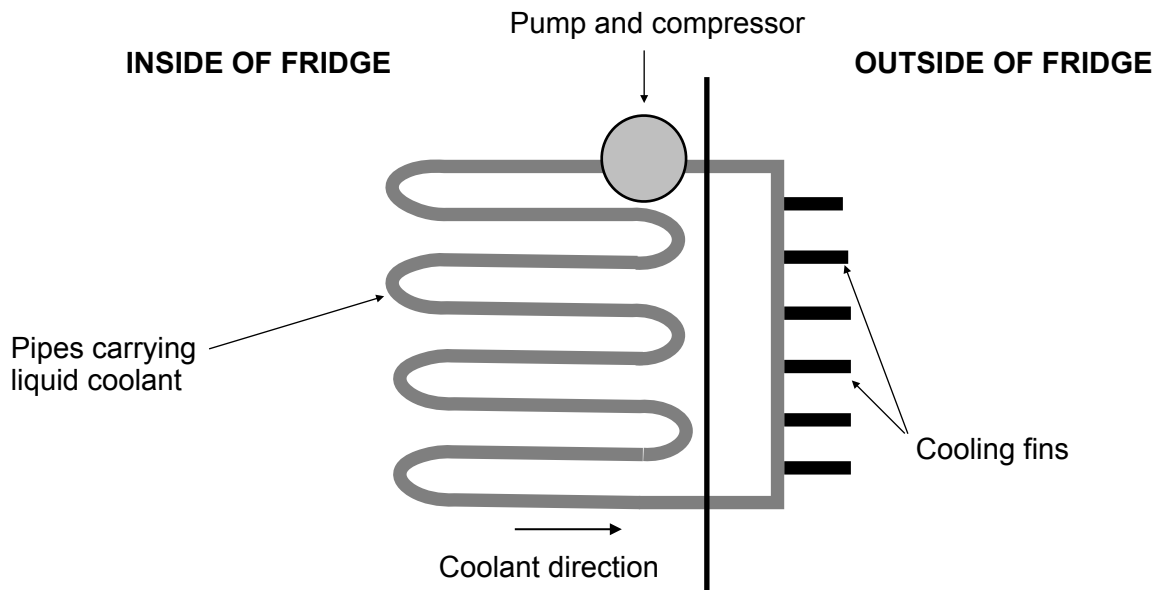


1 The diagram shows the cooling mechanism for a fridge.



The cooling mechanism works in the following way:

- The liquid coolant is circulated throughout the pipes in the fridge.
- It absorbs heat energy from inside the fridge and becomes a gas.
- Cooling fins radiate the heat energy from the gas coolant to the surroundings.
- The gas coolant now condenses back to a liquid and is circulated back into the fridge.

1 (a) (i) Why are the pipes carrying the liquid coolant inside the fridge coloured matt black? [1 mark]

To absorb as much heat energy as possible or to absorb a large amount of heat energy. [1]

1 (a) (ii) Why are the **cooling fins** painted matt black? [1 mark]

To emit or release as much heat energy as possible or increase the amount of heat energy radiated. [1]

1 (a) (iii) Explain why the liquid coolant becomes a gas when it absorbs heat energy from inside the fridge.

Refer to the particles in the coolant in your answer. [2 marks]

Particles absorb heat energy. [1]

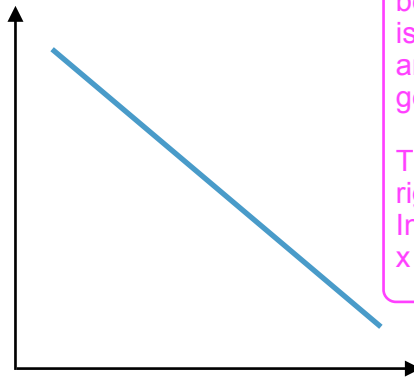
They move further apart. [1]

- 1 (b) The number of cooling fins on the back of the fridge affects the amount of heat energy released to the surroundings.

This affects the speed at which a new fridge can cool down from 21°C to 3°C.

Complete the sketch graph below to show the relationship between the **number of cooling fins** and the **time taken to cool** from room 21°C. [3 marks]

Time taken to cool (from room temperature) [1]



Technically this line would be a curve but the key idea is that it goes downward, so any downward line would get you the mark.

The axis labels must be the right way round. Independent variable on the x axis.

Number of cooling fins [1]

(Total 7 marks)

End