

Recommended style of activity

Public engagement: Family drop-in demonstration &/or craft activity

Schools: Class activity

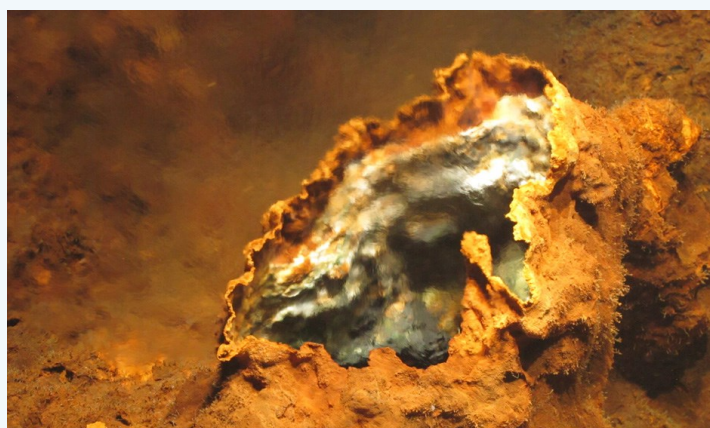
Suggested age range: 6-15 years

Approximate time : 15 minutes to assemble model vents, 5 minutes to demonstrate or use vents.

Background Science

Hydrothermal vents are a bit like underwater hot springs. They often form at areas where tectonic plates meet such as along the mid-Atlantic ridge where the plates are moving slowly apart. Seawater seeps down through deep cracks in the seafloor and is heated by molten rock. Depending on the conditions, the vent water can resurface at over 300°C and will have picked up lots of interesting minerals and/or gases from the rocks. 'Black smokers' are a distinctive type of vent where the vent liquid contains particles of a mineral called iron sulphide, giving them the appearance of producing thick smoke. The minerals can form tall chimneys that are several metres high. Many interesting creatures are adapted to live in these extreme environments and some theories suggest that life could have started under these conditions!

In June 2018 scientists from the ATLAS project discovered new Hydrothermal Vents in the middle of the Atlantic Ocean, near the Azores. These vents were not particularly hot but a large increase in CO₂ was detected. In this activity you can mimic the CO₂-rich emissions of the Azores vents using fizzing tablets such as vitamin tablets or alka-seltzers which react with water to release CO₂ gas.



Curriculum for Excellence Links (Scotland):

I can identify and classify examples of living things, past and present, to help me appreciate their diversity. I can relate physical and behavioural characteristics to their survival or extinction. **SCN 2-01a**

Having explored the substances that make up Earth's surface, I can compare some of their characteristics and uses. **SCN 2-17a**

Kit List:

- Fist-sized lump of Plasticine or modelling clay (brown, white, yellow and orange would be more realistic but you can get creative!)
- Plastic straws (3 per vent)
- 1 plastic bottle top per vent
- Scissors
- Vitamin tablets or alka-seltzer tablets
- Container with water, deep enough to fully submerge the assembled vent

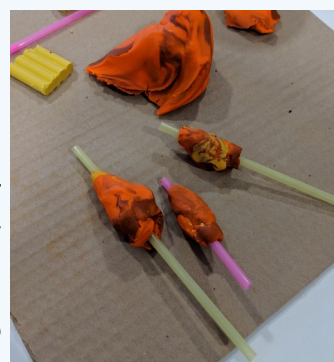


NB Unfortunately, paper straws do not work well in the vents as they will go soggy after repeated demonstrations. We recommend you either use biodegradable plastic straws or dispose of the plastic ones responsibly after use.

If running this as a Public Engagement Activity, you can also use the explanatory activity sheets—available online in the ATLAS Outreach Portfolio.

Constructing your vent:

- You may need to start by kneading the plasticine first to make it easier to work with.
- Start by wrapping flat bits of plasticine around your three straws, leaving different lengths sticking out. Try to ensure that the straws keep their shape.
- Gather the pieces together and use your fingers to smooth the joins.



Constructing your vent (continued):

- Add more plasticine and continue to mould to make the vent look more realistic!
- Use the scissors to trim the straws at the bottom so that they stick out just enough to fit inside the bottle cap. You can mould a rim around the cap to help it fit better.
- Trim the straws at the top and mould around them for a smooth finish.



Activating your vent!

- Fill a suitable container with water. The vent should be fully submerged when placed inside.
- Take the bottle-top from the bottom of the vent and fit a vitamin tablet or alka-seltzer inside it.
- Squash the bottle-top with the tablet back onto the bottom of the vent, ensuring a tight fit.
- Place the vent into the water. You should see CO₂ bubbles start to appear as water travels down the straws and causes the tablet to fizz. If you have used a coloured vitamin tablet, the bubbles will probably be coloured too.

Tip: after repeated use the bottom ends of the straws may become a bit squashed, slowing down the bubbles. Just use the end of a pen or pencil to re-open them and it should work again!

Extension: add a few drops of black food colouring to the tablet to make a 'black smoker' as mentioned in the introduction.

For more oceans-themed activities and experiments, please visit
<https://www.eu-atlas.org/education/education-packs>



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