Sinking Ships

Subject: Science and Maths
Context: Everyday materials - floating and sinking, size and shape, weighing and measuring, counting, length, width and area.

Year Group: Year 3

Date:

Knowledge, Skills and Understanding:
This activity investigates what the size and geometry of boats and how that affects the ability to hold weights.

Learning Objectives (Choose from):

- Asking simple questions and recognising that they can be answered in different ways.
- Observing closely, using simple equipment.
- Performing simple tests.
- Identifying and classifying.
- Using their observations and ideas to suggest answers to questions.
- Gathering and recording data to help in answering questions.
- Distinguish between an object and the material from which it is made.
- Describe the simple physical properties of a variety of everyday materials.
- Compare and group together a variety of everyday materials on the basis of their simple physical properties.

Lesson Overview:
From cardboard make rectangular boats of different sizes e.g. 10 X 5 cm, 15 X 10cm, 20 X 10cm, etc all the boats need to have the same height (suggested 5cm), seal the corners with sellotape.

Activity:

- Fill the reservoir with water.
- Measure the size of the boats (length & width) and record on the board.
- Work out the surface area of each boat and record.
- Float the different boats one at a time.
- Add marbles to each boat one at a time.
- Record what happens and how many marbles it takes to sink each boat.
- Weigh the amount of marbles it takes to sink each boat and record the results.
- Plot the results in a table and graph form.

Resources:

- Moti-Lab reservoir
- paper boat templates
- a ruler
- set of scales
- lots of marbles the same size

Key Vocabulary:
float, sink, faster, slower, heavier, lighter, larger smaller, stable, unstable

Conclusion / Plenary:

- Does the size of the boat affect how much weight it can carry?
- Some objects float on the top of the water.
- Some objects soak up the water then sink.
- Recognise that the marbles sink and adding marbles to the boats affects its ability to float.
- Describe the relationship between the size of a boat and what weight it can hold.
- Is the relationship proportional?
- Using the graph what area would a boat need to hold 500 grams? Predict and test.
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Cross Curricular Links:

Maths

Measurement

- Compare, describe and solve practical problems for:
  - Lengths and heights [for example, long/short, longer/shorter, tall/short, double/half].
  - Mass/weight [for example, heavy/light, heavier than, lighter than].
  - Weighing exercise and recording results.
  - Making tables to demonstrate results.

Design and Technology

- Making models to specific dimensions.

English

- Learn the names of simple shapes.
- State observations in speech and writing.
- Write a poem or story about different boats, famous ships etc.

Complementary Activities

- Investigate different types of boats for different uses, e.g. a cruise ship, and a canoe?

Useful Links:

Videos on displacement / buoyancy

- https://www.youtube.com/watch?v=xniW3_afO-0 - Displacement animation
- https://www.youtube.com/watch?v=CvWrkxzCiaY - Why do ships float? Animation

Challenge Questions (Choose from):

Does the size of the boat relate to how well it floats and the weight it can carry?
Can you describe and list the different objects in size?
Can you group similar objects?
Which boat do you think will float the best? Why?
Were your predictions right?