



Royal Academy  
of Engineering



STEMunity

Mixed reality

This is  
Engineering  
: Water

Explore the engineering in water  
technologies through  
augmented and virtual reality





# What Two Degrees Temperature Rise Means to Our Earth



Since the last century, the Earth has already experienced an exponential rise in temperature by  $1^{\circ}\text{C}$ . If the increase continues to reach  $2^{\circ}\text{C}$  in the future, the consequences will be catastrophic and irreversible.



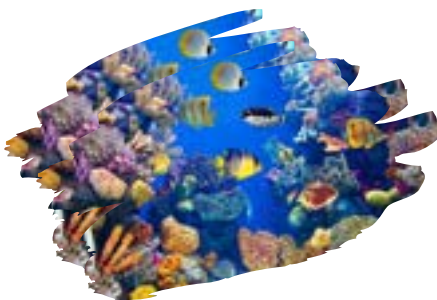
Once every five years, 37% of the world population is exposed to extreme heatwaves.



More than 400 million people worldwide are live with water scarcity.



The earth loses 18% of insects, 16% of plants, 8% of vertebrates.



The coral reefs around the world decline up to 99%.



Sea levels rise by up to 46 cm and impact 30 to 80 million people.



# RISING SEA LEVELS

Scan the different pictures to find answers to the clues! Some of the interactives have links to further information to help you.



## ACROSS

2. Sea level rising could cause dangerous \_\_\_\_\_.
6. A stream from Mexico which heats up England
7. This will account for 60% of sea level rise
9. A country that could be affected by global warming
10. An example of a greenhouse gas

## DOWN

1. A place where glaciers and ice sheets are melting
3. Methane is an example of this
4. Where the majority of the warmth goes
5. An example of an animal being affected by greenhouse effects
8. A way we could help reduce global warming





# Water purification



# Water Quality

Scan the poster and answer the following questions

**1** What chemical is used to disinfect water?

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**2** What charge do the impurities become during coagulation?

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**3** What is the risk with water in a water tank?

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**4** Name one of the four types of filtration?

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**5** What substance is added to water during flocculation?

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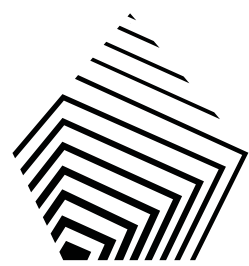
**6** What is the name of the natural purification step that happens in reservoirs?

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**7** Scan the image and turn your room into a water purification site.







# Flood Defences



## Flash flood effects

- Stormwater runoff transports pollutants & garbage into rivers & seas
- Destruction of roads, buildings, bridges, & communication services
- Residential & commercial areas have been flooded, causing valuables to be damaged
- Farms are destroyed & livestock are slaughtered

- Built parks, gardens, & rooftop gardens to absorb rainwater
- Planning & construction of embankments to aid in the diversion of water into open land areas during heavy rains
- Making flood plains & overflow areas along rivers and streams
- Creating proper urban drainage systems, as well as cleaning & unclogging drainage

## How can we prevent flash floods?



# DESIGN A FLOOD PROOF HOUSE

## MAKERSPACE PROJECT

### Your task

Use your knowledge of the causes and preventions of floods to design a flood resistant house that is near water.



### Planning

Think about the design and characteristics of your house:

- Size:
- Number of floors:
- Materials:
- Rooms:
- Special features:



### Draw and label your house





# The Microplastic problem



"We use plastic in almost every area of our lives – as packaging, in electronics, clothing and building materials. Plastic is inexpensive and easy to make. It's unmatched in its cost-effective durability and resistance to degradation.

But this attractive durability has created a global plastic crisis. Some plastics take more than 400 years to break down, and around 11 million metric tons of plastic ends up in our oceans every year. Half of all plastic becomes waste within a year of being made, yet most isn't recycled. Our planet is suffocating in plastic. We need radical action to halt this trend and limit the damaging consequences of plastic pollution on our health and the environment."

Revolution Plastics 2023, The University of Portsmouth



Laura studies the impact of pollution on ragworms and crabs globally.



Bidemi studies Sand shrimp and the impact of chemical pollution.



Stephanie studies plastics and their impact on the environment.





# Microplastics

The ship had to stop off at a top-secret location to visit our Marine Pollution team. Scan the QR code for a 360 tour of the labs and find the two clues.

- ① Clue number 1 has a bright-coloured top on it, what is the object?
- 

- ② Clue number 2 gives you the name of a common organism which lives on the shore in the UK.
- 

- ③ What is the name of the secret location? Visit the website with the QR code on the right, the password is a combination of the two clue words.



- ④ Describe the different places that Laura works in her role.
- 

- ⑤ What is the specific type of pollution from plastics that Bidemi studies the impact of.
- 

- ⑥ What happens to microplastics from the samples that Stephanie and her team find?
- 

- ⑦ Scan the crab to find out why we must reduce our plastic pollution in the marine ecosystem. What action can you take?





