

# Penguin huddle

## Energise Anything!



### Did you know?

Just like the animation, Emperor penguins really do huddle together for warmth – and it helps them survive Antarctic temperatures of  $-50^{\circ}\text{C}$ . Inside the huddle, temperatures have been known to reach upwards of a staggering  $20^{\circ}\text{C}$ .

### Science scene-setter

By huddling together in tightly packed groups, Emperor penguins conserve heat, and shelter from the intense winds. The penguins take turns to be on the cold outside edges and warm inners of the huddle so that each of them can warm up, but don't get too hot. Scientific calculations have shown that by huddling together, Emperor penguins use about half the energy that they would otherwise.

### The challenge

Design an experiment to investigate why a huddle maintains so much heat.



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## Key activity steps

### 1 Research



Share the animation *The nature of Insulation* with your class: [eonenergy.com/primary](http://eonenergy.com/primary)

Also look for some clips of penguin huddles in the wild online.

- Role play a penguin huddle as a class
- Discuss who feels the hottest and who feels the coldest.

### 2 Design

Explain to pupils that together you're going to design an experiment to find out what happens to penguins in a huddle.

- Fill several test tubes with warm water to represent the warmth of a penguin's body
- Label each test tube - or 'penguin' - with a sticker. Check its temperature, and use a beaker to hold the test tubes
- Ask pupils to suggest how you should move the test tubes around to explore what happens to the penguins (test tubes) when they create a huddle.
- Ask pupils to predict what will happen to the temperature as you move the test tubes around.

### 3 Test

Make a table to record your results.

- The best results come from repeat measurements and calculating averages
- Discuss which penguins (test tubes) stayed the warmest, and which were coolest?
- Try repeating the experiment with added insulating materials – they can get creative if they want.

### 4 Reflect

- What materials make good thermal insulators and bad thermal insulators?
- What are the properties of those materials? Clue: the best insulators are often waterproof and thick or, like penguin huddles, made of more than one layer
- Why do some animals shed fur to keep cool?
- Why do some reptiles hide in the shade in order to cool down?
- Do feathers keep birds warm?

## Equipment and resources

- ✓ Beakers and test tubes
- ✓ Stickers to label them
- ✓ Warm water
- ✓ Thermometers
- ✓ Timers or stopwatches
- ✓ Other materials to insulate beakers  
e.g. cotton wool, tin foil, fabric

E.ON's Energise Anything has already engaged over 25,000 young people. We asked some of their teachers to describe it in three words. Here's what they said most often!

