

MICROFIBRES

What are the impacts of microplastics?



**BE
THE
WAVE**

**MARINE
CONSERVATION
SOCIETY**



cadwch keep
gymru'n wales
daclus tidy



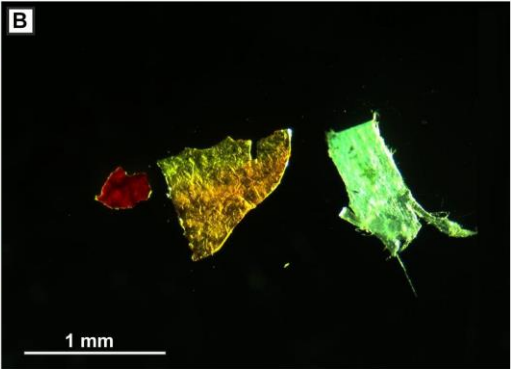
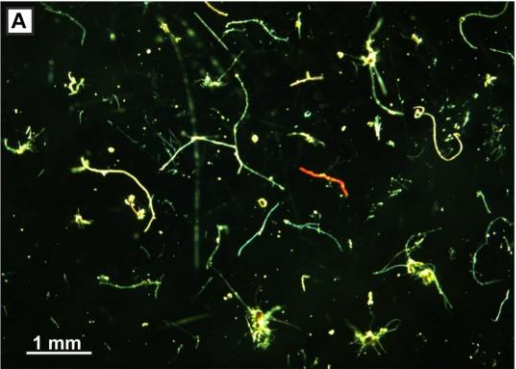
Lesson Objectives

- To define microplastics
- To explain a source and impact of microfibres
- To develop research and investigation skills into microfibers
- To apply knowledge of microplastics to everyday life through action #BeTheWave and Eco Schools programme



What Are microplastics?

Discuss the images in your group. Complete the inference grid.



Question Matrix

Use the question matrix to develop question stems e.g. When does.....? How can.....?

	Lower					Higher	
Lower	Is/Does (Present)	Has/Does (Past)	Can (Possibility)	Should (Opinion)	Would/Could (Probability)	Will (Prediction)	Might (Imagination)
What (event)							
Where (Place)							
When (Time)							
Which (Choice)							
Who (Person)							
Why (Reason)							
Higher	How (Meaning)						Higher

What are Microplastics?

You are going to research microplastics. Read the articles and analyse the information in them.

Step 1

Read the article

Step 2

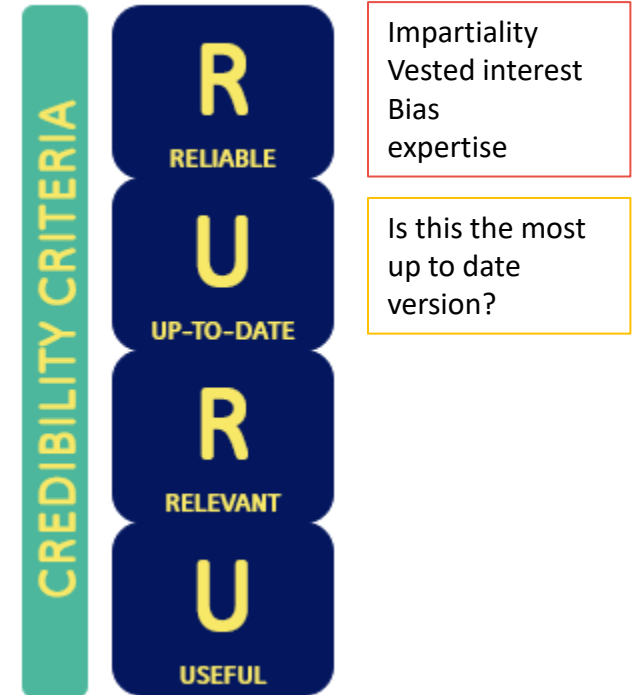
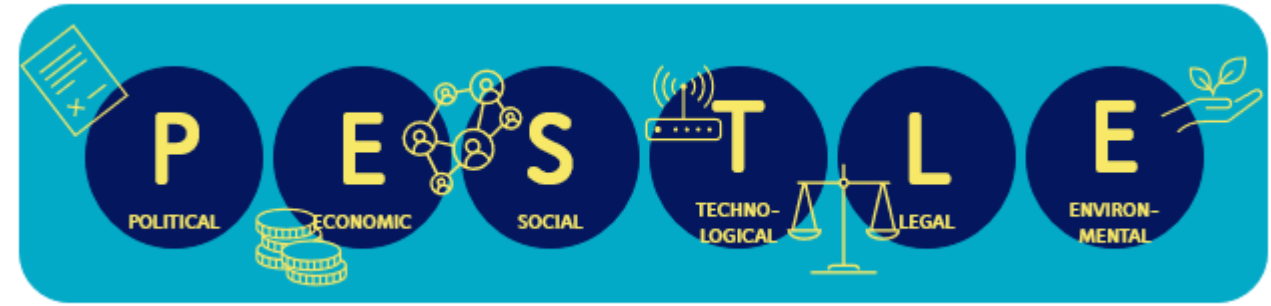
Highlight/underline information using the PESTLE key to identify information which is political, environment, economic etc. Your article may not have all aspects.

Step 3

Annotate the information with thoughts, question and concerns.

