

Approach: One to one

Year: 4 & 8

Focus: Exploring closed and open circuits

Resources: Circuit with bulb, battery, mystery card, recording book, pencil

Questions / instructions:

In this activity, you will be using this electric circuit to work out where the electricity goes between the circles on this mystery card.

Give student the circuit.

First, touch the clips together on the circuit to make sure that the bulb lights up.

Give student mystery card.

Now have a try at touching different circles on the mystery card with the clips to see what happens.

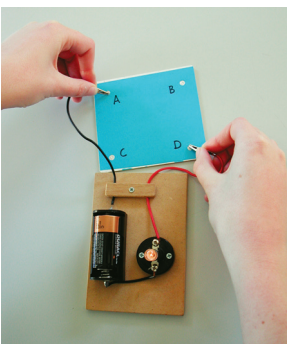
Allow time.

Now touch Circle A with one clip. **At the same time**, touch Circle B with the other clip.

1. What's happening to the bulb?  
bulb lights up

Now touch A with one clip, at the same time touch C with the other clip.

2. What's happening to the bulb?  
bulb doesn't light up



Now touch A with one clip, at the same time touch D with the other clip.

% response 2007 ('03)  
year 4 year 8

99 (99) 99 (100)

98 (99) 99 (99)

3. What's happening to the bulb?  
bulb lights up

4. Why do you think the bulb didn't light up when A and C were touched?

Give student recording book and pencil.

Quality of explanation:  
(A and C not connected, so circuit not complete, so electricity can't flow to light up bulb)

clear, detailed explanation  
partial explanation

5. Draw what you think is inside the mystery card.

Allow time.

A connected to B (directly or via D)

A connected to D (directly or via B)

A not connected to C (directly or indirectly)

6. Use your diagram to explain why the bulb lights up when some circles are touched but not with other circles.

Explanation:

clear, convincing explanation, using diagram (explains lighting up AND not lighting up)

partial explanation, using diagram (explains at least one of lighting up OR not lighting up)

Total score:

4-5 5 (11) 28 (34)  
3 30 (40) 32 (40)  
2 20 (12) 17 (10)  
0-1 45 (37) 23 (16)

% response 2007 ('03)  
year 4 year 8

82 (84) 75 (94)

0 (2) 7 (4)  
10 (15) 31 (34)

54 (60) 76 (82)

47 (56) 60 (79)

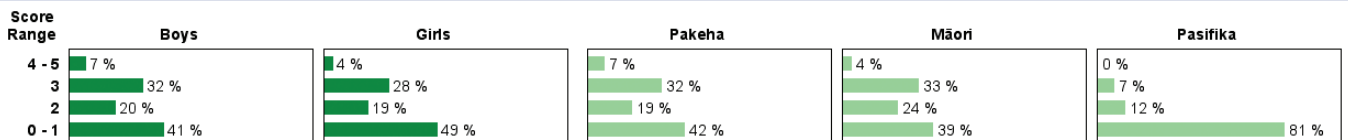
81 (88) 86 (88)

5 (7) 17 (24)

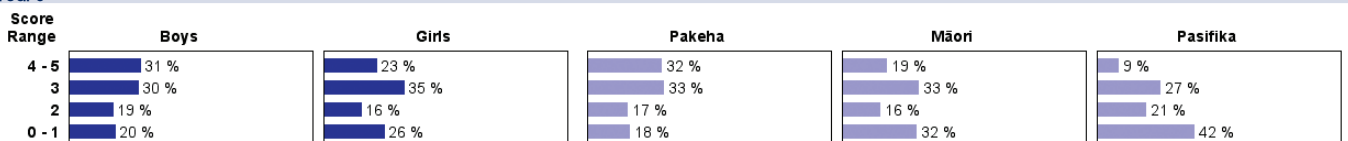
21 (25) 38 (38)

Subgroup Analyses:

Year 4



Year 8



Commentary:

This task was very popular but there were some problems with the mystery card for year 8 students in 2007 (the A to D link did not reliably produce the intended result). Performance dropped markedly for year 4 students between 2003 and 2007, but similar judgements are not justified for year 8 students because of the equipment problems. Year 4 Pakeha and Māori students performed similarly.