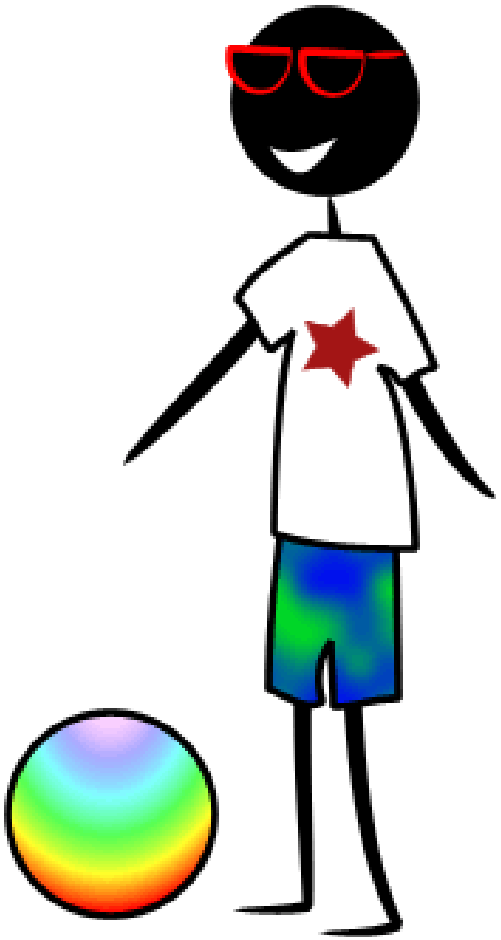
webanywhere
stretch beyond

Unit 4C: Keeping Warm

Learnanywhere

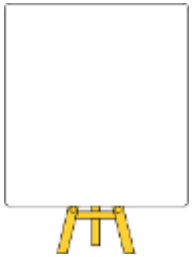
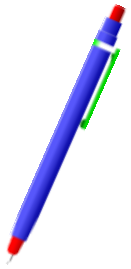
Keeping Warm



Temperature	a measure of how hot an object is
Thermometer	an instrument used to measure temperature
Degrees Celsius	the units used to measure temperature
Thermal Conductor	a material that lets heat pass through it
Thermal Insulator	a material that doesn't let heat pass through it
Insulate	to keep heat in
Conduct	when heat travels through a material

