Worksheet 2.3.4 Heating

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1 Explaining temperature >

Jo has gone into the garden shed to look for some tools. It was a cold night and it’s still pretty chilly in the shed. She notices as she picks up various items that tools with metal handles feel really cold, whereas ones with wooden handles feel not quite so cold. When she gets back in the house, she tells her brother and sisters, who make these comments.

Wood is just a warmer material – any room you go in, the wooden objects are warmer than the metal ones.

The metal isn’t any colder than the wood but it’s better at conducting the heat out of Jo’s hands so it feels colder.

The metal handles are colder because the metal got colder overnight.

Who do you think is right, and why?

2 Water on the move >>

Abi put a beaker of cold water on a tripod and gauze over a roaring blue Bunsen flame. She dropped a few crystals of potassium permanganate into the water; they sank to the bottom, right over where the water was being heated and started to colour the water purple. As the water moved, it carried the purple dye.

1. Which direction would she see the dye carried in and why?

1. After several minutes there doesn’t seem to be much movement in the water any more. Why do you think this is?

1. Explain why the movements that carried the purple dye around are called convection currents.

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3 Thermal energy >>>

Rob and his friends are at the playing field for the annual Bonfire night event. The bonfire itself is huge, with great flames leaping up into the night sky, keeping everybody warm on a pretty cold night. They’re talking about how the thermal energy actually gets to them from the bonfire. These are the comments made:

It’s by conduction – put your arms out towards the heat and you can feel the warmth travel up yours arms.

It’s by convection – look up and you can see bits of ash being carried upwards.

It’s by radiation – if you hold your hands in front of your face it doesn’t feel as hot because the rays have been blocked.

Comment on each of those ideas and the explanations offered.