

## Rods

## Trend Task

**Approach:** One to one

**Level:** Year 4 and year 8

**Focus:** Predict and investigate the heat conductivity of different materials, and explain practical applications.

**Resources:** 5 rods, picture of saucepan, , timer, mug, paper towel, water (boiling), electric jug

<i>Questions/instructions:</i>	% responses		<i>After 2 minutes of feel tests:</i>	% responses	
	1999 ('95) year 4	1999 ('95) year 8		1999 ('95) year 4	1999 ('95) year 8
In this activity you are going to find out and tell me about how quickly different materials let heat through them.			6. Now lift each rod out of the water and place them on the table in order, from the one that let the heat through most quickly, to the one that let it through least quickly. Be careful to lift them out with a paper towel so that you don't burn your fingers.		
<b>Show student the rods as you name them.</b>			<b>Observations:</b>		
1. Here are 5 rods. They are made of wood, perspex, copper, steel and aluminium.			copper first	80 (90)	86 (89)
I am going to put them into this cup then pour in boiling water. Then I will get you to touch the end of each rod to find out how much heat they are letting through.			aluminium second	71 (79)	77 (83)
2. But before we start, can you tell me which rod you think will let the heat move through most quickly?			steel third	81 (81)	84 (86)
<b>Prediction for first:</b>			perspex fourth	65 (61)	70 (67)
copper	10 (32)	28 (34)	wood fifth	68 (61)	71 (69)
aluminium	10 (27)	20 (22)			
steel	15 (15)	21 (19)	7. Materials that let the heat travel through easily are called <b>good conductors</b> . Which rods were good conductors of heat?		
perspex	28 (15)	14 (14)	copper	92 (95)	97 (97)
wood	38 (11)	17 (11)	aluminium	87 (87)	93 (93)
3. Why do you think that rod will let the heat through most quickly?			steel	54 (52)	49 (37)
<b>not marked</b>					
4. Now let's do the experiment.			8. When toffee is made, the ingredients are made very hot, a lot hotter than water. If we had spoons made out of each of these materials, which spoon would be the best for stirring the very hot toffee mixture?		
I am going to pour boiling water into the mug, and I want you to test each rod. When you test the rods, touch them like this:			wood and/or perspex	4 (3)	3 (7)
<b>Demonstrate how the rods should be touched — before the boiling water is added. Demonstrate use of timer.</b>			wood	41 (35)	58 (56)
I will get you to check them every 30 seconds, for two minutes.			perspex	14 (16)	12 (11)
<b>With the rods already in the mug, pour boiling water into the mug, and get ready to time the 30 sec intervals. Repeat the following instruction 4 times (every 30 seconds).</b>			copper	26 (27)	15 (11)
5. Feel each rod now, and tell me what you notice.			9. Why would you use that material?		
			<b>not good conductor of heat</b>	56 (60)	69 (85)
			<b>Show student the picture of a saucepan.</b>		
			The saucepan in this picture is made of stainless steel. It has a copper bottom, and a plastic handle.		
			10. Why do you think it has a copper bottom?		
			<b>conducts heat well</b>	75 (70)	91 (93)
			11. Why do you think it has a plastic handle?		
			<b>conducts heat poorly</b>	91 (92)	96 (95)

**Commentary:**

Both year 4 and year 8 students conducted and interpreted the experiment quite well. Year 8 students showed better initial knowledge of the rod materials, and were better able to explain the practical applications. There was no marked change in performance between 1995 and 1999.