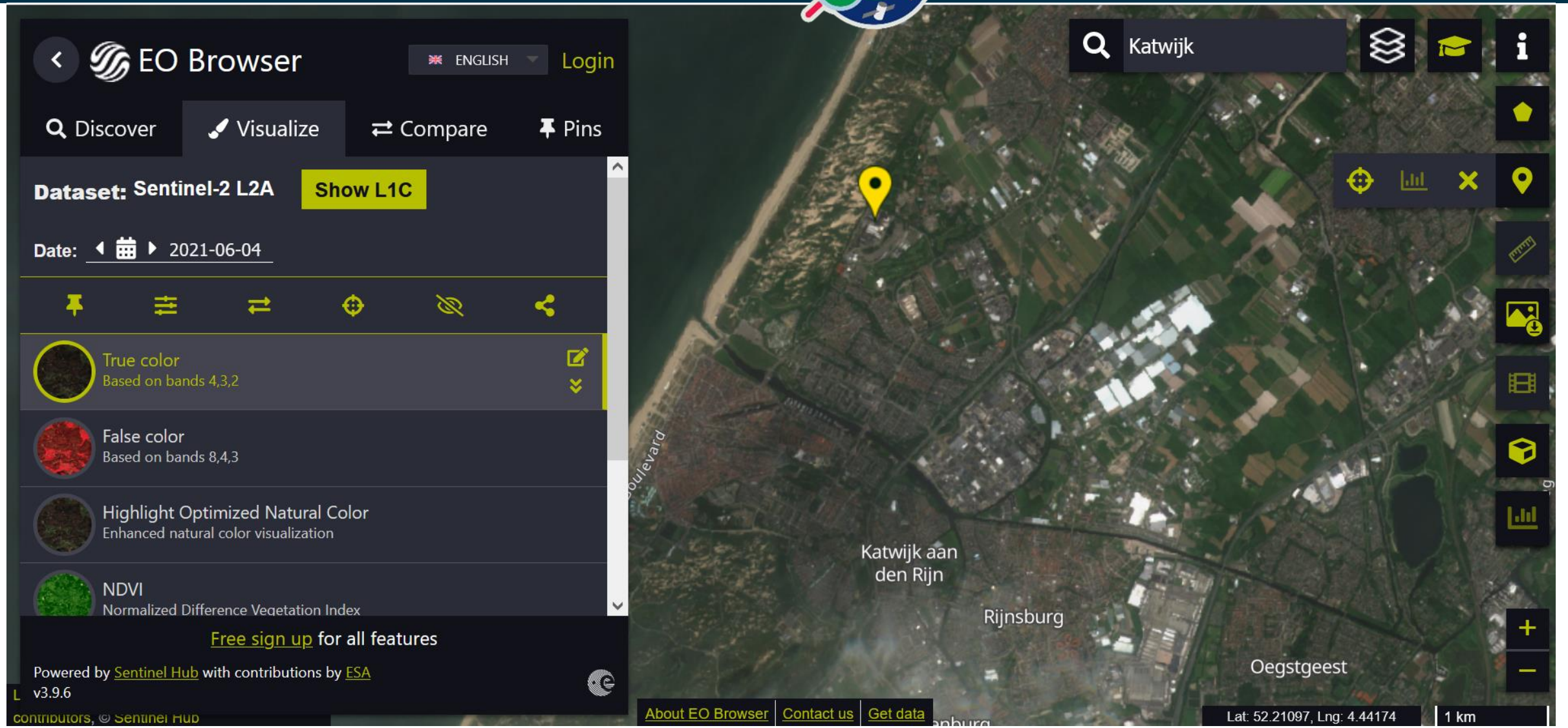
Climate from Space: Sea surface

EO Browser

An online platform that combines an archive of different EO missions and can be used to find satellite images of any area of interest.

EO Browser: Time lapse from Tagus river, Entrepeñas reservoir, Spain

Climate Detectives– EO Browser



climatedetectives.esa.int and Project Gallery

CLIMATE DETECTIVES ❯ PROJECT GALLERY

Project topic: Weather measurements

Project title: Climate change and

Team: The rain

ITIS E. Barsanti ISIS E. Europa Pomigliano D'Arco Italy 25

Research question

How do we prevent flooding problems affecting the areas in which we live?

