



GLOBE Investigation

Gozo College Rabat primary School 2021-2022



Title - "Save our Seas by reducing your use of Plastics"

Organization: Gozo College Rabat Primary School

Student(s): Eco-Schools/GLOBE Committee

Grade Level: Grades K-2, ages 5-8

GLOBE Teacher: Josephine Jesse Mercieca

Report Type(s): International Virtual Science Symposium Report

Protocols: Atmosphere, Hydrosphere

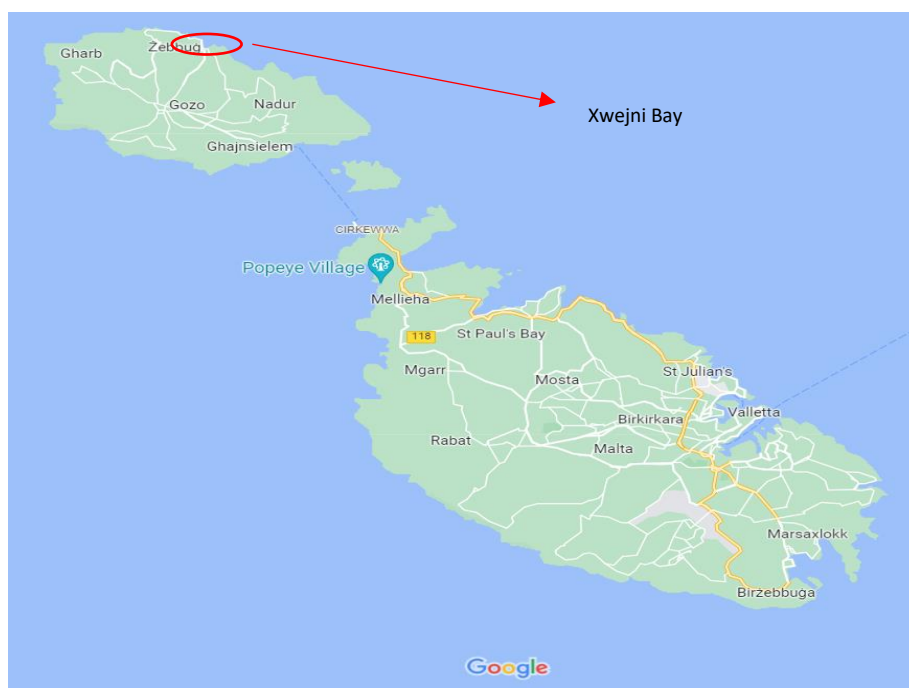
Presentation Type: Poster

Optional Badges: I am a Data Scientist, I make an Impact, I am a storyteller

SUMMARY:

The seas are an integral part of the human and animal lives on planet earth. Oceans give us 70% of the oxygen we breathe and has an impact on climate change, so we need to care for it. We put forward a simple question, "Is there a problem with our oceans today?" Yes, waste, especially one-time use plastic waste which doesn't get recycled has had a negative impact on the seas affecting our food, water, etc. We decided to take a deep look into why this is happening.

Since we live on an island, we are surrounded by beaches/bays, they are all around us. We started out by choosing one area – Xwejini Bay in Marsalforn, Gozo, Malta. This is mainly a rock beach.