Touch various objects around the room and decide how hot or cold they are




Object	How hot/cold

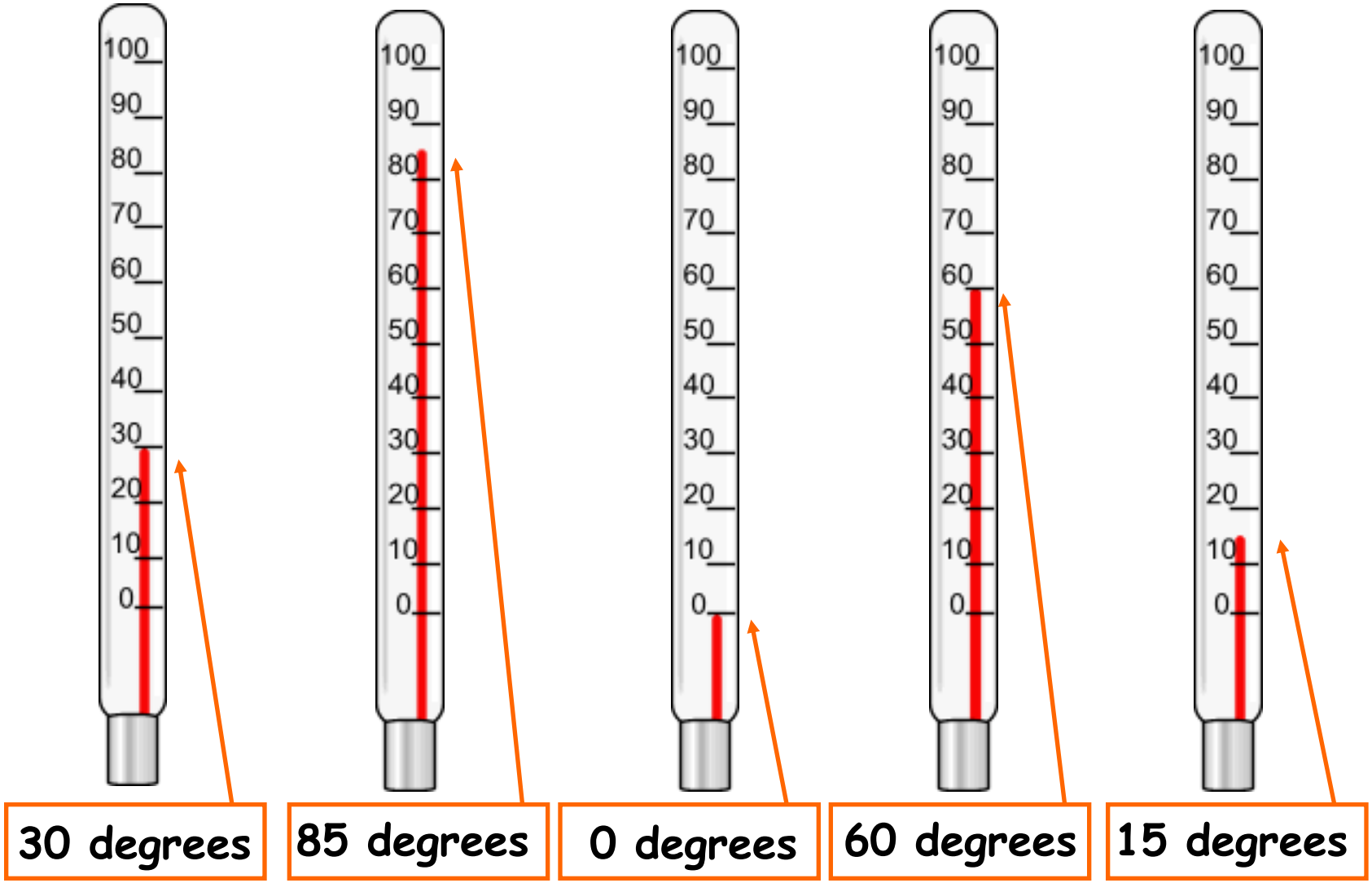
Work in pairs: 1 of you put a hand in the 'cold' bowl and 1 of you put your hand in the 'hot' bowl.

After a few seconds, take your hands out of the water and into the 3rd bowl of water.

Is the water hot or cold?

Is touch the best way to determine if things are hot or cold?

We use a thermometer to measure temperature



Carefully take thermometer readings for each of the following situations:

Situation	Temperature
Held in air	
Blown across	
Held under cold tap	
Beaker of water left for 1 hour	
Cup of freshly made tea	
Cup of tea left for 15 minutes	

after 1 min	after 5 min	after 15 min
		
		

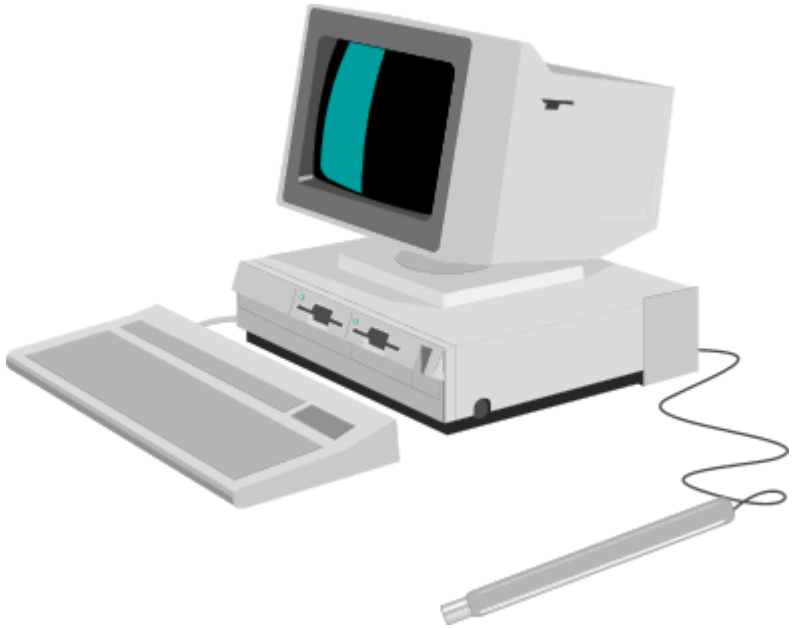
If an ice cube is left at room temperature what happens to it and why does this happen?

