



Sea Level Rise

Investigating links between sea levels rising and climate change

Practitioner Knowledge

Sea level rise is a direct consequence of climate change and is caused by two factors:

- Glaciers (land ice) and ice sheets are melting adding water to the ocean.
- The volume of the ocean is expanding as it warms this is thermal expansion there is bigger spaces between the water molecules as it warms so it physically takes up more space. A third of all sea level rise is caused by thermal expansion. Since 1971 the oceans have absorbed over 90% of the excess heat caused by climate change.

For example, ice loss from the Greenland Ice sheet has increased 7-fold between 1991 and 2016, from 34 billion tons per year, to 247 billion tons per year. In the UK sea level rise is faster than the global average UK sea level is rising faster than the global average | National Oceanography Centre

Another example of how ice is melting faster than expected, can be seen in this news story. Two Irish surfers who found a time capsule washed up in Ireland. The time capsule had been planted in the ice floes of the arctic circle by a crew of Russian North Pole explorers in 2018. They had expected the capsule to remain locked in the ice for 30 – 50 years, but the instead it melted out and floated to Ireland within 2 years, illustrating how rapidly the ice is melting <https://www.bbc.co.uk/news/world-europe-54808196>

Kiribati, an island in the mid-Pacific is an example of an area that is already experiencing severe consequences of sea level rise. <https://www.bbc.com/future/article/20190813-how-to-save-a-sinking-island-nation>

Worldwide, 267 million people live on land less than two meters above sea level, which is most at risk from sea level rise, according to a study in Nature Communications.

Solutions to sea level rise:

- Reducing greenhouse gas emissions which is the primary driver of climate change. This could be at an individual or community level. Ways to reduce your carbon footprint, could be through buying less stuff which is made in factories powered by fossil fuels. Reducing food waste and meat consumption as agriculture can contribute the greenhouse gases methane and nitrous oxide into the atmosphere. Actively traveling and using public transport where accessible. Reducing energy consumptions through turning off lights etc.
- On a larger scale there can be mangrove and sand dune management to absorb storm surges and protect communities or hard engineering such as sea defences.
- Building flood resistant buildings.
- Some communities may need to be relocated

Activity

Set the scene or prior learning:

- What is ice? Where do we find it in the world?
- Consider how climate change is increasing the temperature of the world. What happens to ice/things as it warms? Images slide 2
- If the ice in the world melts where does this water go?

Materials Needed:

Set up the activity this could be a demonstration or in groups. The materials need for each group:

- X2 plastic containers
- Substrate such as sand, soil or stones
- Water
- Measuring containers
- Permanent marker pen or ruler
- Ice cubes
- Figures/toys to set the scene (optional)
- Timer (optional)

Step 1

Place substrate into the containers, this will be 'the land'.



Step 2

Add ice to the land in one container – this is glaciers

Add ice the sea in the other – sea ice



Step 3

Use a pen to mark the level of water or measure it.



Step 4

Wait for the ice to melt

[You could time how long it takes in the 'sea' and on land']



Step 5

Mark the level of water again.

[You should see that the land ice has increased the level of the 'sea' the container with the sea ice should show no change as the volume of water whether as solid ice or liquid takes up the same space in the sea. This helps to demonstrate that it is glaciers melting not icebergs/sea ice which causes sea level rise]



Step 6

What has happened are they the same/different.

Use numeracy language appropriate to your learners this could range from it changes/ gone up to the volume has increased.

Discussion could also consider how do we know? What have we kept the same? (control of variables)

The only difference between the 2 set ups is the location of the ice (independent variable) so this is the only thing that could have caused the change.



Curriculum Links

Purpose(s)	AOLE(s)	Statement of What Matters
Ethical, informed citizens Ambitious, capable learners Healthy, confident individuals	Humanities	Enquiry, exploration and investigation inspire curiosity about the world, its past, present and future. Our natural world is diverse and dynamic, influenced by processes and human actions. Informed, self-aware citizens engage with the challenges and opportunities that face humanity and are able to take considered and ethical action.
	Health & Wellbeing	Our decision-making impacts on the quality of our lives and the lives of others.

	Mathematics & Numeracy	The number system is used to compare quantities.
	Science & Technology	Being curious and searching for answers is essential to understanding and predicting phenomena.

Next Steps and Other Ideas:

- Why does sea level rise matter?
- Where do people around the world live?
- What do houses look like around the world in the UK, where is it wet, where it is dry?

Further Reading

- [Sea level rise is a global threat – here's why | World Economic Forum](#)
- [Special Report on the Ocean and Cryosphere in a Changing Climate —](#)
- [IPCC Special Report "The Ocean and Cryosphere in a Changing Climate" - Summary for teachers | Office for Climate Education](#)

UN Sustainable Global Goals Links:

