**GROUP WORK**

Six groups: one group / document

Prepare a short oral presentation of the document (3 to 5 minutes):

Source? Context? Point of view ? Arguments and justifications? Facts, causes and consequences?

Each group will present the document in front of the class. The other groups must take notes and prepare questions.

**Document 1 – Difficulty: 🟊🟊🟊**

**Plastics industry pushed ‘advanced recycling’ despite knowing problems**

Dharna Noor, *The Guardian*, 8 May 2025

Plastic producers have pushed**“**advanced recycling” as a salve to the plastic waste crisis despite knowing for years that it is not a technically or economically feasible solution, a new report argues.

Advanced recycling, also known as chemical recycling, refers to a variety of processes used to break plastics into their constituent molecules. The industry has increasingly promoted these technologies, as public concern about the environmental and health effects of plastic pollution [has grown](https://www.theguardian.com/environment/2019/aug/17/plastic-recycling-myth-what-really-happens-your-rubbish). Yet the rollout of these technologies has been plagued by problems, according to a [new analysis from the Center for Climate Integrity (CCI)](https://climateintegrity.org/projects/advanced-recycling-fraud), a fossil-fuel accountability advocacy group.

“The companies make it sound like it’s pretty great, like it’s something we should pursue,” said Davis Allen, investigative researcher at the CCI and author of the report. “But they know the problems, the limitations.”

The new analysis follows a [2024 CCI report](https://www.theguardian.com/us-news/2024/feb/15/recycling-plastics-producers-report) which alleged that plastic producers concealed the problems with traditional recycling, and argued that they could face legal ramifications for doing so. That earlier research was cited in a September lawsuit filed by California’s attorney general, Rob Bonta, against ExxonMobil for its role in the plastic pollution crisis.

“The new report focuses on this modern deception with advanced recycling, which has become a real focus for the industry in recent years,” said Davis.

Companies have depicted advanced recycling as groundbreaking and new. A [2020 video](https://vimeo.com/465979058) from Chevron Phillips, a joint venture between Chevron and Phillips 66, calls it a “revolutionary innovation that can turn a piece of plastic into a new material again and again and again”. Three years later, ExxonMobil’s CEO, Darren Woods, called the technology “brand new” in an [interview](https://www.youtube.com/watch?v=gTZK94-5yjU&t=2614s), the report notes.

The air of newness has been echoed by [publications](https://www.newscientist.com/article/mg26234881-900-the-incredible-new-tech-that-can-recycle-all-plastics-forever/) and [politicians](https://www.recyclingtoday.com/news/pennsylvania-governor-passes-advanced-recycling-legislation/). However, though there have been some new technological innovations, chemical recycling processes were patented as early as the [1950s](https://pubs.acs.org/doi/10.1021/acsapm.1c00648), and have been [touted as a solution to plastic waste](https://catalog.hathitrust.org/Record/009059341) by trade groups since the 1970s. Back in 1977, for instance, a brochure from the Society of the Plastics Industry trade group claimed that the most common form of advanced recycling, pyrolysis, would allow plastic waste to be “recycled into feedstocks that can be used again to make new plastics”, the report notes.

Asked to comment on the research, an [ExxonMobil](https://www.theguardian.com/business/exxonmobil) spokesperson, Michelle Gray, said: “Advanced recycling is a proven technology – one which the EU recognizes as a solution to plastic waste. We’ve processed more than 80m pounds of plastic at our Baytown facility since startup that might otherwise have gone to landfills.”

Matthew Kastner, a spokesperson for top US chemical trade group American Chemistry Council, which represents plastic producers, said: “Activist groups who claim advanced recycling ‘isn’t real’ appear to be ignoring science, innovation and measurable results.

“Reports built on selective data and anti-plastic agendas do nothing to advance real environmental progress,” he said, adding: “Groups like the Center for Climate Integrity … who claim expertise on advanced recycling despite likely never having visited a facility, were founded to dismantle the petrochemical industry in the United States, killing thousands of jobs and billions of dollars in tax revenue.”

Chevron Phillips declined to comment.

The Society of the [Plastics](https://www.theguardian.com/environment/plastic) Industry did not respond to a request for comment.

Though they have existed for decades, these technologies have still not been realized at scale because they face strong limitations. Though they do not seem to mention them in ads or public relations campaigns, the industry has long been familiar with those problems, the report says.

One major issue: the processes are expensive, requiring large amounts of energy, fuel and labor. In 1991, a market research firm said the “economics of these processes has not been demonstrated”, and at a 1994 trade meeting, Exxon Chemical vice-president Irwin Levowitz called pyrolysis “fundamentally uneconomical”, the analysis says.

In an emailed comment, Exxon’s Gray said: “The technology makes sense, which is why we’ve invested more than $200m to expand advanced recycling operations and aim to continue doing so both in the US and in Europe.”