If a cup of tea is left at room temperature what happens to it and why does this happen?

Draw a plan of the classroom. Select 3 or 4 different places to take the temperature which you think will have different temperatures.

Which locations have you chosen?

Why have you selected these particular locations?



Set up a sensor in each of your chosen locations and leave them to record the temperature over a 24 hour period.

Look at the results you have obtained over the 24 hours. What do they show?

Is the temperature different in the different locations? If so, can you explain why?

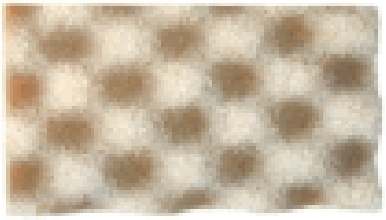
Does the temperature change at different times of the day? If so, can you suggest any reasons why?

Is it better to take temperatures with the sensors or a thermometer? Why do you think this?

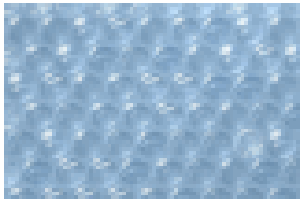
In the World Cup 2006, the organisers are worried that the half time drinks will be too warm for the players by the end of the first half. Your task is to investigate a number of different materials that could be used to make a container to keep the drinks cold.

The materials available to you are:

Polythene



Sponge sheeting



Bubble wrap

Aluminium foil

Decide how you will carry out the investigation. What apparatus will you need?

What will you use as a 'cold drink'?

How will you record your results?

How many results will you take and how often?

How will you decide which is the best material?

How will you make sure it is a fair test?

Which is the best material for the job?

Try to explain why you think this one is the best.

In the World Cup 2006, the organisers are worried that the half time drinks will be too warm for the players by the end of the first half. Your task is to investigate a number of different materials that could be used to make a container to keep the drinks cold.

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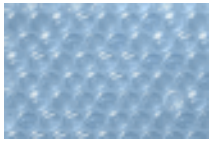


