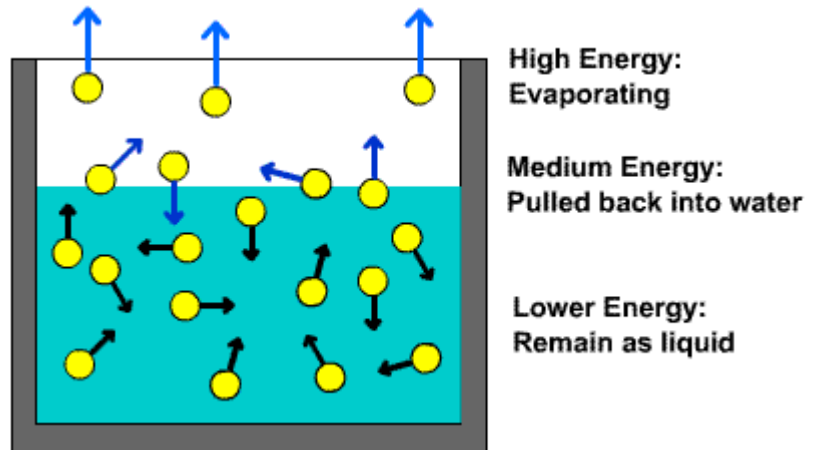


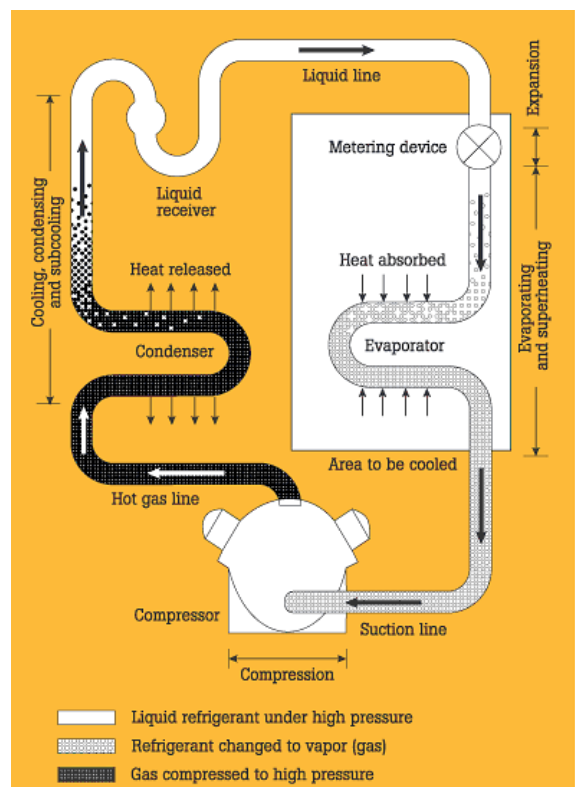
## Evaporation

The particles in a liquid have different amounts of energy. The particles with the most energy move the fastest. High energy liquid particles near the surface move so fast that they can break through the surface and escape into the air and form a gas. This is called evaporation. When these particles leave, the amount of energy remaining in the liquid is reduced and the temperature of the liquid drops making it cooler.



The human body must be kept at 37°C for good health. When we exercise, our muscles release some energy as heat and our body temperature rises. This causes the sweat glands in the skin to release sweat onto skin surface. As the sweat evaporates its temperature falls and this draws heat from the body to the surface and cools the body down.

Evaporation is also used to keep refrigerators and freezers cool. A gaseous substance called a refrigerant is squashed in a compressor. The increased pressure moves the particles together so much that the refrigerant turns into a liquid. This is released into tubes in the cold compartment of a refrigerator or freezer. As it is released its pressure drops rapidly and this causes a huge number of particles to evaporate and form of gas. The temperature of the remaining liquid falls and draws heat out of the air in the compartment and reduces its temperature too. The refrigerant then leaves the compartment and returns to the



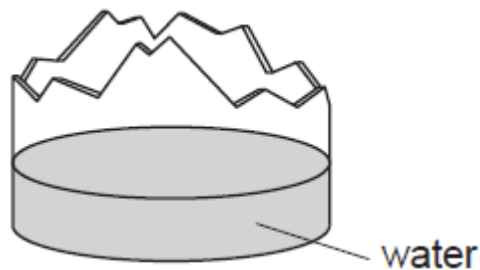
compressor where it is squashed again before returning to the compartment and cooling it some more. This cycle of events continues until the required temperature of the refrigerator or freezer is reached.

Video links:

<https://www.youtube.com/watch?v=qrcEWhurQl4>

**Answer the following questions**

1. In the waste basket is a broken glass bottle containing a small quantity of water, as shown in the figure



As the sun shines on it, the volume of water slowly decreases.

1. State the name of the process causing this decrease.

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2. In terms of the effect of the sun's rays on the water molecules, explain your answer.

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2. In the cool compartment of a fridge there are pipes carrying liquid from a compressor .The pressure in the pipes is much lower than in the compressor.

1. How does the fall in pressure affect the liquid?

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2. What happens to the number of particles in the liquid?

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The change in the liquid makes the pipes cooler than the air in the compartment. Heat is drawn from the air through the wall of the pipe.

3. What form of thermal energy transfer takes place?

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3.(a) The table below describes the conditions of the molecules of the substance in the three states of matter.

In the right hand column, write the state of the substance that is described in the left hand column.

<b>condition of the molecules</b>	<b>state in which the substance exists</b>
The molecules are a great distance apart, moving very rapidly, with negligible interaction. The substance occupies all the space available.	
The molecules are only able to vibrate rapidly about fixed positions. The substance does not need a container to maintain its shape.	
The molecules move about amongst each other, with attractive forces between them. The substance does not necessarily fill its container.	

(b) 1. What is the state of matter just before a substance boils?

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2. Describe what happens to the molecules before boiling?

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3. State two differences between boiling and evaporation.

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