**Reading Temperature Across a Cooling Tile**

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A ceramics display compares equal tiles made of the same material. Uneven cooling can make the surface contract before the center, stressing the tile. The model compares this explanation with the idea that cracking depends only on the final temperature.

| Test | Surface at 1 min (°C) | Center at 1 min (°C) | Final temperature throughout (°C) | Cracked |
|---|---|---|---|---|
| P | 35 | 75 | 25 | Yes |
| Q | 55 | 65 | 25 | No |

**1** Which readings directly test how uneven the cooling is at one minute?

(1) The two final temperatures

(2) Only the surface temperature in P

(3) The surface and center temperatures in each test

(4) Only whether each tile cracks

**2** Calculate the temperature difference inside each tile at one minute and compare the results. [1]

Answer and work

**3** Use the records to evaluate the claim that the final temperature alone determines whether the tiles crack. [1]

Answer and work

A third test uses the same kind of tile and ends at 25 °C. The team can slow cooling at the exposed surface without changing the tile’s material.

**4** Describe measurements that would test whether slower surface cooling reduces the internal difference and cracking. [1]

Answer and work