Bubble wrap

Sponge sheeting

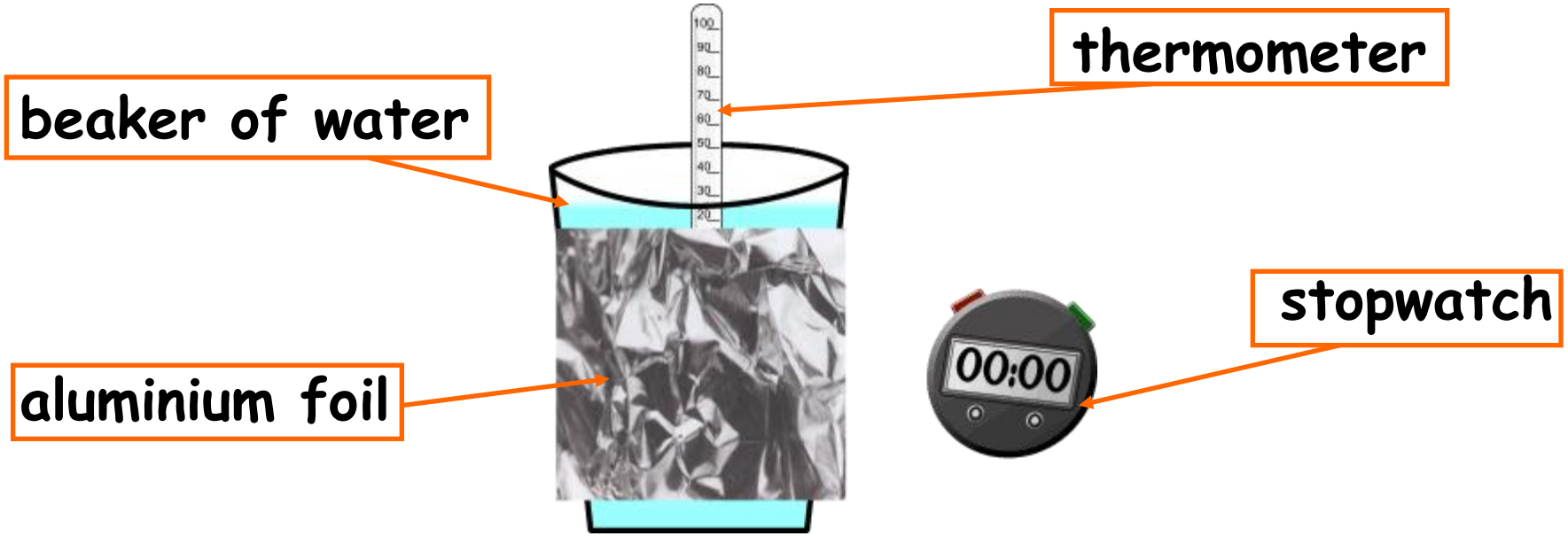
Aluminium foil

For the 'cold drink' use a beaker of iced water as shown in the picture.

Take the temperature at the start – time 0 – then every 2 minutes.

To make the test fair only wrap the material round the beaker once.

Record the results in a table

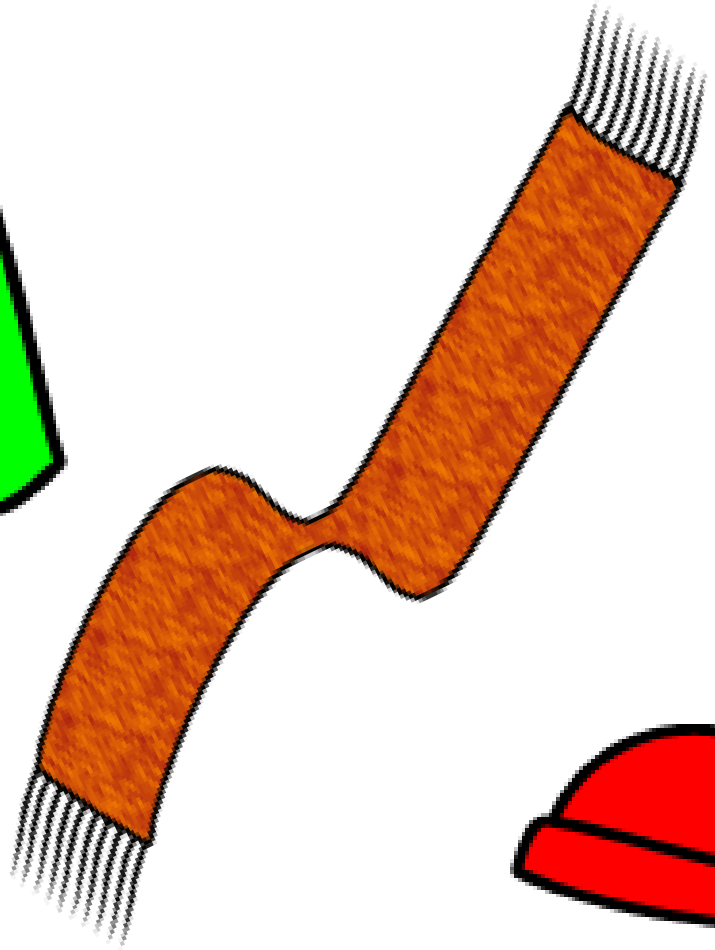


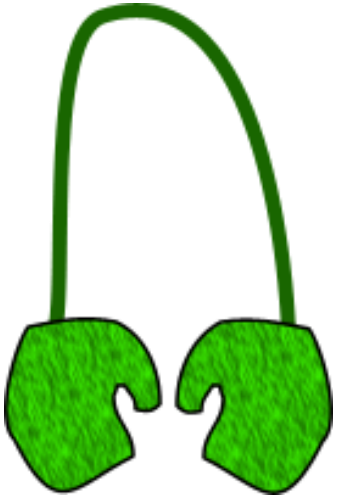
time	foil	polythene	bubble wrap	sponge
0 min				
2 min				
4 min				
6 min				
8 min				
10 min				
12 min				
14 min				

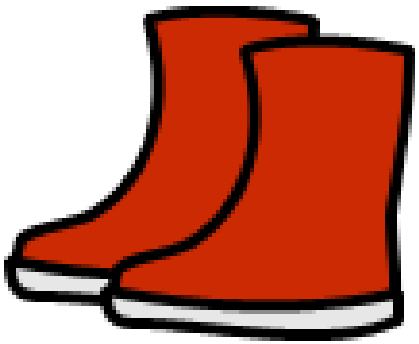
Which is the best material for the job?

