SCIENTIX®
The community for science education in Europe

T I N K E R

BluDiversity

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Learning Scenario Basic Information

Title

BluDiversity

Author(s)

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Summary

In this Ocean Decade it is important for our students to be able to make connections to the water, even if our school is located in the Castelli Romani, about 50km from the Mediterranean Sea, and the students have few interactions with the coast. In addition, we need to encourage inclusive informatics based on authentic learning, with connections to real-life and gender inclusive activities.

In collaboration with the teachers of Math, Geography and Art we've created an interdisciplinary project that brings the Ocean into our lessons, with a focus on aquatic species of different regions of Italy (Geography), that are either endemic and invasive (Science), using data about their population number over time (Math) to understand how human impacts have impacted their dispersion (invasive) or endangered status. Everything will be connected in a Science Poster which will also include scientific drawings done in Art.

Students will have the opportunity to develop individual projects based on enquiry of species chosen together with the science professor. They will be able to enhance 21st Century/Global Skills with peer-reviews, collaboration, and creativity. In the end, a Science Fair open to the community will enhance communication and articulation skills, and a final video will bring everything together.

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Keywords

Ocean Literacy, Copernicus Browser, Aquatic Species, Invasive and Endemic

Aim of the lesson

The objective is for students, through studying their aquatic species, gain an enhanced understanding of curriculum topics and develop digital and global skills.

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Funding

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Overview

Informatics topic areas	Data and information, Responsibility and empowerment
Subject(s)	Science, Math, Geography, Art
Age of the learners	11-12 years old
Total implementation time	About 15 hours, yet variable
Teaching material	List here all material necessary to conduct your activity. Online materials and resources: - Computer/tablets (I recommend computers because Copernicus is easier to use from a computer instead of a tablet) - Google docs: link (example of what we made that was given to the students so they could follow allong the process) - Google slides - Canva Copernicus Browser Template made by author: link - iNaturalist.org - onezoom.org - earth.google.com Google Earth - chatgpt.com or another AI - Copernicus Browser - Youtube video on Sentinel Satellites and Copernicus: link Physical materials: posters, paper, pens, glue, scissors, graph paper, pencils, markers, eraser, ruler
Setting	This summer one of the students went fishing, but instead of catching fish he caught blue crabs. For his summer science assignment, which was to make slides about something that had happened, somewhere you visit or something you learn, he sent slides with him holding blue crabs and explaining they

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are an invasive species that we “need to eat” because they are increasing so much!

When we chose to do the school’s annual science week on the Theme of biodiversity I knew right away that I wanted this particular class to focus on something regarding the water, but I wanted it to have a local connection, just like this boy’s story. In collaboration with the geography, math and art teachers we decided to tell the story of what’s happening in different aquatic ecosystems in various regions of Italy. Each student was paired with a species that they were interested in, and some had endemic and/or endangered species, while others had invasive, alien species. Of course the boy of the blue crab had that species and he developed a beautiful project that really connected to something he had held in his hand, and he was able to explain everything about it during our final Science Fair along with his classmates, each explaining their own species.

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The Learning Scenario activities

Activity Plan

Fill in the table with the activity name, a brief description of the procedure, and the time needed to complete it.

Name	Procedure	Duration
Introduction - in Science lesson	Explanation of plan for science project, (this needs to be done about 2 months prior to the final date of the Science Fair so there is time to prepare everything). Theme this year: Biodiversity What does Biodiversity mean? Our class will focus on aquatic species. What aquatic species do you know? Explanation of project involving Science, Math, Geography and Art. Which region are you interested in? Each student picks one region of Italy and it is written on the table. Teacher assigns species that is found in that region that can work for that student (needs to be done ahead of time - most species can be found in all regions of Italy - with some exceptions, so it isn't hard). The species is written in only as the Scientific Name. What species do you think it is based off the scientific name? This part is fun and funny because the student tries to guess what their animal could be (they don't know yet) and it is written down in parenthesis under the scientific name. Show example of what the final product should look like (science poster) - see annex.	50 min

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	First Homework assignment: Learn more about your animal, follow the steps on the shared google document (link) and create slides.	
Citizen Science and iNaturalist - in Science lesson	15 min - Review of homework assignment from the previous day, with focus on questions and hypotheses and interesting things each student has learned. 20 min - Explanation of Citizen science and introduction to **iNaturalist**. Example of teachers observation of a sperm whale. 15 min - Explanation of **onezoom**.org and how all the species are related, our evolution and the tree of life. Class discussion about what we see with the tour of humans (there are several tours available). Second homework assignment: use iNaturalist and find where your animal has been observed, from a bigger picture and then going into detail in your region, place screenshots in your shared slides. Find your species on onezoom and discover other closely related species, are they at a similar conservation status? Why, why not? Follow steps on the shared google doc (link). At this point the students should have their posters and start working on layout (I usually include this as part of the homework assignment)	50 min
Geography	**Google Earth laboratory** In a shared Google Earth file, each student puts in their pin, finding a GPS point the teacher has given, and writes down the type of geographical environment that the species lives in, with the link back to the slides made in the science class. Homework: complete Google Earth pins	50 min

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Math	**Math laboratory** How can we graph the data about our species? In math lesson teacher uses data generated with chatgpt (or another AI) to show how population has changed over time for each species using a histogram. Then using data on threats (for endemic/endangered species) or causes of spread (for invasive/alien species) they do pie charts on the different percentages. Homework: add graphs to the poster and explain results.	50 min
Art	**Art laboratory** Students work on their scientific observational skills with realistic drawings first, and then watercolour, of their species. Homework: add artwork to poster.	100 min
Science	**Copernicus laboratory** Introduction to the Copernicus Browser and the Sentinel satellites, ESA, ESERO, etc. Watch video of Mr. Copernicus: link Step-by-step instructions together about creating log-in, all students need a computer or tablet. This is time consuming and moves smoother if everyone follows the steps together. Time for the students to explore on their own the features of the Copernicus Browser. (Here some students will enjoy the freedom while others won't know what to do, so based on student participation decide how long to leave this free time - shouldn't be more than 10 minutes. Show steps and share Canva Template (link) so they have scaffolding and step-by-step explanations that they can refer to when working at their own pace.	50 min (this may need two lessons)