The industry has failed to highlight not only the economic challenges of advanced recycling, but also its technical limitations, Allen argues. The industry group America’s Plastic Makers – part of the American Chemistry Council trade group – for instance, has [often](https://www.youtube.com/playlist?list=PLuTggavUZ44_0iHH28LN4T45k-Tt-9knQ) [claimed](https://plasticmakers.org/plastic-recycling-facts/what-is-advanced-recycling/) the processes can transform plastic waste into “[brand new plastic](https://plasticmakers.org/our-solutions/advanced-recycling-technologies/)”. And in 2023, the energy giant Shell [claimed in a video](https://www.youtube.com/watch?v=GxXFlQjlMO4&t=3s) that chemical recycling can process plastics “used in many places like homes, hospitals, transportation, construction, agriculture and electronics”.

However, many chemical recycling facilities do not turn plastic into new plastic; rather, they produce only fuel.

“That undermines the claim that they’re creating a circular economy – it’s not circular if you’re not using the materials to make new plastic,” said Allen.

Further, post-consumer items cannot easily be processed with advanced recycling, the report says. The process [works best](https://www.propublica.org/article/delusion-advanced-chemical-plastic-recycling-pyrolysis) with clean, homogeneous inputs, and since sorting and cleaning consumer products is expensive, many facilities working at scale process mostly clean, un-dyed industrial waste. It’s an issue raised in California’s 2024 lawsuit against Exxon.

In an email, the American Chemistry Council’s Kastner said: “I’ve seen firsthand post-consumer mixed plastics from MRFs be fed into the processing systems of an advanced recycling facility.”

In response to a request for comment about the research, Shell spokesperson Natalie Gunnell said: “Shell supports advancing circularity of plastics globally. We encourage reduction, reuse and recycling of plastics and are working across the plastics value chain to expand the development of waste handling and recycling technologies for greater circularity.”

Another problem the industry does not frequently address publicly: the pollution caused by advanced recycling. Though “the plastics industry positions advanced recycling as an environmentally friendly solution for plastic waste”, the report says, the processes emit toxic and planet-warming pollutants.

The industry acknowledges this fact internally, the report says, noting a 2024 report from consulting firm Roland Berger which addresses advanced recycling’s “substantial” carbon footprint, and a 2023 industry presentation from engineering firm AMI Consulting which said the environmental effects of the technologies “need to be taken seriously”.

The Guardian has asked Roland Berger for comment.

The limitations of advanced recycling [generally](https://corporate.exxonmobil.com/what-we-do/materials-for-modern-living/A-different-way-to-handle-used-plastics?gad_source=1&gbraid=0AAAAADDxKVjSU5RoYvMGDRUIZdBjRaMhA&gclid=Cj0KCQjww-HABhCGARIsALLO6XwpXGf8vKSrc-A_NLoxvZHUdIchapnI9SH7AXaO347Wze4Ox8c_yvEaAqgVEALw_wcB&gclsrc=aw.ds) go [unmentioned](https://sustainability-report.cpchem.com/2023/product-sustainability-and-circularity/advanced-recycling-and-feedstocks-of-the-future.html) in public by companies, but have long been raised by environmentalists. Privately, industry interests have given credence to those concerns.

“The concerns of industry critics are, in many cases, justified,” one industry consultant explained at a 2023 conference sponsored by the American Chemistry Council trade group, the report notes.

It is possible that the new research could inspire additional litigation, but its main purpose is to inform the public, said Allen.

“The information ecosystem around advanced recycling is totally dominated by the industry itself,” Allen said. “Our hope is that our work gives people the tools they need to break down and assess the industry’s claims.”

**Document 2 - Difficulty: 🟊🟊🟊**

**Car tyres shed a quarter of all microplastics in the environment – urgent action is needed**

Henry Obanya, *The Conversation*, 27 novembre 2024

Every year, billions of vehicles worldwide shed an estimated [6 million tonnes](https://www.plasticstoday.com/medical/tire-wear-a-major-source-of-microplastics-say-researchers) of tyre fragments. These tiny flakes of plastic, generated by the wear and tear of normal driving, eventually accumulate in the soil, in rivers and lakes, and even in our food. Researchers in [South China](https://pubs.acs.org/doi/10.1021/acs.estlett.2c00821) recently found tyre-derived chemicals in most human urine samples.

These tyre particles are a significant but often-overlooked contributor to microplastic pollution. They account for [28% of microplastics](https://tireindustryproject.org/faq/are-tires-the-main-source-of-ocean-microplastics/) entering the environment globally.

Despite the scale of the issue, tyre particles have flown under the radar. Often lumped in with other microplastics, they are rarely treated as a distinct pollution category, yet their unique characteristics demand a different approach.