Try to explain why you think this one is the best.

What kind of clothes do we wear in the winter to keep warm?



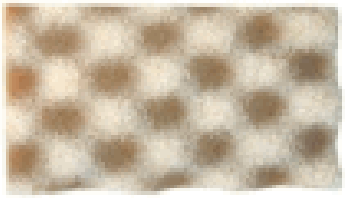




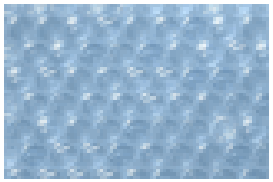
Professor Mac likes to go bird watching in the winter. He always takes a flask of soup but finds that it goes cold too quickly when he pours it into his plastic mug. He needs you to investigate what material he could wrap around his mug to keep his soup hot for longer

The materials he wants you to use are:

Polythene



Sponge sheeting



Bubble wrap

Aluminium foil

Decide how you will carry out the investigation. What apparatus will you need?

What will you use as a 'soup'?

How will you record your results?

How many results will you take and how often?

How will you decide which is the best material?

How will you make sure it is a fair test?

Which is the best material for the job?

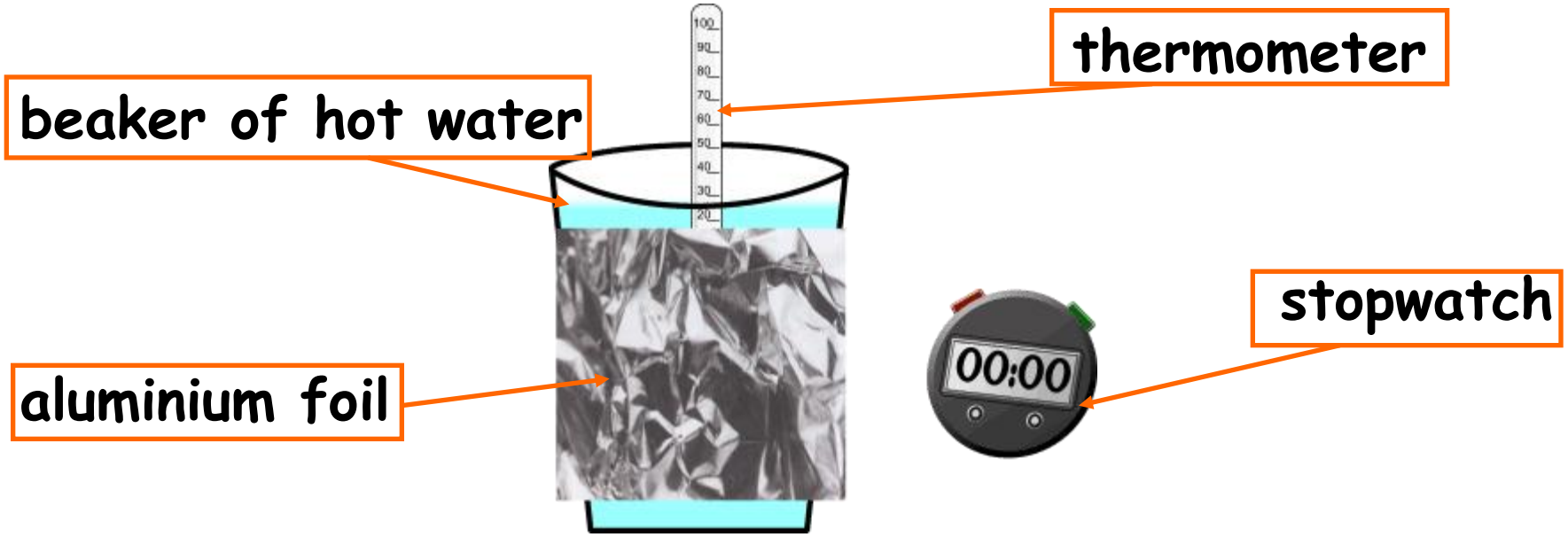
Try to explain why you think this one is the best.

For the soup use a beaker of hot water as shown in the picture.

Take the temperature at the start – time 0 – then every 2 minutes.

To make the test fair only wrap the material round the beaker once.