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	Students should focus on the GPS point of the Geography lesson and do the steps shown on the template. They will be able to start a part in class and can finish the assignment as homework. Homework: work on posters	
Science	**Wrap up and preparation for the fair** Creation of results and conclusion parts of science posters, written by students on shared file and then checked by the teacher. Last check of all data, research, results, graphs. Peer-review of posters that are partially done, work on constructive criticism both giving and receiving. Reflection on next steps, how to improve, what is still needed, sharing of ideas. Homework - complete posters and be ready to present.	50-100min
Guest speakers	**Participation of guest speakers on biodiversity.** We were able to get a mixture of male and female speakers to show the students that STEM careers are accessible for everyone. Our speakers included: University Professor specialized in microorganisms (female), who brought in a microscope University professor specialised in shells (male) Expert on bees (male), who brought in a bee hive. Operator of a nature reserve specialized in local biodiversity (female), with nicely done interactive presentation	50-200 min
Science Fair	**School wide science fair** - students present their posters, research and results, to the school community	100min

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	including parents, other teachers, and other students.	

Assessment

Students are graded on the process more than the final product.
Criteria are:

-level of scientific terminology and processes
-correct use of English grammar, punctuation and vocabulary
-ability to follow directions and maintain deadlines
-creativity
-peer-review exercise participation
-presentation, ability to communicate effectively

Each criteria are graded based on this scale:

10: excellent
9: very good - with slight room for improvement
8: good - yet room for improvement
7: average - should put in more effort
6: satisfactory - unable to complete task autonomously; completes tasks supported
5: unsatisfactory - tasks not completed

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Reflection on practice

STEM Strategy Criteria

Please indicate which Criteria correspond to the specific Learning Scenario, contributing on a broader scale to the development of a STEM School strategy: https://www.stemschoollabel.eu/criteria.

Click the arrow on the left of each category heading to see and select the corresponding criteria.

A. Introduction

X [A1] Personalisation of learning

X [A2] Problem and project-based learning (PBL)

X [A3] Inquiry based Science Education (IBSE)

B. Curriculum implementation

X [B1] Emphasis on STEM topics and competencies

X [B2] Interdisciplinary instruction

X [B3] Contextualisation of STEM teaching

C. Assessment

X [C1] Continuous assessment

X [C2] Personalised assessment

D. Professionalisation of staff

X [D1] Highly qualified professionals

X [D2] Existence of supporting (pedagogical) staff

X [D3] Professional development

E. School leadership and culture

X [E1] School leadership

X [E2] High level of cooperation among staff

X [E3] Inclusive culture

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F. Connections

X [F1] with industry

X [F2] with parents/guardians

X [F3] with other schools and/or educational platforms

X [F4] with universities and/or research centers

X [F5] with local communities

G. School infrastructure

X [G1] Access to technology and equipment

X [G2] High quality instruction and classroom materials

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Reflect on your development process

After you have designed your Learning Scenario, take a step back and reflect on the choices you have made. Answer the questions below, related to specific sections of the template.

Context and relevance

Explain how the scenario connects to real-world applications. Identify which principles of authentic learning from the TINKER framework are evident in your Learning Scenario. Explain why you chose these principles and how they shape students' learning processes.

Students were able to learn more about aquatic species that they can find in the waters around the school. Unfortunately we are not close to the Sea, yet there are lakes and rivers and students were paired with organisms that they were interested in to promote motivational learning. The process was a bit complicated, to not simplify the learning and stimulate their "stretch" zone.

Describe how your learning scenario promotes equality and encourages all students to participate actively, avoiding stereotypes or biases in roles that there might be in it. Reflect on your own context and explain why its implementation would be beneficiary.

Using a template to guide the process with Copernicus browser allows all students, even those that are slower, to complete the activity, thus promoting equality and encouraging all students to participate at their own level and within the requirements.

Activities

What inspired the development of these activities, and have you implemented similar activities before? If so, how does your current approach differ from previous ones, and what motivated those changes?

I've worked with all the resources before, however, I've never used Canva in this way. This is the first time I use it to create a template to assist with the use of another resource, and it was very effective. I was inspired to do this overall project because I wanted to do something that involved these elements: 1) local, 2) aquatic, 3) connected to geography, 4) connected with informatics. These were the four

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pillars, then from there I had the idea to do aquatic species in different environments and as I was developing the lessons I realized we could also make a connection with art and math, and then also with climate change and invasive species. I slowly realized all the connections I was able to make with this simple start and I'm very satisfied with the final result.

What resources did you use during your research to help develop the activities? Please explain how you applied these resources in designing the activities and evaluate their usefulness for achieving your objectives.

More than anything I talked with the other teachers. At first I only had "onboard" the geography teacher but then I slowly realized there were roles for others. In addition to the teachers that were directly connected to my project, in the end, all the other teachers created parallel projects of their own that they also presented in the final science week (English, History, French), which used their topic with a connection to BluDiversity.

Describe how your learning scenario could evolve across different stages of difficulty, and offer suggestions for adjusting it to meet the needs of learners with diverse skill levels.

This is a good starting project for Middle School level. It wouldn't be adapt for younger students in Primary school, and in general I wouldn't suggest any younger students to use Copernicus. However, it could be made more complex by involving a more indepth analysis of the satellite data, or over more days (I had the students only do 3 separate years (once every 5 years - 2016-2020-2025) but they could have also done every year that there was satellite data. I had the student focus on only one location, but they could have also done more areas.

Assessment

Explain why you chose a specific assessment method, or a mix of more methods, and what is their relevance for the given tasks you linked them to.

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I chose this assessment method because it was in line with the school grading policy and also matched what would work to evaluate the process and not only the final product.

STEM strategy criteria

Reflect on the STEM strategy criteria you identified. Explain how these criteria are addressed within this Learning Scenario. Then, discuss how the implementation of this Learning Scenario could inform or enhance your school's existing STEM strategy—or that of another school. Consider how the experience might strengthen interdisciplinary connections and promote real-world problem solving.

This project is able to hit all the STEM strategy criteria. I worked hard on developing this project after having completed many other learning scenarios over the past years and this was a good blend between something that wasn't too complex for us educators to organize, nor too complex for the students to complete, while also not being too simple for the students. It also was authentic, using a real "problem" (species endangered, or invasive species increasing) that can be connected to climate change. In addition, given the difficulty of working with Copernicus, in particular for students that are less-tech savvy, I tried to create a tool that would help everyone participate. The fact that all the teachers worked together, and that this project was completely interdisciplinary, was really powerful and made a big difference on the student participation, appreciation, and overall knowledge.