Map of the Maltese Islands showing Xwejini Bay



Xwejni Bay, Marsalforn, Gozo, Malta

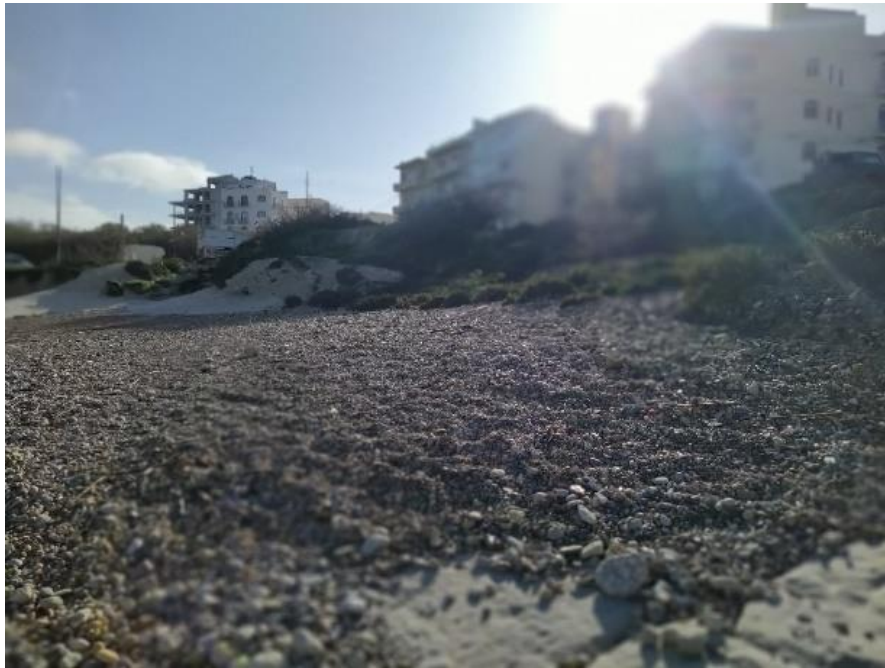
At first glance you don't see any plastic on the beach or in its waters. But getting onto the beach was a different story altogether. We wanted to know if this waste is affecting our seas to be more specific – The Mediterranean Ocean. We were amazed to find that this was on the beach we sunbath and swim in.



Our committee believes we need to take a serious look at the waste

RESEARCH QUESTIONS:

Xwejni Bay is where we go to swim and enjoy our summers. We thought that it was time to take matters in our own hands – this is our beach and we don't want this rubbish here. Doing a beach clean-up wasn't enough. It was time to analyse what we find. Is it possible to make the general public aware of the impact of plastics and what they can do to better safeguard our waters for us and future generations? What are the effects of plastic litter on the coastal environment?



RESEARCH METHODS:

Prior to our meeting on the beach we (and when I mean “WE” students, teachers and parents) needed to educate ourselves about plastics and the oceans. We researched on the internet and found many videos on plastic pollution in our waters and the life cycle of plastics:

1. Planet Earth: A Celebration – a message from Sir David Attenborough
2. Marine Plastic Pollution: Towards a necessary plastic life cycle approach
3. Powerful Video: Why we need to stop plastic pollution in our oceans for GOOD
4. Plastics/Ocean Literacy/FuseSchool – Beach Clean-up

We choose one of our beaches/bays on the Island of Gozo and planned our field trip. We used different apparatus;

- a digital thermometer to test the sea water temperature,
- a digital pH reader to measure the pH of sea water,
- a data logger to measure weather parameters of which air temperature, air pressure and humidity.

The students also observed and reported cloud cover and surface conditions using the clouds tools on the GLOBE Observer App and last but not least the students sampled shingle/sand for microplastics using a handheld digital microscopes attached to mini laptops. This gave the students the opportunity to see plastics up close.



Measuring sea water temperature and pH level using specialised equipment



Sampling sand for microplastics using a handheld digital microscope

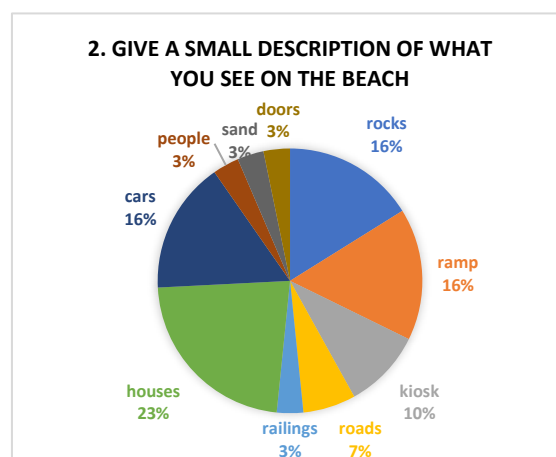


*GLOBE students, teachers and parents working on their data sheets (see appendix)
assisted by GLOBE Malta Deputy Coordinator, Ms. Ramona Mercieca*

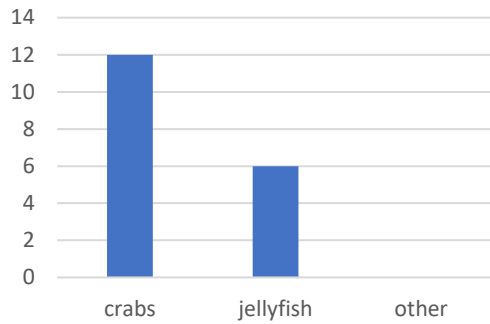
RESULTS:

After the fieldtrip at Xwejni Beach all data was analysed and presented in graph form.