Record the results in a table



time	foil	polythene	bubble wrap	sponge
0 min				
2 min				
4 min				
6 min				
8 min				
10 min				
12 min				
14 min				

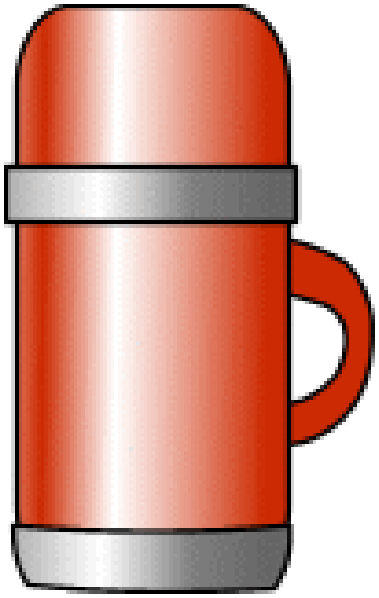
Which is the best material for the job?

Try to explain why you think this one is the best.

Which material was the best at keeping the cold drink cold?

Which material was the best at keeping the Professors soup hot?

Is there anything you notice about this?

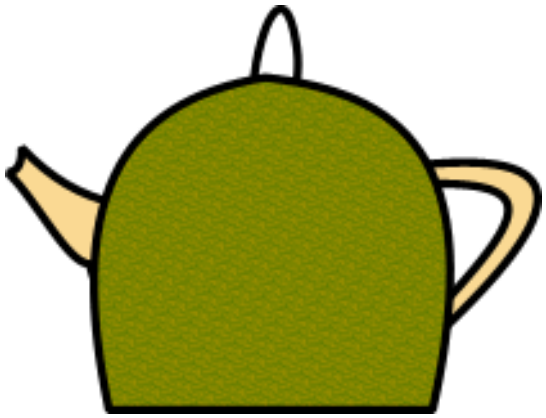


What does a flask do?

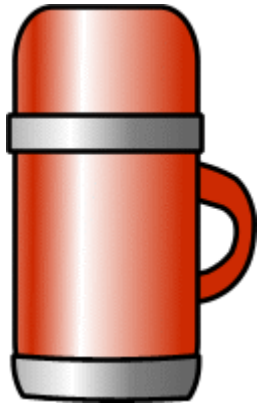
Keeps HOT things HOT

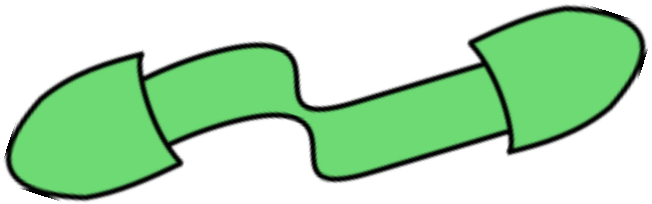
Keeps COLD things COLD

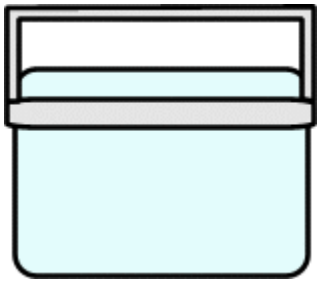
Good Thermal Insulators will keep HOT things HOT and COLD things COLD