Overall

How did you experience the creation of this Learning Scenario? Name the challenges you encountered, and how you have overcome them.

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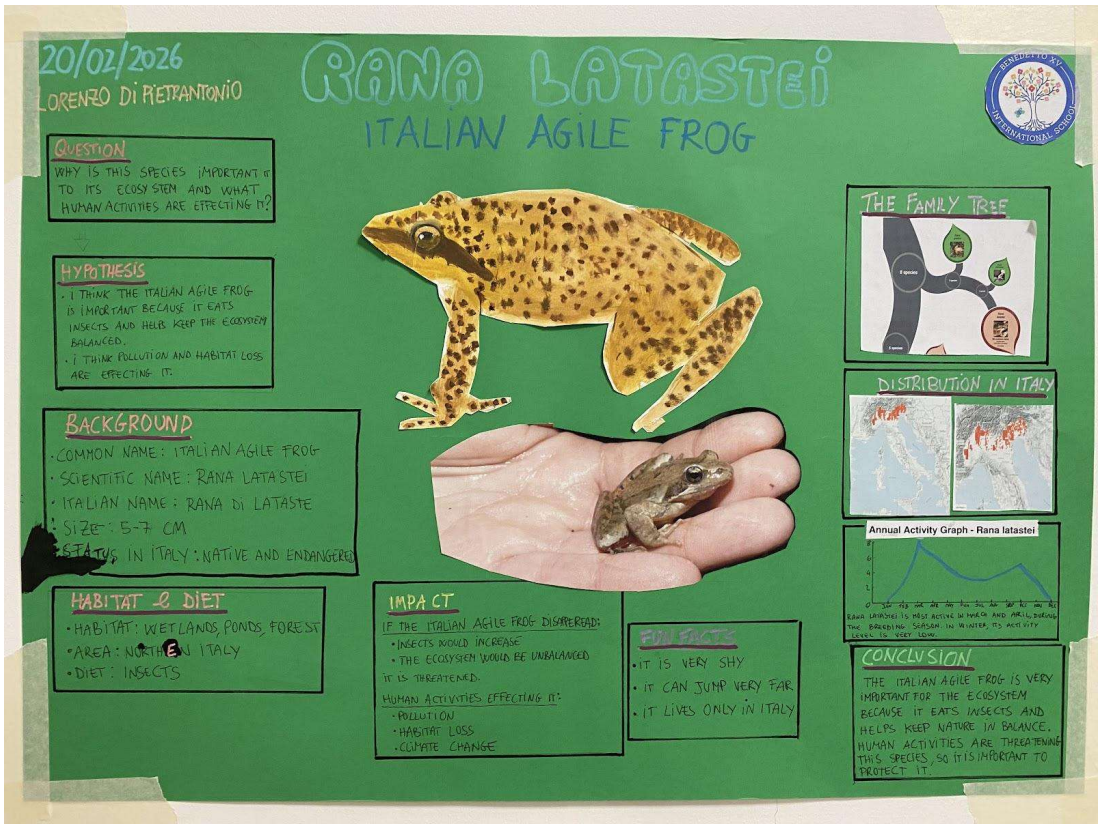
About Scientix

Scientix® is the community for science education in Europe. An initiative of European Schoolnet (EUN). that aims to promote and support a Europe-wide collaboration among STEM teachers, education researchers, policymakers and other educational stakeholders to inspire students to pursue careers in the field of Science, Technology, Engineering and Mathematics (STEM).

Annex (optional)

Example of posters:



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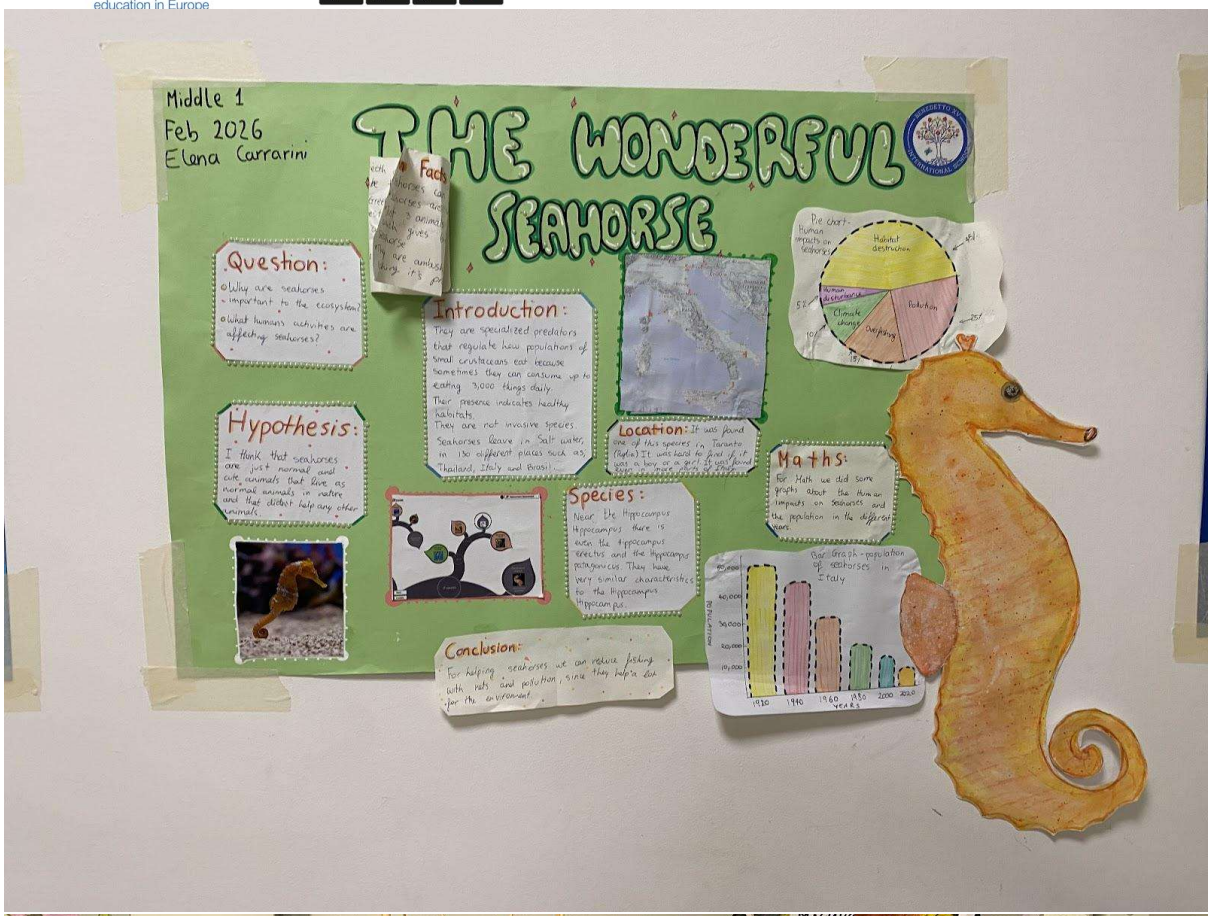

