Explorers Education Programme™

Date	Class level Fifth and Sixth Class	Subject Mathematics

Strand Data	Strand Unit Representing and Interpreting data.

Title
Interpreting and presenting data about marine litter in the ocean.

Objective(s)
The children will learn how to represent and interpret data about ocean pollution.
They will organise and represent data using bar charts and read and interpret block graphs.

Skills Required
Applying and problem solving, Communicating and expressing, Integrating and connecting, Reasoning, Implementing, Understanding and Recalling.

Learning objectives	Learning activities
The child should be enabled to: Organise the data in the worksheet and represent the information on a bar chart. Interpret the bar chart, compose and answer questions based on the graph. Suggest answers for the questions posed. Work in pairs to complete the tasks and share their information with the whole class.	**Talk and Discussion:** Begin the class with a discussion on marine litter, what it is, how it gets into the ocean, where it ends up, does it float or sink, does it move around in the ocean or stay in the one place, what are its impacts. Use the internet to search for images of marine litter in ocean gyres or videos about marine litter such as the Marlisco Sources and Impacts of Marine litter. Examine some small samples of clean litter if possible. Ask students to research the term Ocean Gyre to become familiar with the feature in the ocean and how marine litter collects in these areas. Explain to the students that you are going to look at data that shows the area of different locations in the ocean, Pacific, Atlantic, etc., and the approximate number of pieces of marine litter that are found there per km^2. Alternatively, the teacher may like to introduce a number of themes relating to the ocean environment and care such as

showing:
Climate Change - Average Global Sea Surface Temperature, 1880–2015

The students can decide on a method for presenting this data or the teacher may select method/ methods for the class to use, such as a bar chart.

Have a whole class discussion to recall previous learning about pictograms, methods for presenting data. Explain that block graphs can be used instead of pictograms to represent data.

Pair/ Group work:
In pairs or small groups examine the data in the attached worksheet. Discuss the information given about the amounts of litter in our ocean and the areas of the ocean listed in the worksheet. Using a globe or map find the areas mentioned on the worksheet to determine their location. Elicit suggestions as to ways in which it can be represented using a block graph.

Teacher models the drawing of a block graph emphasising scale, size and shape of the blocks, title, etc.

Using graph paper and working in pairs the children represent the data in the form of a block graph. They then suggest a title for the graph and compose a question which will be shared with the whole class. Alternatively use a computer programme such as Excel to generate graphs and integrate technology into their class activity.

The students may then review their graph and try an alternative method if desired, such as a line chart. They may also like to graph the size (area) of each location or rank them from smallest to largest using the sizes given on the worksheet.

In conclusion, each group will share their information about how the data is collected, how it is represented and the interpretation of the data. The students are to respond through questions and answer process.

Completed graphs are displayed in the Maths Corner, along with information about marine litter and the image of the ocean gyres form on the worksheet.

Resources

- Worksheet – see below
- World Map/ Globe
- Graph paper
- Pencil and ruler
- Colouring pencils/markers/crayons
- Computers/ Laptops
- Samples of clean litter if possible.

Google: images / statistics
- Plastics in the ocean
- Ocean Pollution
- Climate Change - Average Global Sea Surface Temperature, 1880–2015
- Sources of marine plastic pollution
- Mismanagement of plastic

Differentiation
Mixed ability pairs/ groups. Assign different groups a different line of data/ method for displaying data. Ask groups to calculate the average amount.

Assessment
Oral feedback from children, teacher observation, teacher check, and pupil work samples.

Linkage and Integration
English -Oral language: Talk and discussion about marine litter, its sources and impacts on humans/ animal life.
English – Oral Language – Marine TV and Reporting on Marine Pollution.
Science – Materials- Introduction to degradation and how long it takes for materials to break down.

Geography – Environmental awareness and care – Explorers Caring for Our Ocean Action Board.

Geography – Human Environments – Living in the local community – Keeping our beaches clean from litter

Visual Art – Construction – making constructions, looking and responding – Creating a clay ocean diorama showing the effects of Marine Pollution.

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Worksheet

Strand: Data	Fifth and Sixth Class	Strand Unit: Interpreting and representing data
Areas in the Ocean	**Approximate Quantity (Number of Pieces) of Marine Litter per Km^{2*}**	**Area (km^2)**
North Atlantic	6,000	106,500,000
South Atlantic	5,000	
North Pacific	6,000	161,800,000
South Pacific	2,500	
Indian	1,500	73,600,000
Southern	No data	20,300,000
Arctic	No data	14,000,000
Mediterranean Sea	11,000	2,500,000

* Data taken from figshare.com, April 2017. Eriksen, Marcus; Reisser, Julia; Galgani, Francois; Moore, Charles; Ryan, Peter; Carson, Hank; Thiel, Martin (2014): Plastic Marine Pollution Global Dataset. Numbers shown are based on the mean number of pieces of litter measured which were <200mm in size.