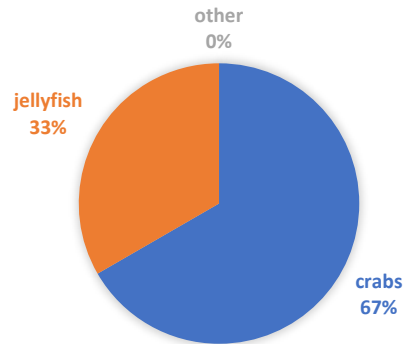
Part 1: Exploring the Beach



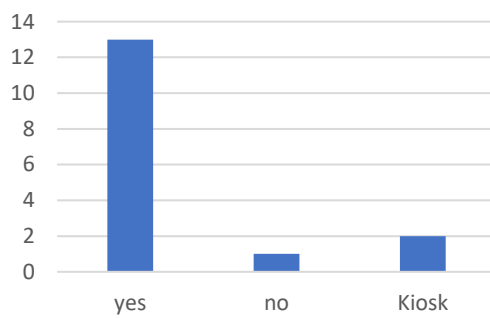
3. Can you see any marine organisms?



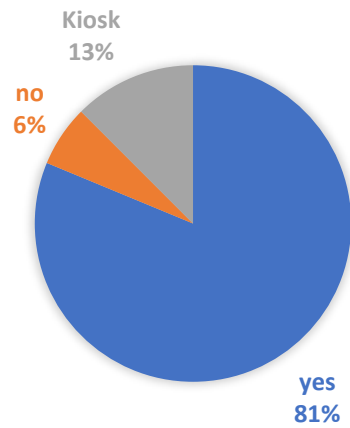
3. CAN YOU SEE ANY MARINE ORGANISMS?



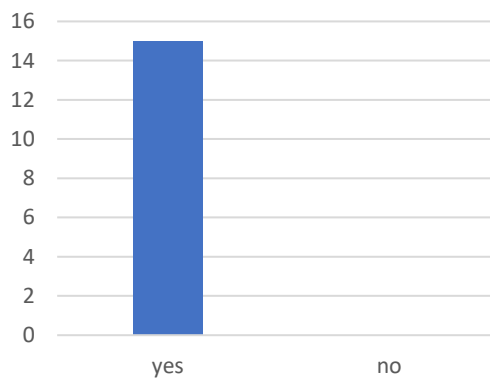
4. Do you see any benches? Do you see any recreational areas?



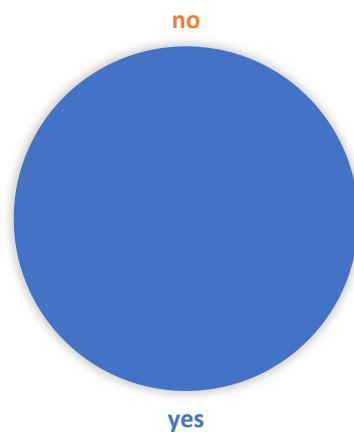
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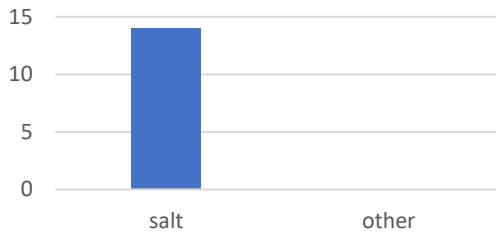
5. Are there any plants & trees?



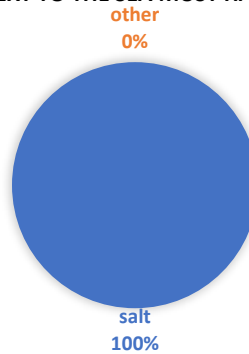
5. ARE THERE ANY PLANTS & TREES?