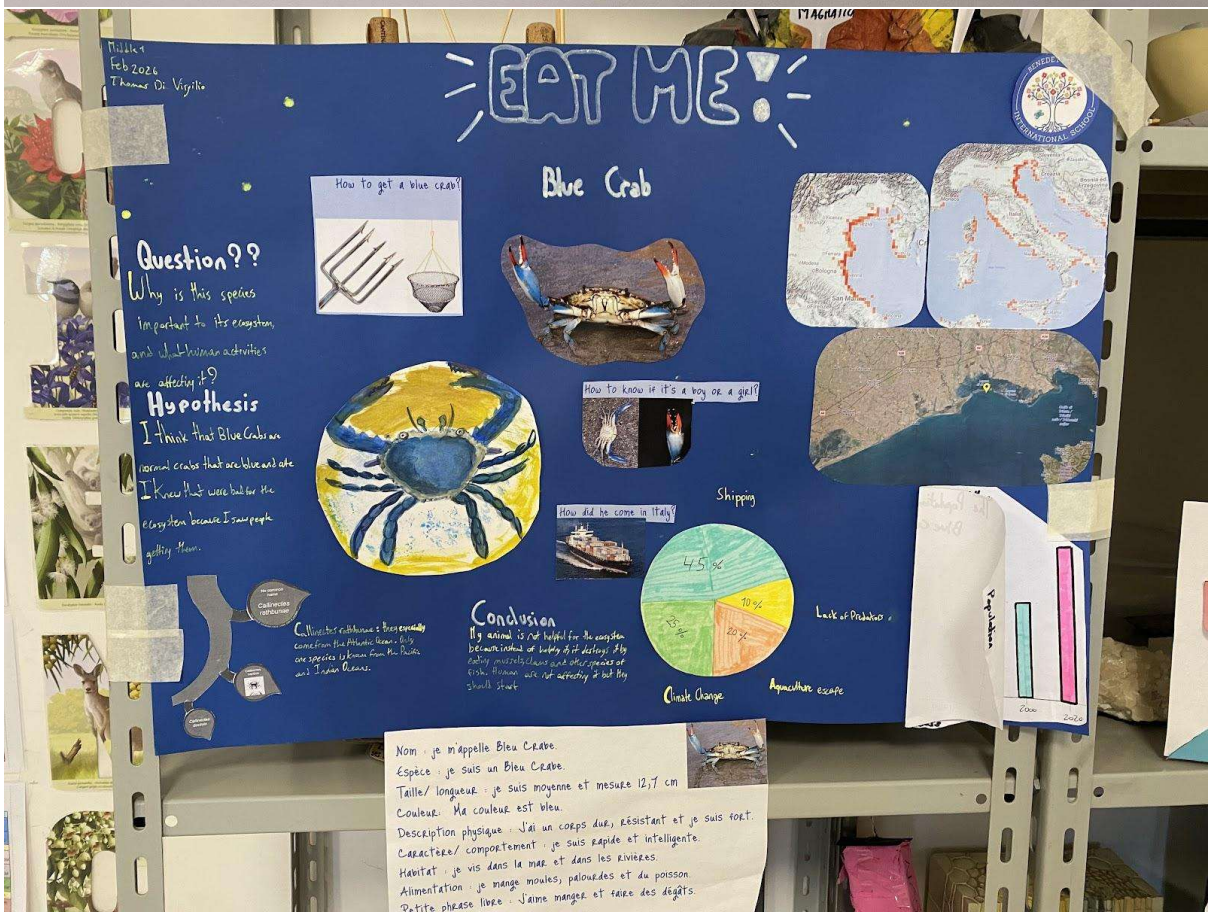

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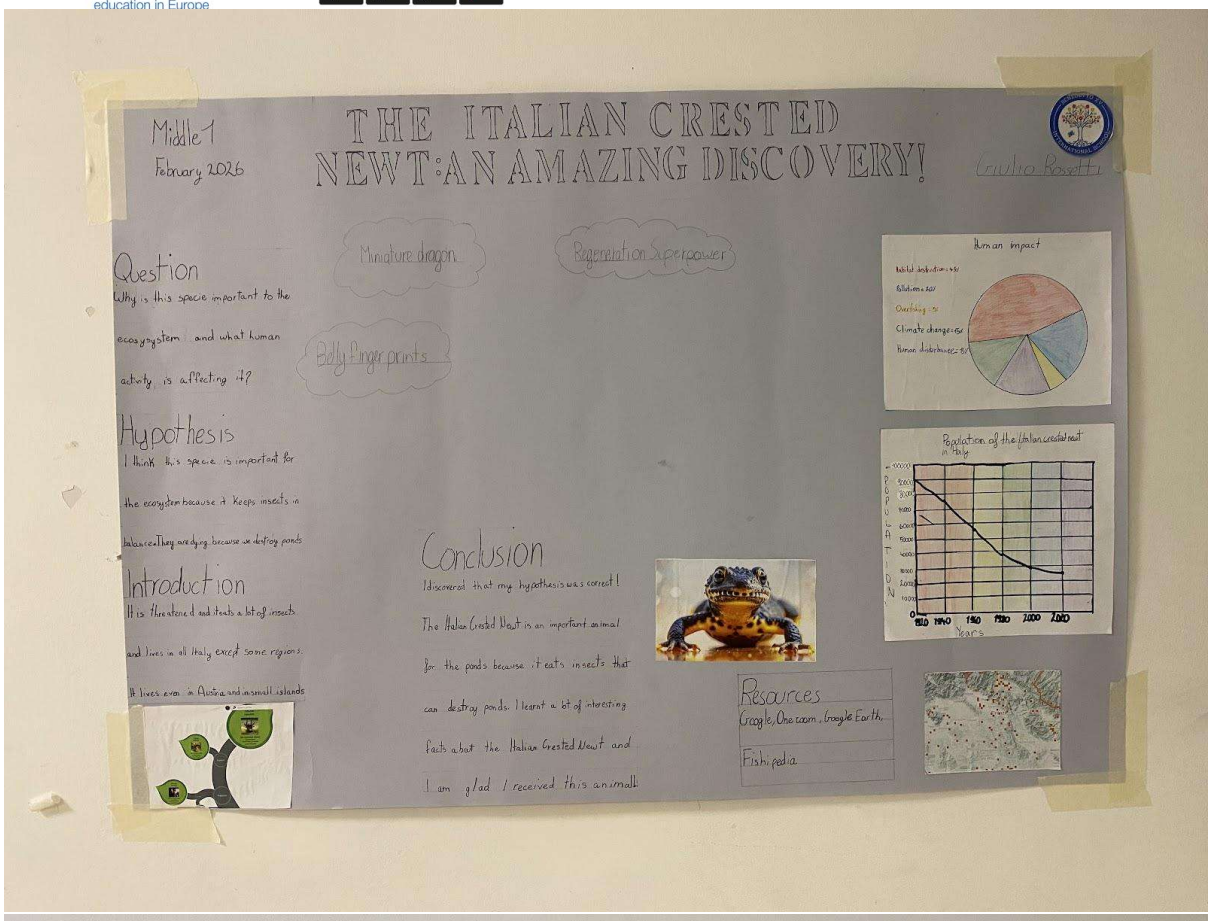