Check out the Climate Detectives guidelines to find more details about

Extreme weather | Weather measurements | Climate change | Air pollution

CLIMATE DETECTIVES 2020 – 2021

CLIMATE CHANGE AND RAINFALL

The rain

ITIS E. Barsanti ISIS E. Europa

RESEARCH QUESTION

How do we prevent flooding problems affecting the areas in which we live?

SUMMARY OF PROJECT

Students, from ITIS E. Barsanti and ISIS Europa, located in Pomigliano d'Arco, near Naples work together combining Science, technology, engineering, and mathematics (STEM) and Nature Based Solution (NBS).They observing whether of our country, a small town located 37m above sea level with a warm and temperate climate. Rains were abundant and frequent in November and December by analyzing data collected by our meteorological station. In the last 15 days of december 101.1mm rain fell, the same of last year determining flooding due to inadequacy collection systems. The excess flow rates discharged to the surface by the pressurized sewer can fill any depressions on the ground, or flow through preferential routes, creating a flow network that in urban areas affects roads, sidewalks, natural depressions and small streams . The intense rainfall increases hydraulic risk generated which impact on people and infrastructures. The students understood that reduction of permeable areas - reduction of vegetated areas - reduction of surface reservoirs is the problem. Through google earth and eurostat.eu, analyze the artificial, waterproofed areas and agricultural surfaces present nearby school. The hydrological balance in natural conditions (P = ET + R + I) Based on the rainfall data by Arce Campania during 2021, the pupils make future predictions of precipitation in the our town with the triangulation method and the "Shape "Of Google Earth. The three localities were: Naples Camaldoli, Ottaviano and Caserta, and with the "geometric" center of gravity of this triangle it was possible to roughly estimate the margin of error.

Figure 1) The image of our town

MAIN RESULTS

Highlights how the transition from agricultural land (natural cover) to a completely waterproofed surface (square, asphalted and / or cemented road, etc.) leads to a progressive reduction of the infiltration coefficient c. the. (represented by the amount of water that infiltrates in conjunction with a meteoric precipitation) and an increase in the surface runoff d.s. (part of precipitation flowing to the surface). Example of calculation

Asphalted surface - schoolyard c.i. = 15% d.s. = 85% (with peaks of up to 80%).
Agricultural land - adjacent cycle path c.i. = 50% r.a. = 10%
The increase in the size of surface runoffs is evident where the soil has been replaced by impermeable areas. It should be borne in mind that during particularly intense hourly rainfall (in the order of 70-80 mm / h) the urban drainage system can go into crisis, causing localized flooding that seriously impacts anthropogenic structures. The forecast implies that the amount of water that will fall in the coming years will be less and less, despite the damage from flooding, floods ... have been growing in recent times.
We can give an explanation to all this, saying that on days when it rains, the rain is very intense, which cannot be disposed of by the current sewage works.

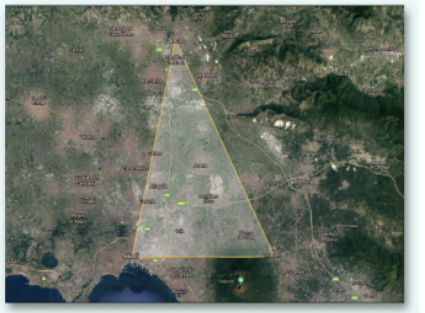


Figure 2: future predictions of precipitation in the town of Pomigliano d'Arco with the triangulation method and the "Shape "Of Google Earth. The three localities were: Naples Camaldoli, Ottaviano and Caserta, and with the "geometric" center of gravity of this triangle it

ACTIONS TO HELP LESSEN TO THE PROBLEM

Figure 3: the system channels to drain excess rainwater along the edges of the roads

By use NBS methodology elaborate a project on infrastructures, correlating nature and urban environment. The idea is create urban drainage channels to drain excess rainwater along the edges of the roads . This system require: limited number of components ,is easy to install and adaptable in length, easily removable and maintenance , stay level with the ground. This solution avoid flooding and drain rainwater to other areas.The students identified possible materials to make water drainage channels which are: galvanized steel, cast iron, polymer, PVC . The materials must be able to withstand the load, and the stresses caused by frequent passage of vehicles, temperature changes and resistance to chemicals. They calculated the water flow rate based on the size of the drainage channels by asking themselves questions
How much rainwater passes inside the channel in a given period of time? What is the slope of the surface or the slope of the channel itself? How important are the dimensions and the grille of the drain?
The volume of rainwater that passes inside the channel is calculated on the basis of the area the runoff coefficient, on an annual basis which expresses the permeability of the surfaces. For examples: soils such as agricultural areas and meadows have a lower coefficient, around 0.10-0.15, since they absorb water more easily, while for asphalt it reaches 0.85- 1.00 precisely because of its poor permeability;rainfall intensity expressed in millimeters per hour.
A calculation of the volume of rainwater (the Rational Method) is therefore:
V = BdcrxA / 3600

→ THE EUROPEAN SPACE AGENCY

Climate Detectives – Why participate?

- Climate Detectives is a **cooperative, inquiry-based, interdisciplinary** school project.
- Climate Detectives replicates a real science project.
- Students build scientific skills and 21st century skills such as **real-world problem solving and communication**.
- Improve students' **knowledge of Earth's climate**, from a local to a global perspective, and **prepare** them **for** the climate **challenges** of this century.

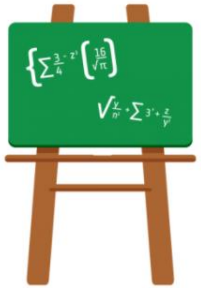
More information

✓ https://climatedetectives.esa.int/

✓ https://climatedetectives.esa.int/how-to-apply/

APPLY!

climate.detectives@esa.int



Teach with Earth from Space: Become a climate detective (20th & 27th October)

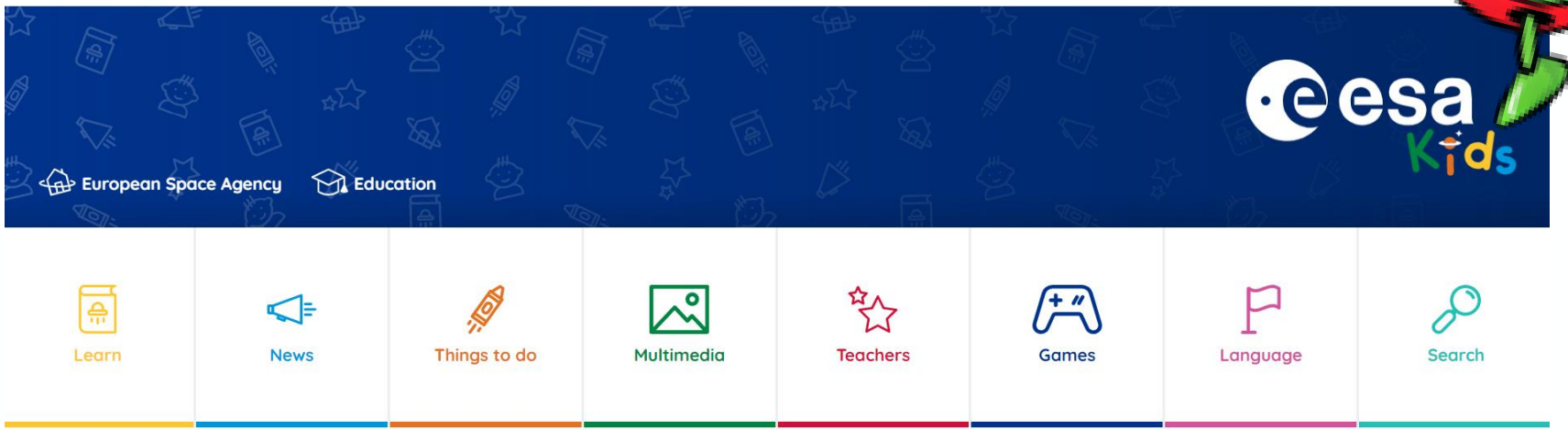
Contains modified Copernicus Sentinel data (2020), processed by ESA, CC BY-SA 3.0 IGO

