



Changes in Temperature - Teacher's Notes

Changes in Temperature - Classroom Discussion

It is important to notice **changes in temperature** because it controls how we live our lives. Humans change their behaviour, put on or take off clothes, made different food and drink choices, light fires or switch on air conditioners to keep our body temperature fairly constant. This is because the body relies on enzymes to work and they only function within a narrow range of temperatures (around 37°C).

Some suggestions for discussion:

- If it is close to 0°C plants get killed by frost.
- If it gets colder our bodies can suffer from frostbite and we can even die.
- If we know it will be hot or cold we can dress to balance this out.
- We can exercise when it is cool and rest when it is hot.
- We can put animals in the shade or cool the air if we know it will get too hot.
- We can carry and drink more water if it is hot.

In Science we use our senses to test for change.

Temperature and Senses - Student Activity (with worksheet)

Can you see heat or cold?

No, but you can sometimes see hot air shimmering above hot things. Frost can cause ice crystals to appear or snow.

Can you hear heat or cold?

NO.

Can you feel heat or cold?

Yes. Your skin feels colder and hotter. You sweat when it is hot. You can shiver when it is cold.





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Can you taste heat or cold?

This is a difficult question. Your tongue can sense heat and cold. Different nerves from those that taste are used.

Can you smell heat or cold?

Another difficult question to answer. Heat often causes minute chemicals to be released into the air making it easier to smell some things when they are heated.

Which senses do you use to tell the temperature?

SEE	HEAR	FEEL	TASTE	SMELL
				
NO	NO	YES		?

Temperature Words

Hot, heat wave, cold, frosty.

Which word would the snow man like? *Cold or frosty*

The class may like to vote (hands up) to work out the answers to these questions.

How many people in the class prefer hot weather?

How many people in the class prefer cold weather?

Which do most people prefer?





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Hot and Cold Hands - Student Activity

We do not use our bodies as thermometers because our individual tolerance for heat and cold is a variable thing. This can be demonstrated by asking selected students to plunge their hands into two of three bowls of water.

Materials

- Three bowls or basins big enough for a hand to be covered.
- Newspaper or towels under the bowls to mop up spills
- Warm, icy and tepid water (warm water should be able to be touched safely)
- Towels to dry hands
- Six (good natured) students

Method

1. Prepare one bowl of hot (but not too hot!) water, one of tepid and one of cold (add ice to make it chilly). The bowls need to be close enough together to permit a student to stand between two and be able to put a hand in both.
2. Do not tell the students which bowl is which.
3. Send three students outside the classroom.
4. Ask the three remaining students to sequentially place one hand in the hot bowl and the other in the tepid bowl.
5. Ask them which is the cold water.
6. Swear the class to silence.
7. Bring in the three students who were outside and ask them to put one hand in the tepid bowl and the other in the icy water.
8. Ask them which bowl has cold water.

Students in different groups will give different answers.





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The hypothalamus in our brain senses heat and the cerebellum compares nerve input from different parts of our bodies to create balance. We can easily tell which is colder by comparison. We cannot however give a consistent measurement to measure the coldness. We need a thermometer (thermo = heat, meter = measurer) to do that.

Temperature and Smells - Student Activity

Most teachers are aware of the difference temperature makes to our sensitivity to smells from some school toilets on a hot day! Students may be reminded of how on a hot day they can smell the scent of eucalyptus trees and conifers from quite far off. They are also more aware of the smell of hot food from the school canteen than cold food.



Q. How far away can you smell a hamburger? **20 steps**

Q. How far away can you smell a salad sandwich? **$\frac{1}{2}$ step**

Q. Which did most of the class find easiest to smell? **Hamburger**

Materials

- An incense stick or scented candle and matches
- A cup of hot coffee and a cup of cold coffee, or two cups of instant soup, one dissolved in hot water and the other in cold
- A handful of dried gum, leaves, matches and two saucers
- A saucer and two 'globs' of scented hand cream, liquid soap or vinegar
- Four pairs of selected students free of sinus problems or head colds.

Method

1. Decide which side of the room shall be "Hot" and which shall be "Cold".





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2. Space out the "Hot" materials on one side of the room and the "Cold" on the other

Hot side	Cold side
Lit candle or incense	Unlit candle or incense
Hot coffee or soup	Cold coffee or soup
Lit gum leaves (carefully)	Unlit gum leaves
Scented cream held in warm hand	Scented cream held on cold saucer

3. Set the scenting pairs of students (assigning them a scent) in the middle of the classroom facing away from each other and ask them to take slow steps towards their side of the room (hot or cold) and stop when they can smell their assigned scent.

Observations

Most students need to be very close to cold materials to be able to smell them. Heat energy makes molecules in the hot materials more mobile and more able to disperse through the air.

For discussion:

Which are easiest to smell, hot feet or cold feet?

Hot feet are easier to smell than cold feet. A combination of hot air and hot feet is most effective at spreading their scent!





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Dressing for the Temperature - Student Activity (worksheet)

Draw different clothes and equipment needed for each student for different temperatures.



HOT/COLD

HOT/COLD

Student answers will vary due to where your school is located; Students in temperate locations will have different experiences from those in the Tropics and from those in the inland. Students may change the drawings and words may need to be scribed by teacher or EA.

Questions for discussion

If these students were outside, how would they know whether it was hot or cold?

What would they hear? Hot - sports being played, splashing on the beach, air conditioners.

Cold - running, teeth chattering.

What would they see? Hot - sun, clear skies, shimmering, dry plants, fire, people with few clothes.

Cold - clouds, snow, ice, people with big coats.





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- What would they feel? Hot - sweaty, sticky, sunburn.
Cold - cold, shivering, tingling ears and toes.
- What would they smell? Hot - fire, road smell (hot bitumen)
Cold - nothing, smoke from fires

