

BE THE WAVE AR FRIG Y DON

Microfibres

Lesson Plan



cadwch keep
gymru'n wales
daclus tidy

MARINE
CONSERVATION
SOCIETY



UNDER EWROPEAIDD
EUROPEAN UNION



Llywodraeth Cymru
Welsh Government

**Cronfeydd Strwythurol a
Buddosodi Ewropeaidd**
European Structural
and Investment Funds



Ariennir gan
Lywodraeth Cymru
Funded by
Welsh Government



Aims
<ul style="list-style-type: none"> • Develop understanding of the impact of microfibres on the marine environment and consider sustainability when making choices. • Raise awareness of issues concerning marine litter and to encourage students to act constructively to make a real difference.
Objectives
<ul style="list-style-type: none"> • Define microplastics and microfibres • Explain the source and impact of microfibres in detail • Develop research and investigation skills into microfibres • Apply knowledge of microplastics to everyday life through action #BeTheWave and Eco-Schools programme

Eco-schools topic	Global goals
<ul style="list-style-type: none"> • Litter 	<ul style="list-style-type: none"> • 6 clean water and sanitation • 12 responsible consumption • 14 life below water

Links to the Curriculum for Wales	
Purpose	
<p>Ambitious, capable learners who:</p> <ul style="list-style-type: none"> • Undertake research and critically evaluate what they find • Build a body of knowledge <p>Ethical, informed citizens who:</p> <ul style="list-style-type: none"> • Engage in contemporary issues, understand, and consider their actions when making choices and acting • Show their commitment to the sustainability of the planet 	
What Matters	Descriptions of Learning
Progression Step: Three/Four	
<p>Science and Technology</p> <ul style="list-style-type: none"> • Suggest conclusions as a result of carrying out my inquiries • Explain how the impact of our actions contribute to the changes in the environment and biodiversity. <p>Humanities</p> <ul style="list-style-type: none"> • Have an understanding of my own and others environmental, economic and social responsibilities in creating a sustainable future <p>Languages, literacy and communication</p> <ul style="list-style-type: none"> • Use inference and deduction to understand more complex texts and can consider the reliability and impact of what I read. 	



DCF	Progression Step: Four
Creating digital content <ul style="list-style-type: none"> Select and use a variety of appropriate software, tools and techniques to create, modify and combine multimedia components for a range of audiences and purposes such as: <ul style="list-style-type: none"> text and images, e.g. explore and use effectively image manipulation techniques; explore and use appropriately the many aspects of document layout; use animation, video and audio effects such as echo, tempo, envelope, layering, frame rate, key frames presentation, e.g. use design tools; adapt themes and colours to suit the purpose; create master templates. 	
LNF	Progression Step: Four
Writing <ul style="list-style-type: none"> Present work appropriately in digital contexts using appropriate digital conventions, e.g. thumbnails, language preferences. Adapt writing style, choosing and using the best structures for different contexts and purposes, e.g. to successfully describe, explain, persuade, discuss. Select and use appropriate strategies to plan and develop my writing for different purposes and audiences. 	
Cynefin	
Articles for research regarding microplastics include the Welsh Swimmer Laura Sanderson, Microplastic levels in Welsh rivers, and the largest microplastic citizen science at Bangor University. Examples of communities and enterprise that are working to minimise microplastics in the environment.	


Activity One	Resources and Equipment
<p>What are microplastics?</p> <p>Students work in pairs/small groups to discuss the images and complete the inference grids feedback to class. [what can I see? what can I infer(guess) what connections have I made between the pictures? What questions could I ask to further my knowledge or understanding?]</p> <p>To support students to develop questions provide a question matrix to help develop deeper inquiry question stems.</p>	<p>Pictures in Presentation</p> <p>Inference grid 1 per group</p> <p>Question Matrix (Included in the Presentation)</p>