6. Can you think of any characteristics that plants growing next to the sea must have?

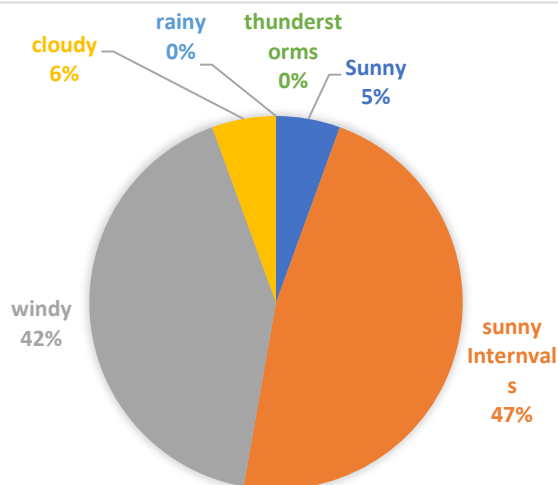
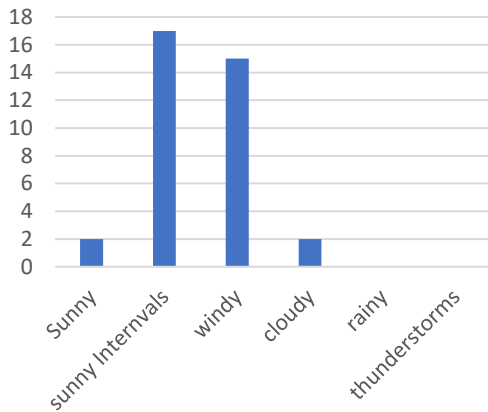


6. CAN YOU THINK OF ANY CHARACTERISTICS THAT PLANTS GROWING NEXT TO THE SEA MUST HAVE?



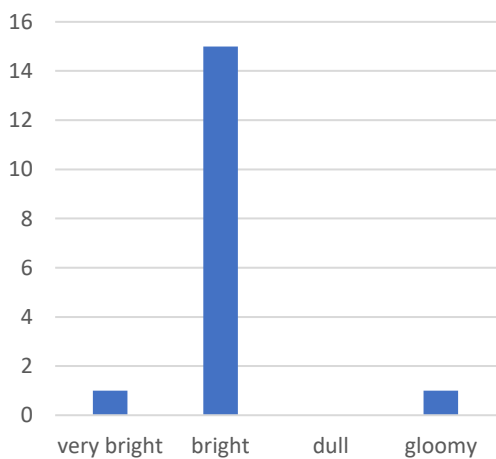
Part 2 – Observing the Weather

7. How is the weather today?

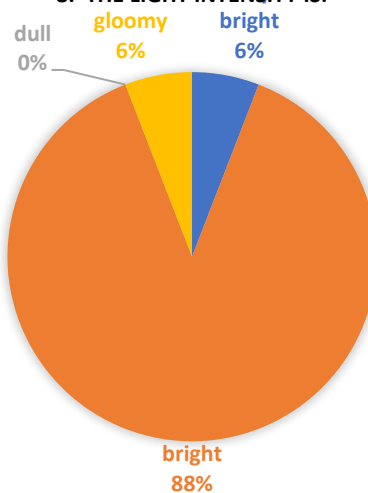


7. HOW IS THE WEATHER TODAY?

8. The light intensity is:



8. THE LIGHT INTENSITY IS:



9. Using a data logger complete the following sentences

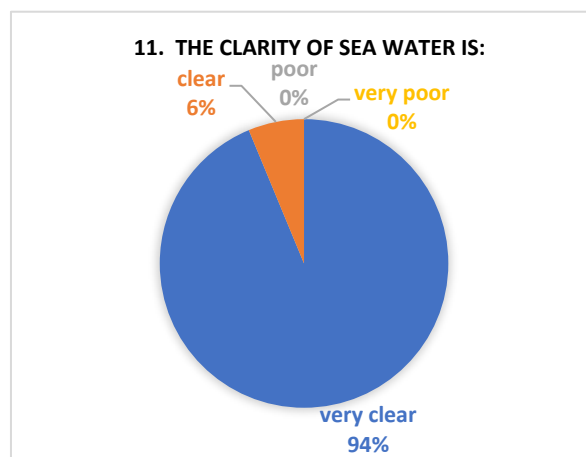
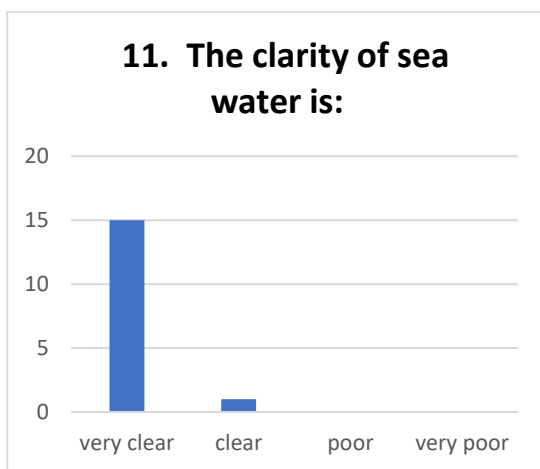
- The temperature today is 16.9c°
- The humidity today is 70.5%
- The air pressure today is 1021.7mb
- The UV today is 2.5
- The wind direction is SW
- Today's wind speed is 4-5