Step 4

Carry out RURU credibility criteria analysis



Example PESTLE and RURU

News Opinion Sport Culture Lifestyle



Plastics

This article is more than **9 months old** *Up to date!*

Microplastic particles now discoverable in human organs

Damian Carrington Environment editor
 @dpcarrington
 Mon 17 Aug 2020 17:07 BST

Microplastic and nanoplastic particles are now discoverable in human organs thanks to a new technique. *if new can it be reliable/reproducible?*

Microplastics have polluted the entire planet, from Arctic snow and Alpine soils to the deepest oceans. People are also known to consume them via food and water, and to breathe them in, but the potential impact on human health is not yet known. *how many studies on this why? why not?*

The researchers expect to find the particles in human organs and have identified chemical traces of plastic in tissue. But isolating and characterising such minuscule *why not?*

fragments is difficult, and contamination from plastics in the air is also a challenge.

Q&A
 What are microplastics?
 Show

To test their technique, they added particles to 47 samples of lung, liver, spleen and kidney tissue obtained from a tissue bank established to study neurodegenerative diseases. Their results showed that the microplastics could be detected in every sample. *Testing method not found in. → can others replicate?*

The scientists, whose work is being presented at a meeting of the American Chemical Society on Monday, said their technique would enable other researchers to determine contamination levels in human organs around the world. *free method: patented*

R Expert "It would be naive to believe there is plastic everywhere but just not in us," said Rolf Halden at Arizona State University. "We are now providing a research platform that will allow us and others to look for what is invisible - these particles too small for the naked eye to see. The risk [to health] really resides in the small particles." *→ range??*

The analytical method developed allows the researchers to identify dozens of types of plastic, including the polyethylene terephthalate (PET) used in plastic drinks bottles and the polyethylene used in plastic bags. *should there be an outright ban?*

R They found bisphenol A (BPA), a chemical used to make plastics, in all 47 samples. The US Environmental Protection Agency is concerned about BPA because "it is a reproductive, developmental and systemic toxicant in animal studies". The researchers examined lung, liver, spleen and kidney tissue as these organs are likely to be exposed to microplastics or collect them. *How many? bioaccumulation science link*

K "We never want to be alarmist but it is concerning that these non-biodegradable materials that are present everywhere [may] enter and accumulate in human tissues and we don't know the possible health effects," said Varun Kelkar of Arizona State University, part of the research team. *concerning*

K "Once we get a better idea of what's in the tissues, we can conduct epidemiological studies to assess human health outcomes," he said. "That way, we can start to understand the potential health risks, if any" - *timescale?*

Charles Roisky, another member of the team, said: "In a few short decades, we've gone from seeing plastic as a wonderful benefit to considering it a threat."

U limited use as still not fully tested. interesting to see how it progresses making it more relevant

KEY: — Political — Social — Legal
— Economic — Technological — Environ

RURU

definition micro nano
 Microplastics are those less than 5mm in diameter and nanoplastics have a diameter of less than 0.001mm. Both form largely from the abrasion of larger pieces of plastic dumped into the environment. Research in wildlife and laboratory animals has linked exposure to tiny plastics to infertility, inflammation and cancer. *we are animals is it in the food we eat?*

The researchers are now testing tissues to find microplastics that accumulated during donors' lifetimes. Donors to tissue banks often provide information on their lifestyles, diets and occupations, so this may help future work to determine the main ways in which people are exposed to microplastics. *we are animals is it in the food we eat?*

The new methodology developed by the team to extract plastics from the tissues and analyse them will be shared online so other researchers can report their results in a standardised way. This shared resource will help build a plastic exposure database so that we can compare exposures in organs and groups of people over time and geographic space, said Halden. *free? consent data protection?*

Previous studies have shown people eat and breathe in at least 50,000 particles of microplastic a year and that microplastic pollution is raining down on city dwellers, with London, UK, having the highest level of four cities analysed last year. The particles can harbour toxic chemicals and harmful microbes and are known to harm some marine creatures. *How? → research.*

Other work has shown different kinds of nanoparticles from air pollution are present in human hearts and brains, and have been linked to brain cancer.

This article was updated on 17 August 2020, after more information was provided to the Guardian by the researchers, to reflect the fact that the plastic particles had been inserted into the samples of human tissue. *Up to date*

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THE STORY OF
MICROFIBERS



Investigation

Equipment

Range of materials/fibers (fleece, cotton, rope, string etc)

Per Group

- Water
- Measuring cylinder/jug
- Beaker/Bowl x2
- Coffee filter paper
- Funnel
- Soap
- Ruler
- Scissors
- Equipment to magnify such as microscope, hand lens, mobile phone with greater than x10 zoom function

Method

1. Cut 5cm² piece of fabric/5cm length of fiber
2. Add 100ml of water to a bowl
3. Add 3 drops of soap
4. Vigorously wash the material in the soap solution rubbing the fibre against itself
5. Add the filter paper to the funnel and place over the second bowl
6. Strain the water through the funnel
7. Observe the filter paper through a lens





#BeTheWave

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School

- 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.

Individual

- Commit to buying next 3 items of clothing as vintage/preloved
- Raise awareness of plastics in our lives by creating a day of plastics photo diary. Share these on social media, school website
- Sign the marine conservation society petition - Stop Ocean Threads <https://www.mcsuk.org/what-you-can-do/campaigns/stop-ocean-threads/>