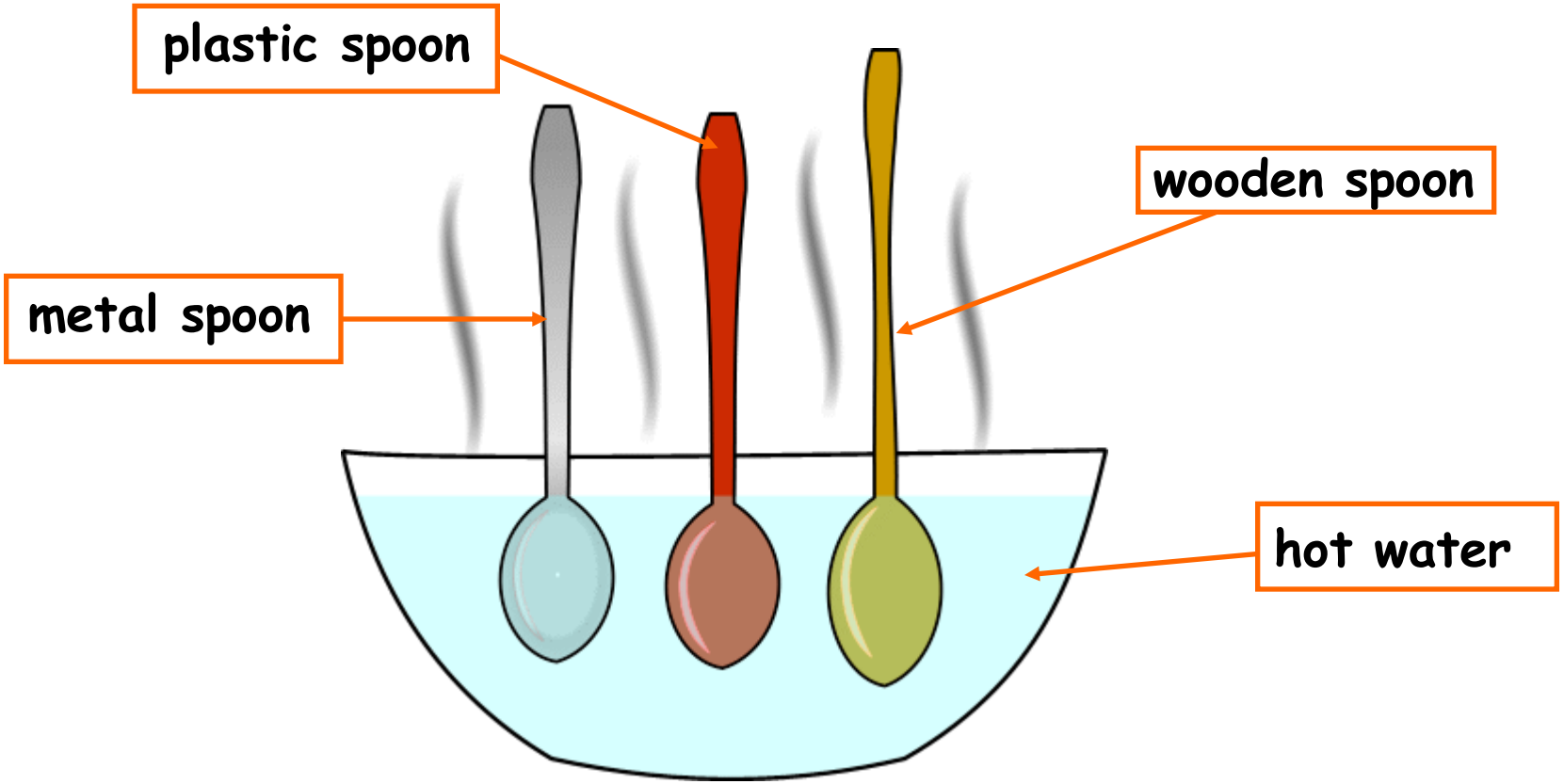


Thermal Insulators









Which spoons would still feel cold after 5 minutes?

Which spoons would feel hot after 5 minutes?

Why do saucepans normally have wooden or plastic handles?

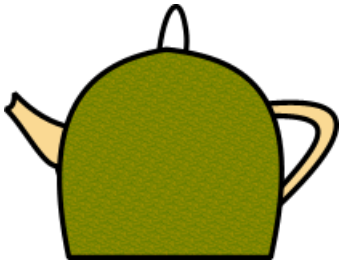
Wood and plastic are good INSULATORS of heat.

"Think about the work you have done on ELECTRICAL CONDUCTORS and INSULATORS. What type of materials were good ELECTRICAL CONDUCTORS?"

METALS

METALS ARE GOOD AS BOTH THERMAL AND ELECTRICAL CONDUCTORS.

HEAT ENERGY CAN TRAVEL ALONG THE METAL SPOON



Saucepan handle

Tea cosy

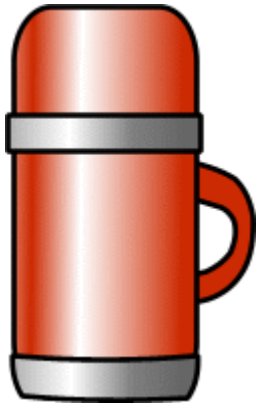
Coats

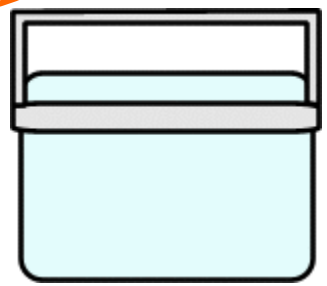
What are thermal insulators used for?

