



Melting ice movements

A do-at-home civil engineering activity for ages 4-18.

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Engineering with ice

Civil engineers keep us safe from flooding in a variety of ways, from sea defences to river dredging (digging up the river to make it deeper).

Alpine flood defences are needed to protect towns and villages from water created by spring melting snow and ice in mountainous areas, causing a risk to lives and property. To plan and build alpine flood defences, civil engineers have to know how quickly ice and snow melts in different temperatures.

This challenge involves experimenting with making ice spheres and measuring melt rates.



Image: La Toussuire ski resort in France. Photo by [Benh LIEU SONG](#) Wikimedia Commons.

What you'll need

- Two or more balloons (small 'water bomb' types are best)
- Table salt
- Several empty trays or bowls
- A measuring jug

Optional

- Liquid food colouring (gel or powder don't work as well)
- A torch

Activity instructions

Fill up some balloons with water, tie them securely and put them in the freezer for two days. When you take it out remove the balloon carefully using scissors and you should be left with orbs (not completely spherical of course!) made of ice.

Take one ice orb and cover it in a tablespoon of salt and leave it in an open container, do the same with another orb but don't add any salt.

Come back in one hour and pour the run-off water of the orb with salt on it into a measuring jug and write down how many millilitres of water has melted. Then do the same with the other ice orb and compare the difference. The salt will cause the ice to melt faster because it lowers its freezing point (ice that has one-tenth of salt in it will have its melting point dropped by -6 degrees).

Can you predict how many millilitres of water will have melted from the ice in three hours time?

For fun... Put a drop of liquid food colouring onto the top of an orb. As the ice melts you will be able to see the lines of food colouring forming little rivers on the ice orb. Turn the lights off and shine a torch on the orb and it will illuminate the melting rivers.



For 11-16 year olds

We all know that the temperature affects how fast ICE melts, try adding another ice orb to your experiment with one in a room with a higher temperature and find out what melts the ice faster: an increase in temperature or a tablespoon of salt?

For 16-18 year olds

Artificial snow cannons use water to make extra snow for ski resorts. The Cairngorm Mountain resort in Scotland makes over 100 tonnes of snow a day when conditions are good! Before they do this they need to calculate how quickly it will turn to water and how much of it there will be so it won't flood the local area.

After weighing your ice orb, record how much ice has melted over the period of an hour. Use this to calculate how much water would melt from 45,600 tonnes of snow in an hour.

Tell us what you thought!

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Careers and activity resources on our website: [ice.org.uk/educationresources](https://www.ice.org.uk/educationresources)

Civil engineering project case studies: [ice.org.uk/what-is-civil-engineering/what-do-civil-engineers-do](https://www.ice.org.uk/what-is-civil-engineering/what-do-civil-engineers-do)

Civil engineer (people) case studies: [ice.org.uk/what-is-civil-engineering/who-are-civil-engineers](https://www.ice.org.uk/what-is-civil-engineering/who-are-civil-engineers)

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