10. Let's look up in the sky and observe the clouds

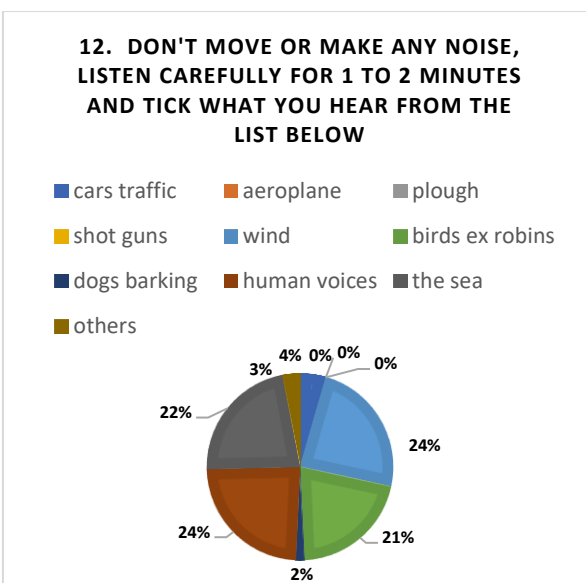
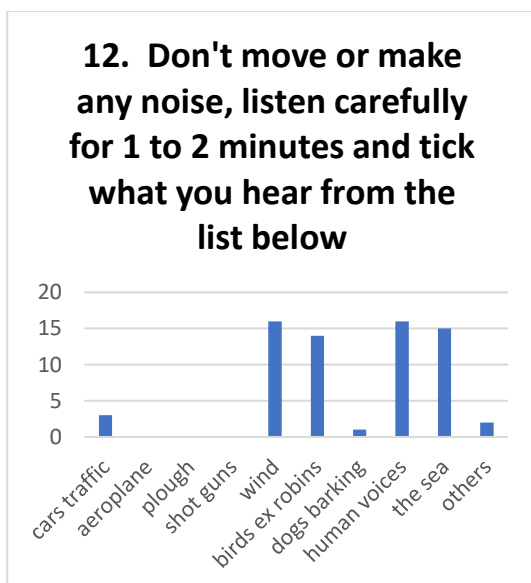
Part 3 – Measuring sea water conditions

11. Take a sample of sea water using a bucket and complete the following sentences

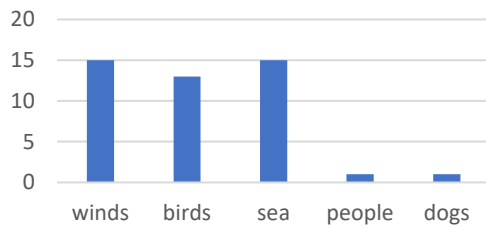
- The temperature of sea water is 16.5
- The pH of sea water is 7.49
- The clarity of sea water is very clear