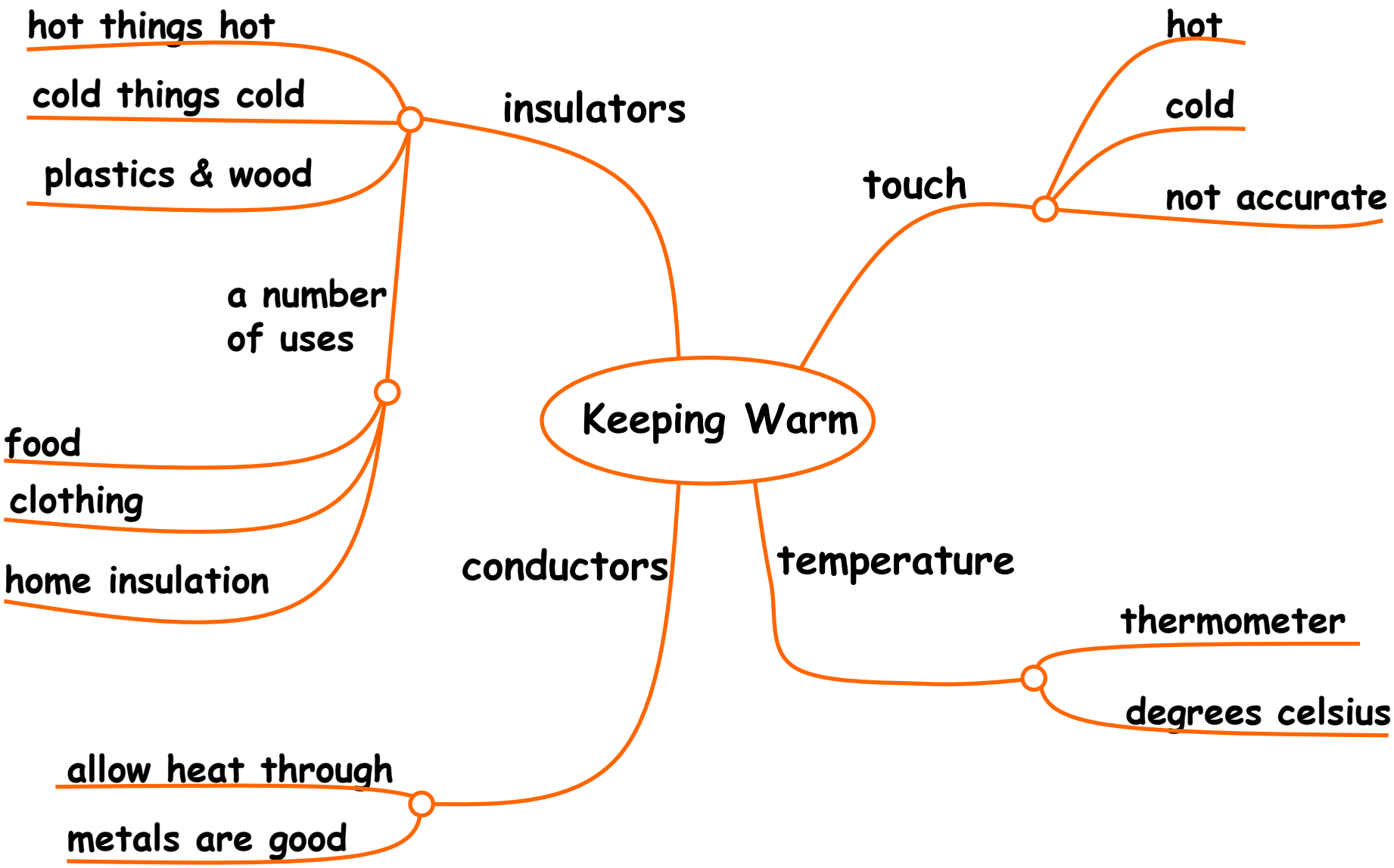
Flasks

Coolboxes

Oven gloves






Keeping Warm
insulators
hot things hot
cold things cold
plastics & wood
a number of uses
food
clothing
home insulation
touch
hot
cold
not accurate
conductors
allow heat through
metals are good
temperature
thermometer
degrees celsius