We urgently need to classify tyre particles as a unique pollution category. In our recent [international study](https://www.sciencedirect.com/science/article/pii/S0013935124021297), colleagues and I found that this approach would drive more focused research that could inform policies specifically designed to mitigate tyre pollution. And it could help ordinary people better understand the scale of the problem and what they can do about it.

Right now, delegates are meeting in South Korea to negotiate the [first global plastics pollution treaty](https://theconversation.com/time-is-running-out-for-a-treaty-to-end-plastic-pollution-heres-why-it-matters-242165). While this landmark agreement is poised to address many aspects of plastic pollution, tyre particles are [barely on the agenda](https://www.unep.org/inc-plastic-pollution/session-5). Given their significant contribution to microplastics, recognising tyre pollution as a unique issue could help unlock targeted solutions and public awareness. This is what we need to address this growing environmental threat.

**Hundreds of chemical additives**

Tyre particles tend to be made from a [complex mix](https://www.epa.gov/chemical-research/public-webinar-part-1-tire-crumb-rubber-characterization) of synthetic and natural rubbers, along with hundreds of chemical additives. This means the consequences of tyre pollution can be unexpected and far reaching.

For instance, zinc oxide accounts for around [0.7% of a tyre’s weight](https://www.ustires.org/system/files/files/2024-02/USTMA%20DTSC%20Zinc%20Workshop%207.28.21_0.pdf). Though it is essential for making tyres more durable, zinc oxide is [highly toxic for fish and other aquatic life](https://dtsc.ca.gov/wp-content/uploads/sites/31/2021/03/Rationale-Document-Zinc-in-Tires.pdf) and disrupts ecosystems even in trace amounts.

Another harmful additive is a chemical known as 6PPD, which protects tyres from cracking. When exposed to air and water, it transforms into 6PPD-quinone, a compound linked to [mass fish die-offs](https://www.acs.org/pressroom/presspacs/2022/acs-presspac-march-2-2022/substance-derived-from-tire-debris-is-toxic-to-two-trout-species.html) in the US.

**Heavy vehicles, more pollution**

We know that heavier vehicles, including electric cars (which have very heavy batteries), wear down their tyres faster and generate more microplastic particles. Car industry experts [Nick Molden and Felix Leach](https://www.sae.org/publications/books/content/r-575/) say that, as weight is so crucial to a vehicle’s environmental impact, manufacturers should be targeted with weight-based taxes under a “polluter pays” principle. This could encourage lighter vehicle designs while motivating consumers to make greener choices.

There are many [questions we still need to investigate](https://www.sciencedirect.com/science/article/pii/S0013935124021297). For instance, we still don’t know how far these tyre particles disperse, or exactly where they are accumulating. To assess their full ecological impact, we need more detailed information on which tyre additives are most toxic, how they behave in the environment, and which species are most at risk ([some salmon species](https://6ppd.itrcweb.org/wp-content/uploads/2023/09/6PPD-Focus-Sheet-Web-Layout-9.pdf) are more sensitive to 6PPD-quinone than others, for example).

In the longer-term, standardised methods will be crucial to measure tyre particles and create effective regulations.

**We need global action**

Regulatory frameworks, such as the EU’s upcoming [Euro 7 emissions standard](https://www.consilium.europa.eu/en/press/press-releases/2024/04/12/euro-7-council-adopts-new-rules-on-emission-limits-for-cars-vans-and-trucks/) (which targets vehicle emissions), provide a starting point for controlling tyre emissions. But additional measures are needed.

Innovations in tyre design, such as eco-friendly alternatives to zinc oxide and other materials like 6PPD, could significantly reduce environmental harm. Establishing a [global panel of scientific and policy experts](https://pubs.acs.org/doi/10.1021/acs.estlett.4c00294), similar to ones that already exist for climate science (known as the IPCC) or biodiversity (IPBES), could further coordinate research and regulatory efforts.

Crucially, we must classify tyre particles as a distinct pollution category. Compared to conventional microplastics, tyre particles behave differently in the environment, break down into unique chemical compounds, and present distinct toxicological challenges.

With more than [2 billion tyres](https://www.reuters.com/business/autos-transportation/tyre-makers-under-pressure-too-much-rubber-hits-road-2023-05-17/) produced each year to fit ever-heavier and more numerous cars, the problem is set to escalate. The environmental toll will only increase unless we recognise and target the specific problem.

Measures like weight-based taxation and eco-friendly tyre innovations would not only reduce tyre pollution but also pave the way for more sustainable transportation systems. The question isn’t whether we can afford to act. It’s whether we can afford not to.