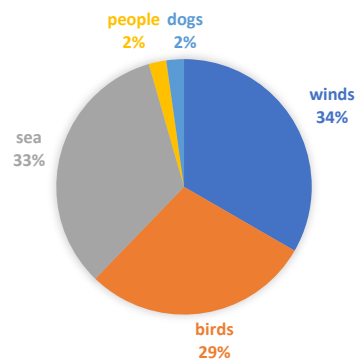
Part 4 – Silence Exercise



13. Are the noises you heard cause by humans or are they natural? Put the noises you heard under the correct heading

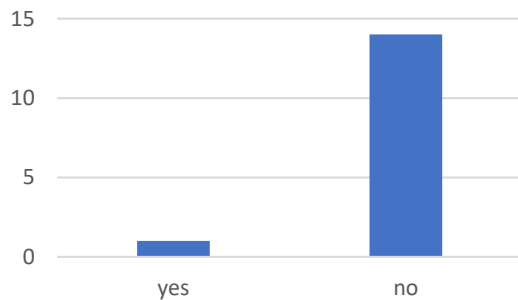


13. ARE THE NOISES YOU HEARD CAUSE BY HUMANS OR ARE THEY NATURAL? PUT THE NOISES YOU HEARD UNDER THE CORRECT HEADING

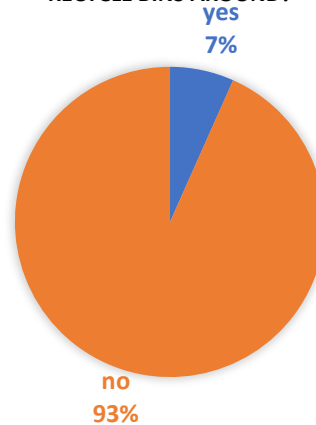


Part 5 – Investigating Marine Litter

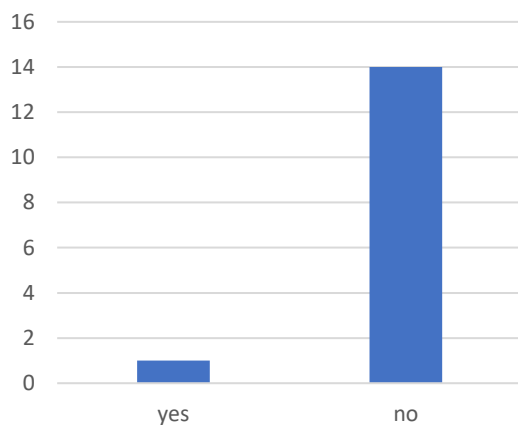
14a. Are there any garbage bins and recycle bins around?



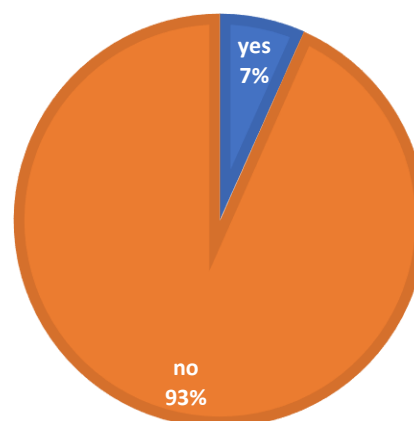
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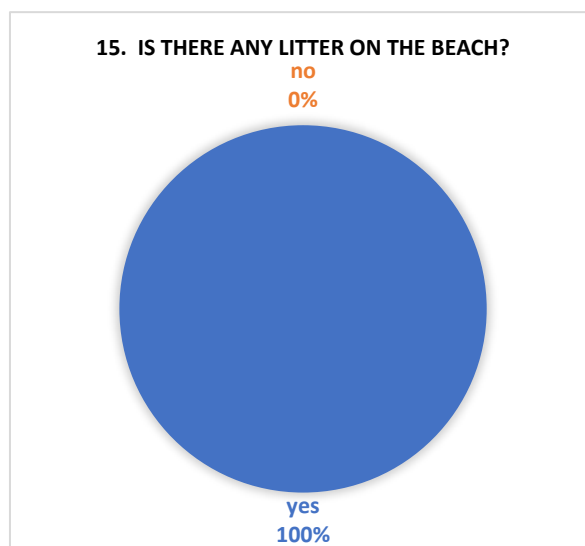
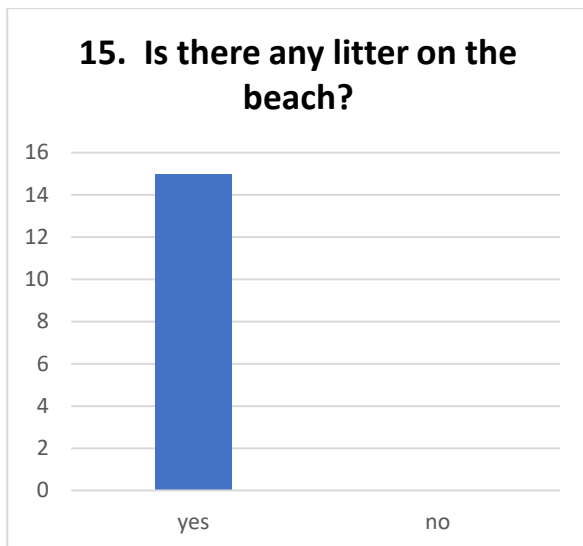


14b. Are they used?



