

Date	Class level Fifth Class and Sixth Class	Subject Science
Strand Materials	Strand Unit Properties and characteristics of materials.	
Title Materials - Exploring Marine Debris Degradation		
Objective(s) The aim of the lesson plan is for the children identify and investigate a range of common materials in the immediate environment. The children will observe, investigate and experiment on the degradation effects the environment has on these items.		
Skills Required Observing, Investigating and Experimenting.		
Learning objectives The child will be enabled to: Explore types of materials that make up marine debris. Examine how these materials degrade in an aquatic environment. Investigate how environmental conditions affect the degradation of the materials.		Learning activities Talk and Discussion: Teacher discusses with the class how they would define "Marine Debris". Ask students to think about how humans affect the ocean. If possible show students a stimulus video to encourage discussion. <i>Please note that videos are not attached as material available online is constantly changing and being updated. However we would recommend the following websites for video material on Marine litter, marine pollution and marine debris:</i> <ul style="list-style-type: none"> - "Ocean Today" produced by NOAA in America. This site has a selection of videos in the section on "Fix our Ocean". - "Two minutes on Oceans with Tim Toomey" produced by the United Nations Education Programme. - Vimeo. Marlisco marine Ask students to think about the types of materials that become part of marine debris. Introduce the term degradation and biodegradation. Ask students to

consider how the materials they have listed will degrade.

Explore with students the ways degradation can be assessed/ measured, such as changes in colour, shape, size and the ability to retain structure (not be pulled apart).

Free exploration of materials:

Provide students with the materials to be used in the experiment and allow them to examine them. Ask students to consider the following questions during the exploration:

- Do they think the material is natural or man-made?
- Would the material float?
- Would the material move if blown by the wind?
- Would the material move if sprinkled with water?

Recommended materials are outlined in the resources section below. *Please make sure all materials are clean and dry and have no sharp edges or contain any chemicals.*

Teacher Directed Approach:

Fill two large shallow containers half-way with fresh or saltwater. Place the same selection of materials into both of the containers and cover with net or mesh and secure with string or twine. Place one container in a sheltered/dark location in the classroom and one container in an outdoor location where it will receive the maximum amount of sunlight possible. Attach a sign to your container to communicate that they contain Explorers Experiments and are not to be disturbed or removed from their locations (see signs attached).

Investigative Approach

Ask students to record weather data daily over the course of the experiment. This can be carried out by selecting one pair of students each day to fill in the weather recording sheet attached. Explain to students that they will record precipitation (if there has been rain or any type of precipitation that day), temperature (if a thermometer is available), and the amount of cloud cover (to determine the amount of sunlight). Discuss ways to rate cloud cover, i.e. total cloud cover, partial cloud cover, blue sky.

Once a week ask students to examine the materials in the indoor and outdoor samples. Ask them to mark an A4 piece of paper with a line down the middle making two halves. One material at a time place the indoor sample on one side and outdoor on the other. Ask students to compare the samples using the following criteria:

- changes in colour
- changes in size (length and width)
- changes in shape

Observations can be recorded on the degradation recording sheet attached. Students may want to cover the tables with newspaper when examining the samples and use rubber gloves when handling the materials.

Students can photograph materials each week so that they can compare the changes over time. Provide students with laminated sheets to place materials on for photographs. Ask them to write the date, sample (indoor/outdoor) and the material type on the sheet before taking each photo. Sheets can be cleaned and reused.

At the end of the investigation (after 4/6

weeks) students repeat the process as outlined above. Finally they test the materials ability to retain its structure by trying to pull it apart (this is only carried out on the final week).

Ask the students to consider the following questions at the end of their investigation:

- Which materials degraded?
- Which materials were persistent? (did not change in colour/shape/size over the study period)
- Were there any differences in the degradation of the indoor and outdoor samples?
- Do they think the water in their samples affected the rate of degradation? How does this link to the marine environment?

Teacher Directed Approach

Examine the weather and degradation recording sheets with the students. Ask the class to consider the following questions

- Do they think weather conditions affected the rate of degradation?
- Which weather condition do they think had the biggest impact on degradation?

Resources

Computer with internet access

Two shallow containers

Two pieces of net or mesh large enough to cover the containers.

Two pieces of string/twine

Water

	<p>A selection of the materials listed below: Two cardboard squares, two plastic bags, two paper bags, two apple cores, two cigarette butts, two plastic spoons, two straws, two paper squares, two pieces of woollen material, two aluminium drink cans, two steel food cans (remove food and drinks from can before use). Two pieces of net, two pieces of styrofoam, two pieces of ribbon, two balloons, two rubber bands, two loom bands, two plastic bottles, and two sweet wrappers.</p> <p>Camera</p> <p>Laminated sheets and markers for photographs.</p> <p>Newspaper</p> <p>Kitchen Gloves.</p> <p>Thermometer</p> <p>Weather recording sheet (attached).</p> <p>Degradation recording sheet (attached).</p> <p>Sample Signs (attached).</p>
<p>Differentiation Higher and Lower order questioning. Differentiate group activities and roles to account of individual needs, by support, task. Mixed ability pairing.</p>	
<p>Assessment Teacher observation and questioning.</p>	
<p>Linkage and Integration Maths: Data collection and representation. Ask students to graph the environmental data collected over the study period. English: Procedural writing. Ask students to write a report on how they carried out their investigation. Geography: Environmental Care and Awareness: Ask students to carry out a cleanup in their local area and to determine the types of materials that were found.</p>	

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Weather Recording Sheet

Investigation Start date:

Week 1

Date	Precipitation	Cloud Cover	Temperature

Week 2

Date	Precipitation	Cloud Cover	Temperature

Week 3

Date	Precipitation	Cloud Cover	Temperature

Week 4

Date	Precipitation	Cloud Cover	Temperature

Sample Signs



Explorers Experiment: Please Do Not Disturb



Explorers Experiment: Please Do Not Disturb

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