(illustration that you can use for your presentation)

**Document 3 - Difficulty: 🟊🟊**

**Ocean plastic: How tech is being used to clean up waste problem**

Danielle Fleming & Liv McMahon, *BBC*, 27 February 2023

**Trying to solve the world's ocean plastic pollution problem has been a "long and painful journey" for Dutch entrepreneur Boyan Slat.**

The 28-year-old founder of non-profit environmental organisation The Ocean Cleanup has been working on ways to filter plastic waste out of the Pacific Ocean for nearly 10 years.

He told BBC News it has been harder than he ever imagined it would be.

"The planet is pretty big, it turns out," Boyan said.

"There's about 1,000 rivers we need to tackle and five ocean garbage patches, [so] the first few years were really about trying to understand the problem."

The world's biggest area of accumulated ocean plastic, commonly dubbed "[the Great Pacific Garbage Patch](https://www.bbc.co.uk/news/science-environment-59521211)", is located in the North Pacific Ocean.

Containing a huge build-up of plastic debris ranging from large fishing nets to flake-sized microplastics, it has been one of the main targets for The Ocean Cleanup team.

**Casting the net**

The Ocean Cleanup uses a long, u-shaped barrier, similar to a net, that is pulled through patches of rubbish by boats. It moves slowly to try to avoid harming marine life.

Cameras powered by artificial intelligence (AI) are used to continuously scan the ocean's surface for plastic and calibrate the team's computer models, helping them understand which parts of the Pacific area to target.

"When you look at the Great Pacific Garbage Patch, there's some areas that have a very high density of plastic and other areas that are virtually empty," he said.

"If we are continuously cleaning up inside those hotspots, we can of course be a lot more effective in our clean-up operation."

Plastic collected by the 800-metre-long (2,600ft) system, the second of its kind developed by the company, is periodically taken to land and emptied for recycling.

Boyan said the system has so far cleaned up almost 200,000 kilograms (440,000 lbs) of ocean plastic.

While this represents just 0.2% of the 100 million kilograms of plastic contained in the world's largest patch of plastic rubbish, he said it was still worth it: "Everything big starts small, right?"

The team believes it will have collected 1% of the patch by the end of this year using its current system - but they are scaling up their operations to try to clean up patches faster.

They are developing System 3, a 2.4km (1.49 miles) long giant barrier, for use in the summer.

And The Ocean Cleanup hopes that rolling out 10 of these larger systems in the near-future could clean up to 80% of the North Pacific's plastic debris by the end of the decade.

**Stemming the flow**

Research [carried out by the company in 2021](https://www.bbc.co.uk/news/av/science-environment-56937300) suggests about 1,000 of the world's rivers are the source of 80% of the river-borne plastic contributing to global ocean plastic pollution.

"The rivers are really the arteries that carry trash from land to sea," Boyan said. "So when it rains, plastic washes from streets into creeks, into rivers, and then ultimately to the ocean."

He says the fast-flowing nature of rivers can make stopping plastic even more difficult.

"In rivers you really only have one shot at catching the plastic - it just flows by and if you don't catch it, it's guaranteed to enter the ocean," he said.

The tech behind these varies according to factors such as width, depth, flow speed and debris type of the river in question - again assessed using AI-powered cameras.

Most of the deployments use a conveyor belt to extract the garbage from the water.

"We are intercepting plastic in 11 rivers around the world," Boyan said, "but ultimately aim to scale this to all 1,000 heaviest polluting rivers in the world."

**'Stopping the tap'**

Prof Richard Lampitt of the National Oceanography Centre [told BBC News in 2018](https://www.bbc.co.uk/news/science-environment-45438736) he believed using boats to pull nets and shuttle plastic from ocean garbage patches to ports could have a high carbon cost.

Several years later, he says he remains sceptical about this - but feels far more positive about targeting rubbish in rivers.

"The environmental costs are much, much lower," he said. "You haven't got to go 1,500km in order to get the stuff."

But noting the risks of microplastics to the heart of the marine ecosystem, Prof Lampitt said he thought that rather than cleaning up plastic in our seas, "it is really is an issue of stopping the tap and stopping this material getting into the ocean".

"I cannot think of any way that you can remove these from the natural environment from the ocean without causing massive damage to the food webs, and of course taking an awful lot of energy in order to do it," he said.

While trying to take on the world's marine pollution problem is undoubtedly tough, and contingent on reduced plastic production and consumption in the first place, Boyan has high hopes for the future.

"I truly believe that with these technologies to clean up the legacy pollution in the ocean and to intercept plastic in rivers before it reaches the oceans, we will actually able to put ourselves out of business in the not-so-distant future," he added.



**Document 4** – **Difficulty** 🟊🟊

Visit the website:

<https://www.plasticisfantastic.info/en/home-1>

**Document 5** – **Difficulty** 🟊🟊

Video : Kenya

https://www.youtube.com/watch?v=xblnXJH8QBY

**Document 6** – **Difficulty** 🟊

Video : Henderson island

https://www.youtube.com/watch?v=ua4ZqbUGZC0