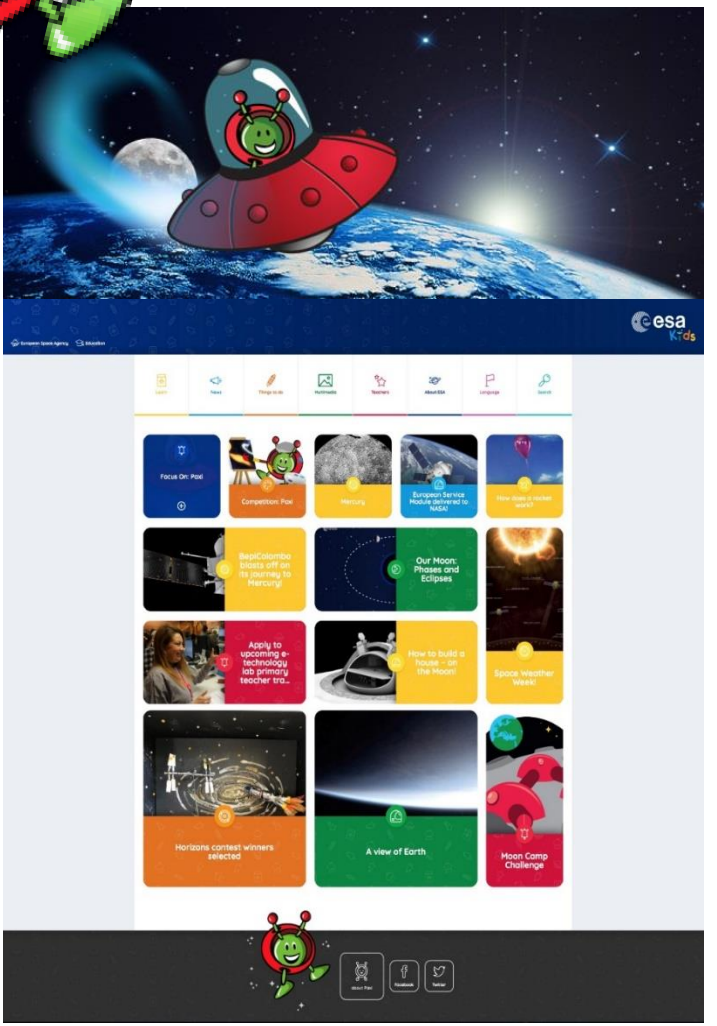
Join the project until 25 November 2021

You can also make a difference!

Informal education for the juniors

Paxi the alien and ESAkids

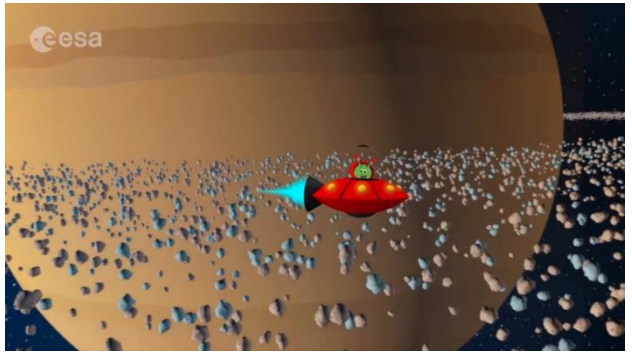


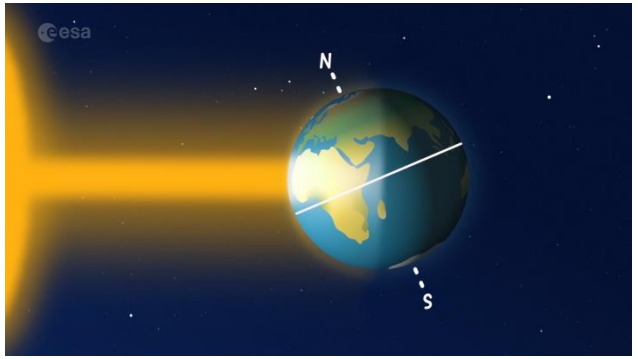


- 3-10 years old
- The most read ESA webpage!
- Great fun for all!
- Try it to complement your (primary) classroom activities!!
  www.esa.int/kids

Paxi animations

1. **Who is Paxi?**
2. **The Solar System**
3. **Rosetta and comets**
4. **The Red Planet**
5. **Do Martians exist?**
6. **Day, night and the seasons**
7. **The water cycle**
8. **Greenhouse effect**
9. **The Moon, phases and eclipses**
10. **Exploring the Moon**
11. **Exoplanets**
12. **Gravity (in preparation)**





http://www.esa.int/spaceinvideos/Sets/Paxi_animations

ESA Education links & contacts

- **ESA Education web portal: www.esa.int/education**
- **ESERO national contacts: www.esa.int/education/esero**

Social Media

- **ESA Education on Facebook: Facebook.com/ESAEducation**
- **ESA Education on twitter: @ESA_Education**
- **ESA Education on flickr: ESA_events**
- **ESAKids web portal: www.esa.int/kids**
- **ESAkids facebook and twitter: PaxiESAKids, #Paxi_ESAKids**