Activity Two	Resources and Equipment
<p>Researching Microplastics</p> <p>Split students into groups each group reads a different article about microplastics</p> <p>(Note: the articles cover a range of microplastic sources including microplastics from the breakdown of plastic and in cosmetics, the microfibres from synthetic clothes and microplastics from car tyres causing air pollution – this can be linked to marine as the particles are washed in the water system after rain as in the source to sea lesson)</p> <p>Students highlight and categorise key information in different colours and annotate the articles (Thematic analysis)</p> <p>e.g. facts in blue, opinions in yellow, positives in green, negatives in red or using PESTLE analysis (PESTLE analysis - Critical thinking and problem solving - WBQ National: Foundation KS4 Revision - BBC Bitesize)</p> <p>And RURU credibility criteria (Credibility criteria - Critical thinking and problem solving - WBQ National: Foundation KS4 Revision - BBC Bitesize)</p> <p>Share key information as a class through snowball discussions, posters, Q&A, presentations. During the feedback students should complete the Microplastics summary worksheet. Students then co-construct on a definition for the term microplastics. This could be done as a think, pair, share then common elements included in the overall class definition.</p> <p>What are the impacts of microplastics? Watch the video clips https://vimeo.com/481186590 (1:33) The Story of Microfibers - YouTube (2:47) Whilst watching the clips students add further information to the Microplastics summary worksheet Find out what your clothes are made of by looking at the labels are they natural or synthetic fibres?</p>	<p>Articles per group</p> <p>Microplastics Summary Worksheet</p> <p>Video clips (included in the Presentation)</p> <p>Microplastics Summary Worksheet (used in previous activity)</p>



Activity Three	Resources and Equipment
<p>Investigating microfibres in water – Practical Activity</p> <p>Each group will investigate 1 source of fibre and results can be shared amongst the class. Methodology can be found in the Presentation.</p> <p>Encourage students to consider scale of problem, how many fibres did they produce during this activity? How many fibres might a jumper produce? How many jumpers are in each load of washing?</p>	<p>Method (Included in the Presentation)</p> <p>Range of fibres or materials (rope, string, fleece, cotton etc)</p> <p>Water</p> <p>Bowl</p> <p>Coffee filter paper</p> <p>Funnel</p> <p>Soap</p> <p>Equipment to magnify such as microscope, hand lens, mobile phone with greater than x10 zoom function or lens attachment.</p> <p>Scissors</p>

 #BeTheWave
<p>Apply the knowledge gathered in the lesson into action as ethical and informed citizens. It is an important aspect to ensure students know they have the power to enact and make changes within their own lives and within the school. It is also a positive step which helps to balance some of the negative impacts explored within the lesson.</p>
<p>Decide on an action/actions to take forward either as individuals or as a class, these are some suggestions, or the class could generate their own.</p>
<p>School:</p> <ul style="list-style-type: none"> • Set up a swap shop/t shirts/school uniform/Christmas jumper. • Work with the Eco-Committee to ensure school uniform is produced with natural Fairtrade materials which will shed less.
<p>Individual:</p> <ul style="list-style-type: none"> • Commit to buying next 3 items of clothing as vintage/preloved • Reduce the frequency of washing synthetic clothing or use a washing bag. • Sign the marine conservation society petition - Stop Ocean Threads https://www.mcsuk.org/what-you-can-do/campaigns/stop-ocean-threads/



Alternative Activities	Resources and Equipment
<p>Research the Nurdle Hunt Citizen Science Project. Watch the video clip Get students to generate questions about the project and research answers. Discuss how you could contribute as individuals/school.</p> <p>Write a letter to your MP informing them of the issues around microplastics and calling for action such as filters on new washing machines, cleaning up waterways.</p> <p>Language lessons on clothing could include phrases such as 'is this made of cotton?' 'Is this a synthetic material?'</p>	<p>The Great Nurdle Hunt, Reducing plastic pellet pollution at sea.</p> <p>https://youtu.be/VTSedYewQE0</p>

What questions could I ask to further my knowledge or understanding?

What can I infer (guess) from these photographs?

What connection have I made between the photographs?

What can I see?

Microplastics Summary		Name:	Date:
What is a microplastic?	Where do microfibrils come from?	How do microfibrils end up in the rivers and oceans?	What information did you find most surprising/interesting/concerning? Give reasons for your choice
What is a primary microplastic?	List 3 impacts microplastics have on the environment? 1. 2. 3.	Suggest 3 possible solutions to tackle microplastics? 1. 2. 3.	
What is a secondary microplastic?			
Why are tyres a problem?			How did this lesson make you feel? Why do you think that might be?
What research is being carried out?	What is a nurdle?	#BeTheWave	
List of references/websites/sources used:			



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