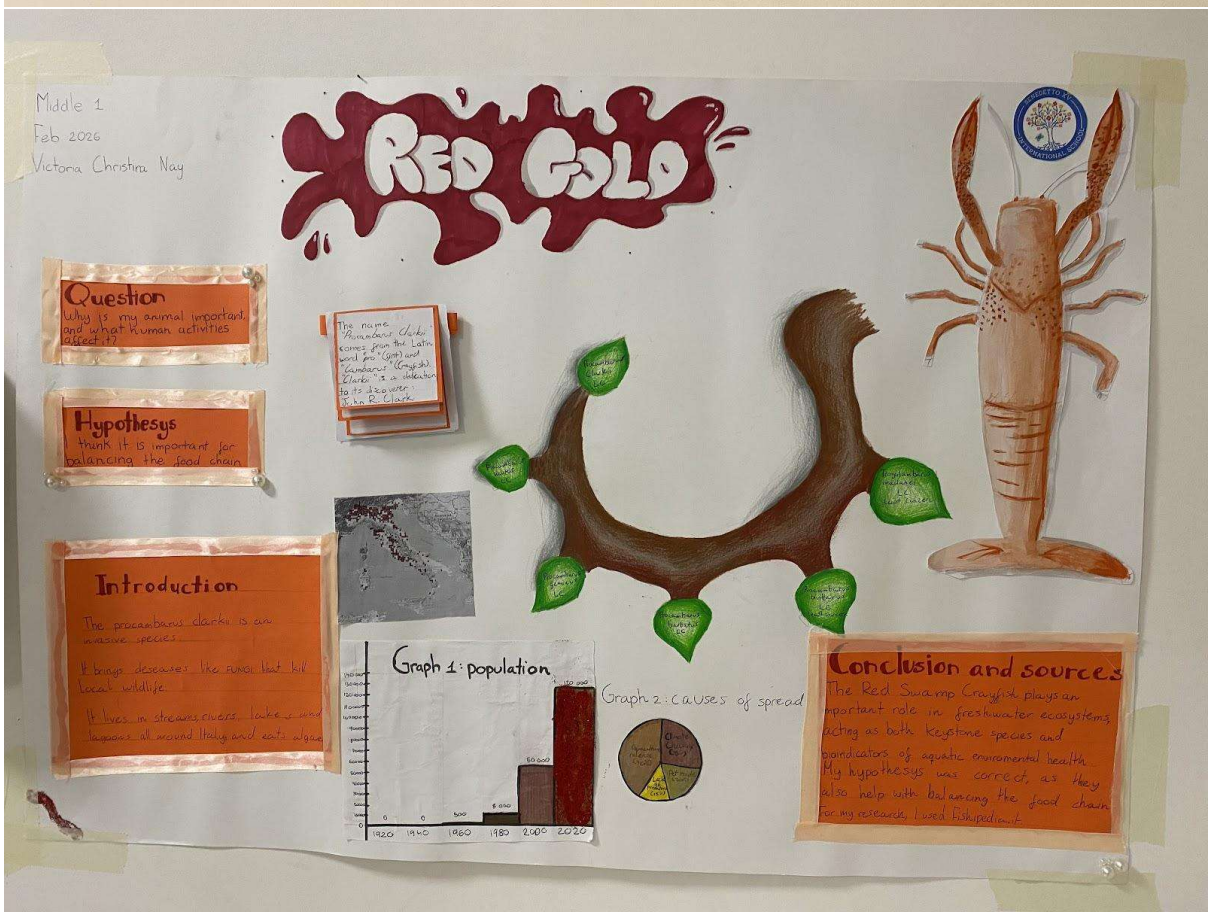

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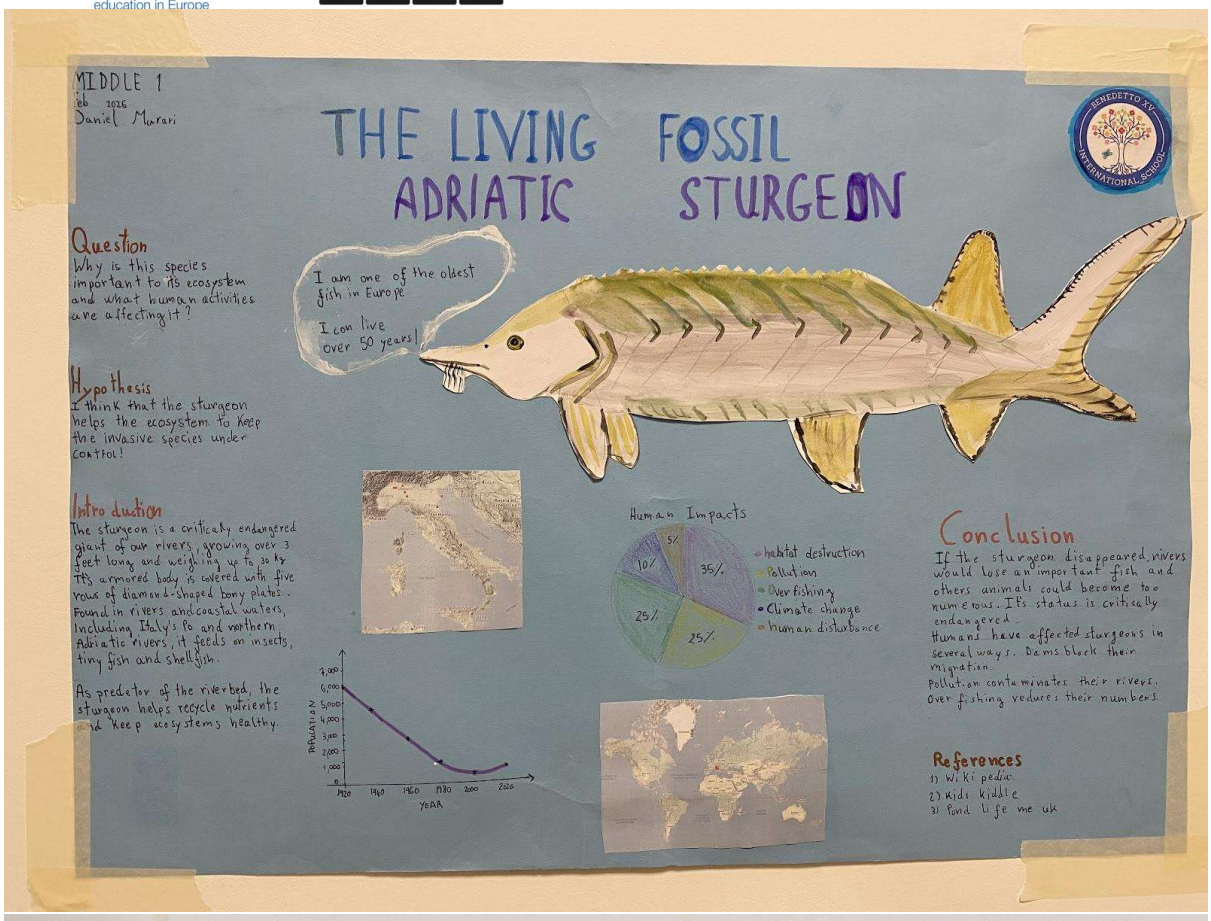