14B. ARE THEY USED?





CONCLUSION:

From the fieldtrip we concluded that the litter found at the beach was brought up by the waves. During this time of year fewer people visit and make use of the beach, in fact no human activity was reported at time of visit with kiosk and nearby restaurants closed. This highlights that marine litter is an international problem and waste generated by other countries affects everyone.

Thus a questions came to mind, “Is it possible to make the general public aware of the impact of plastics and what they can do to better safeguard our waters for us and future generations?” **YES, EDUCATE THEM TO DO BE BETTER!**

Was our fieldwork fruitful? What was our conclusion to our fieldwork? These are some of the questions put forward to our students/teachers/parents at the end of our investigation.

All in all, as per our students and parents, this was a productive, enriching and enjoyable outdoor learning session. To sum it up suggestions were put forward:

1. More litter and recycle bins should be placed on the beach
2. Incorporating school lessons with our fieldwork. For example data collected during fieldwork was used during a Math’s activity called ‘X’hemM Jghaqqadna’ (What connects us). This activity was conducted with Year 6 students during which they calculated recyclable and non-recyclable garbage by weight. Through Maths, students find ways to help and improve the environment.
3. Getting the word out there for all to benefit from a clean beach
4. Having posters made;
 - a. To show that our school children did a clean-up on the beach
 - b. Why is it so important to keep our seas/oceans clean – the ripple effect
5. And finally, it was determined that another outing, during the summer months when there are visitors, will be planned to compare our current data.

Our seas are very important in regulating our climate. The sea’s current helps our world to be habitable by soaking up heat and moving warm water from the equator to the poles and then the cold water from the poles to the tropics. It maintains our carbon cycle, which in turn makes our land liveable. Most of the rain that falls comes from the sea.

Its plant life (like Posidonia) produces 70% of the oxygen we breathe. The sea's microscopic plant life – Phytoplankton, a component of plankton – acts the same way as a tree on land. They attract carbon dioxide and releases oxygen. Since our planet is cover by the sea – two-thirds – we owe our lives to the sea.

It's a source of food for both humans and animals alike. Our human population is growing rapidly and we need to look for alternative food sources. Our seas have an abundance of food which we can source to feed humans as well as animals. As Jacques Yves Cousteau once said, ***“The sea, the great unifier, is man's only hope”***. Meaning we are all in the same boat when it comes to the ocean.

One vital problem in our oceans today is plastics. By studying the impact of plastics in our oceans makes us see how we can better protect our seas. Plastics are a blessing and have a cursor for humanity. The biggest problem is the 1x use plastics such as plastic bags, plastic forks, spoon, etc. It is seen below where it's called, ***“The Great Pacific Garbage Patch”***, often described as a swirl of plastic garbage the size of Texas floating in the Pacific Ocean.



The Great Pacific Garbage Patch

***We need to become ambassadors for our
oceans/seas/beaches/bays***

Citations/Bibliography:

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A Brief History of the Invention of Plastics, ThoughtCo., Mary Bellis, January 28, 2020, [A Brief History of the Invention of Plastics \(thoughtco.com\)](https://www.thoughtco.com/history-of-plastics/2341111/)

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Badge Descriptions/Justifications:

I am a data scientist

Students visited the beach, collected and analysed their own data. They were

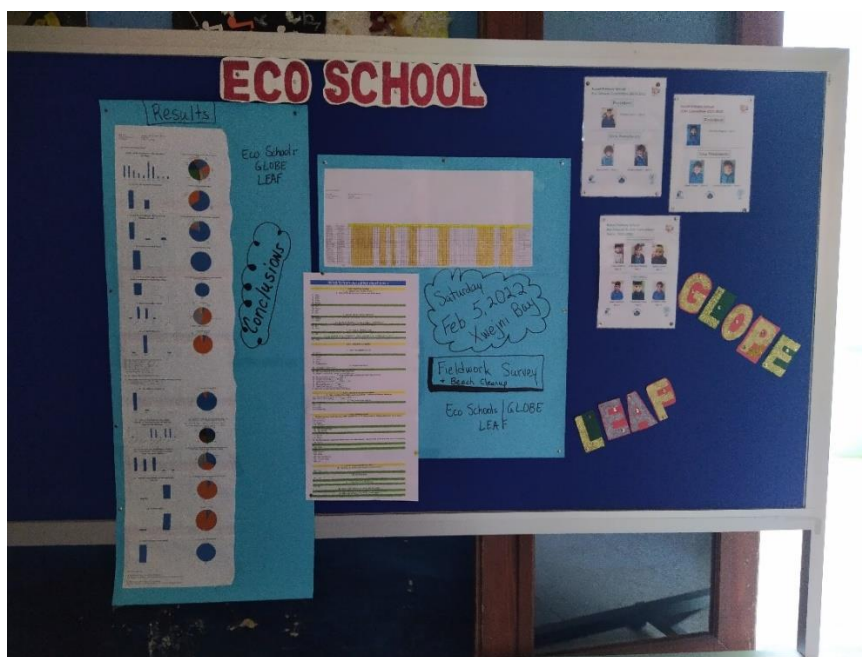
I make an impact

Clean up, suggesting ways how to reduce plastic use and litter. Parents joined students during clean-up. Mayor of locality praised students efforts and shared photos on locality Facebook page.




I am a STEM storyteller

Shared findings with whole school community through noticeboard, social media. Data collected used during Maths lessons.



Appendix:

Datasheets:



GLOBE Beach Fieldwork - Data Recording Sheets

Beach Name: _____ Co-ordinates: _____
 Date: _____ Time: _____

Part 1 - Exploring the beach

Draw a sketch of the beach. Mark on it where you are standing and answer the following questions.

Number of beach users at time of visit (approximate is okay, e.g. I saw 5 people):

Give a small description of what you see on the beach. Circle which part of your description can be attributed to human actions.


Can you see any marine organisms? (e.g. sponges, sea urchins etc.)

Do you see any benches? Do you see any recreational areas?

Are there any plants and trees?







Can you think of any characteristics that plants growing next to the sea must have?

GLOBE® MaltaMs Ramona Mercieca, GLOBE Coordinator



Part 2: Observing the Weather

a. How is the weather today? Circle the correct picture of the current weather.

		
Sunny	Sunny Intervals	Windy
		
Cloudy	Rainy	Thunderstorms


b. The light intensity is: Mark the most relevant for the day.
 Mark ✓ the most relevant for the day.

Light intensity	Meaning
Very bright	Full sunshine
Bright	Sun behind patchy cloud or overhead trees
Dull	Sun obscured by full cloud or thick tree cover
Gloomy	Overcast sky, raining or dense tree cover


c. Using a data logger complete the following sentences.

- The temperature today is _____ °C
- The humidity today is _____ %
- The air pressure today is _____ mb
- The UV today is _____
- The wind direction is _____
- Today's wind speed is _____

d. Let's look up in the sky and observe the clouds. Share all you see using GLOBE Observer App.



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Part 3: Measuring sea water conditions

Take a sample of sea water using a bucket and complete the following sentences.

- The temperature of sea water is _____.
- The pH of sea water is _____.
- The clarity of sea water is: _____

Very clear ☐ clear ☐ poor ☐ Very poor ☐

Part 4: Silence Exercise

a. Don't move or make any noise, listen carefully for one to two minutes and think what you hear from the list below:


Cars, traffic Aeroplane Plough Shot guns Wind	Birds example robin Dogs barking Human voices The Sea Others:
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b. Are the noises you heard caused by humans or are they natural? Put the noises you heard under the correct heading:

Noises


Natural

Caused by humans



Quiet Please

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Part 5: Investigating Marine Litter

Are there any garbage bins and recycle bins around? Are they used?


Is there any litter on the beach?

What, in your opinion, is missing from the beach?

What, do you think, shouldn't be on the beach?

Collect some sand in the container provided. Using the digital microscope sample sand for microplastics.

KEEP OUR SEAS CLEAN!



GLOBE® MaltaMs Ramona Mercieca, GLOBE Coordinator