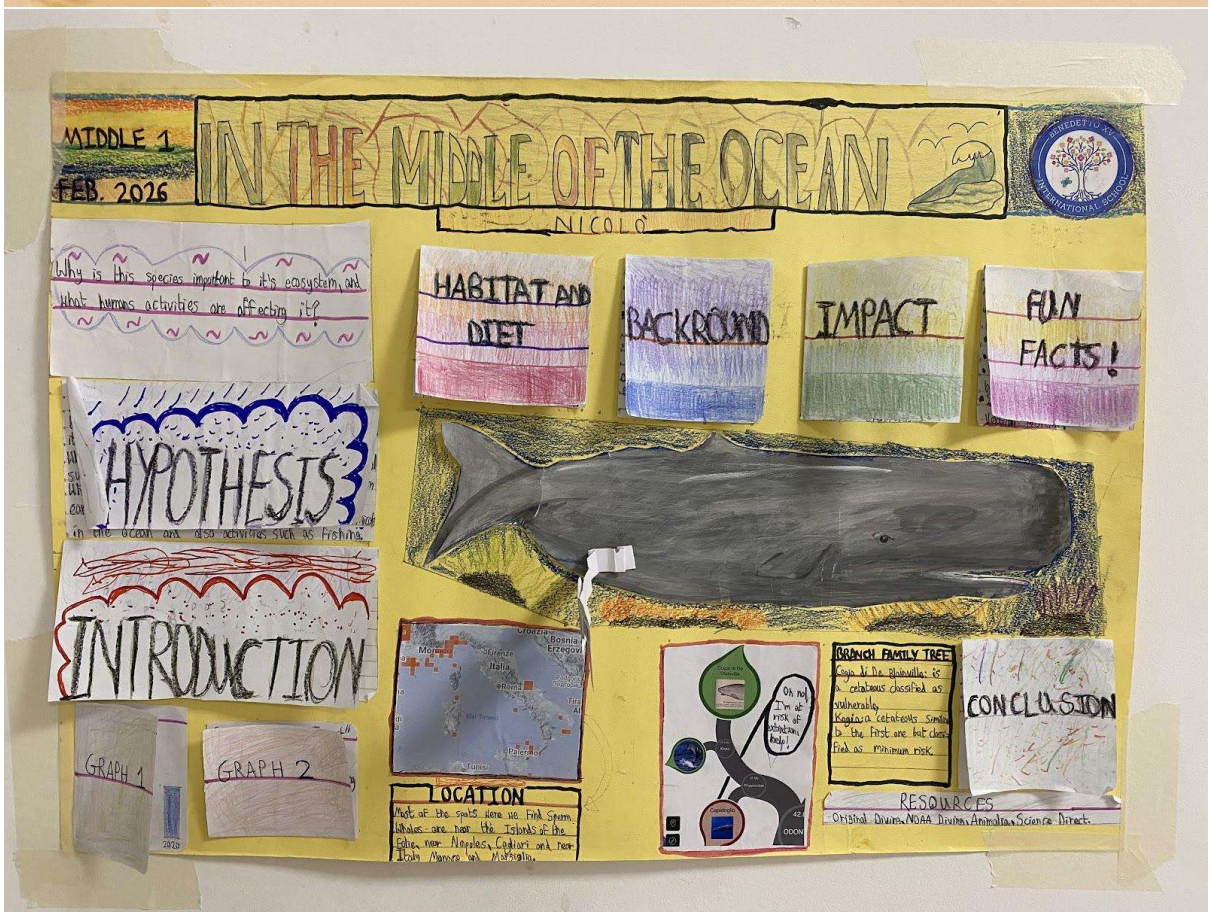

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Our class flyer:

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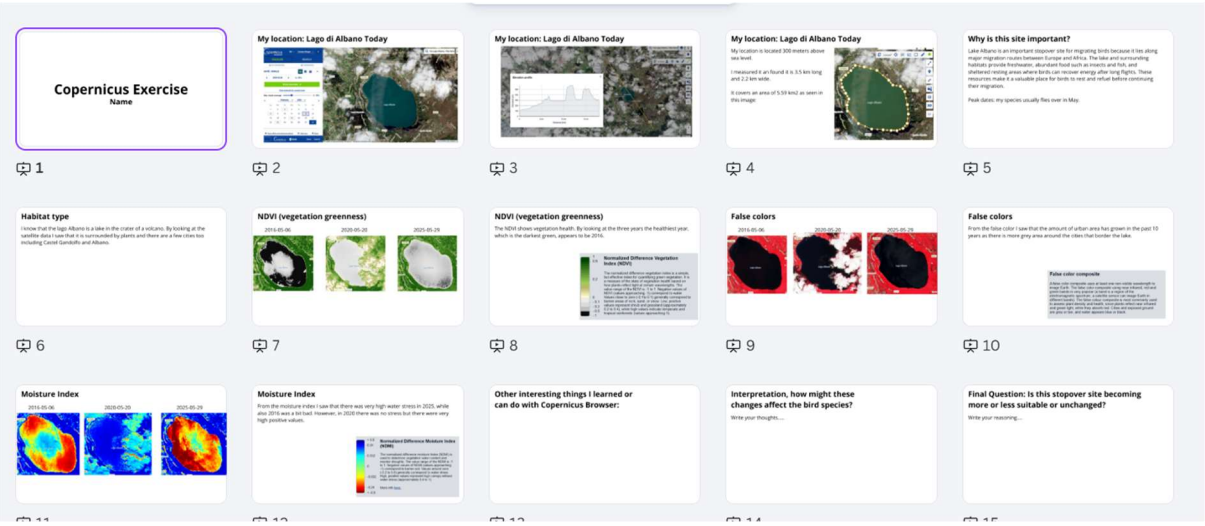
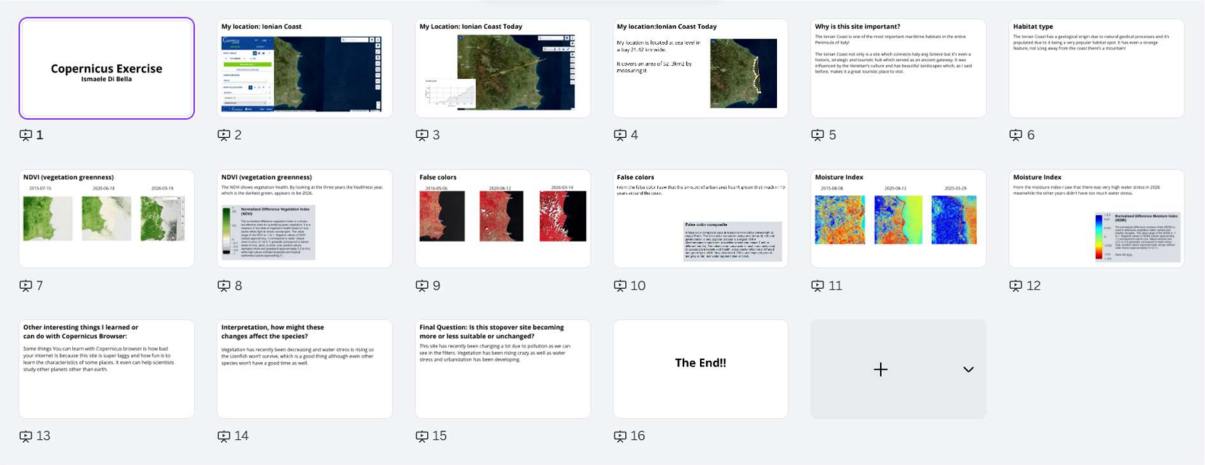
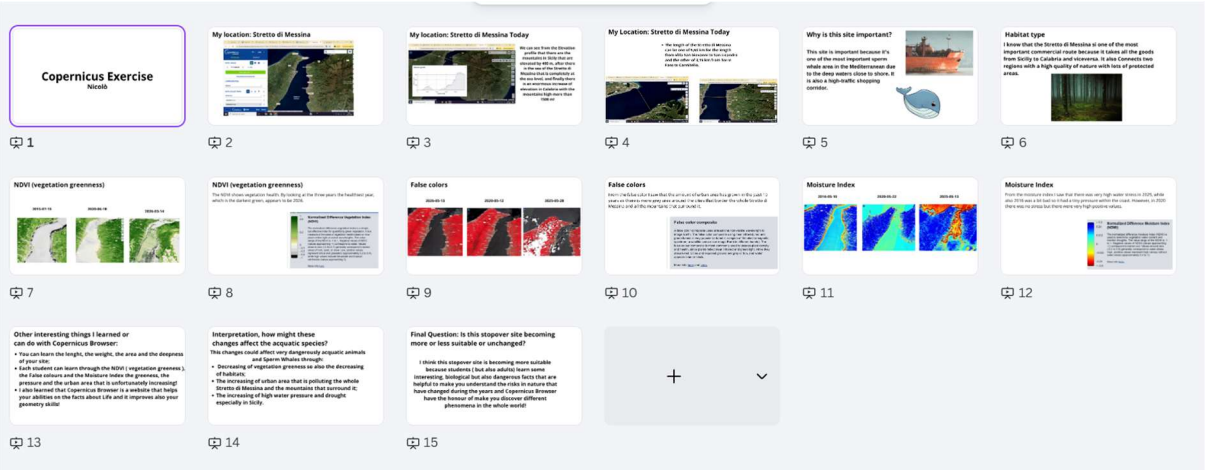
The Canva Template for the Copernicus Exercise, a powerful resource created by the lead-author Carolyn Berger: [link to template]



Examples of the students work based off the template but looking at different locations:





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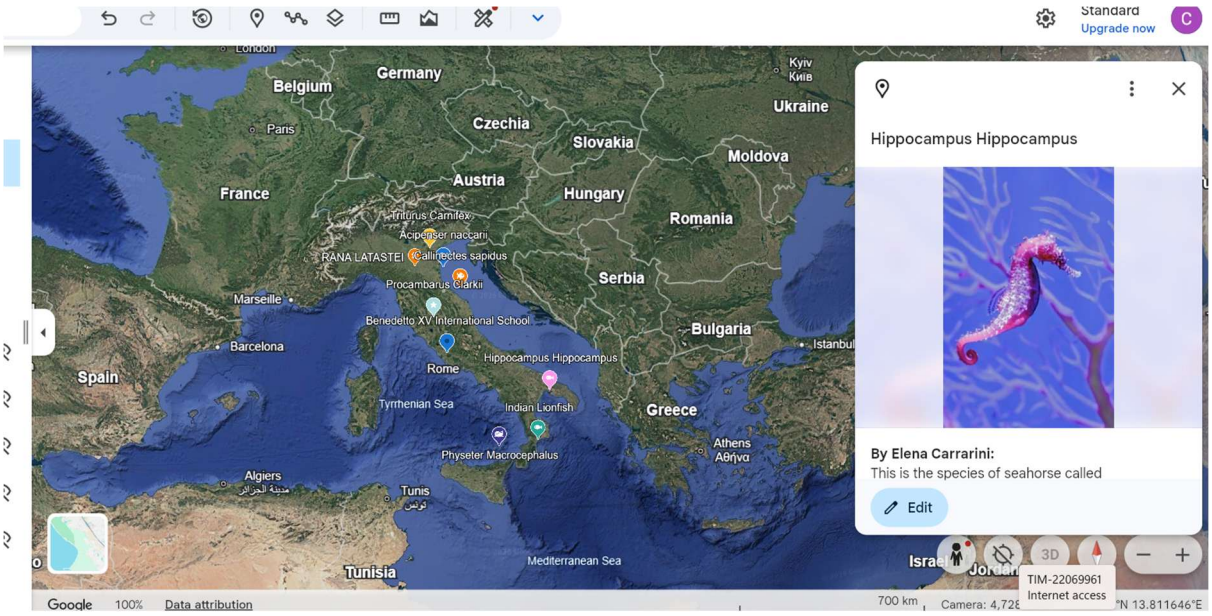
Just to show some examples of the Copernicus data.

Our Google Earth Project - link - (the data for Middle 1 and 2 are both here - Middle 2 did a project called BirDiversity - another learning scenario). At the moment I've selected only the pins for Middle 1 and am showing the detail for one of the pins selected:



The Video we made at the end of the project: link where you can see the posters made by each student

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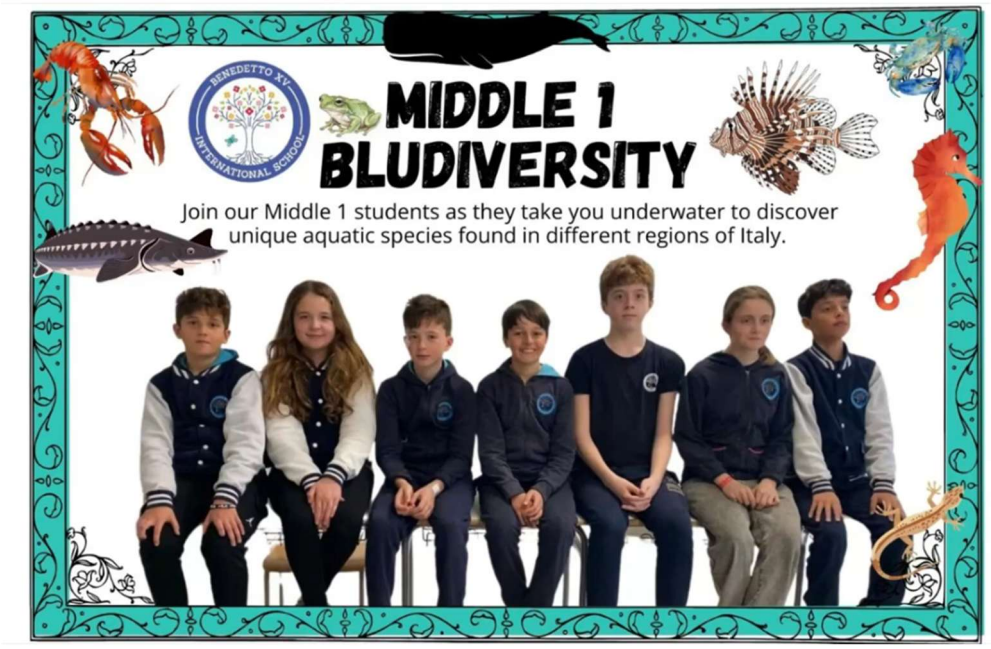


Our School Newsletter (link), with several pages on the topic:

Benedetto XV International School | Issue # 2 WINTER 2026

THE VOICE of Benedetto XV

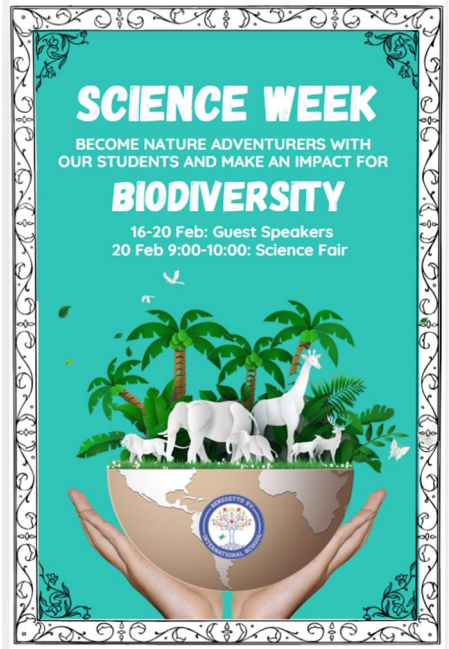
INSIDE THIS ISSUE...

UPCOMING EVENTS

PRINCIPAL'S MESSAGE

The time is always right to do what is right. Martin Luther King Jr. PAGE 1

A brochure (link) about the overall Science Week project that was a whole-school initiative:



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