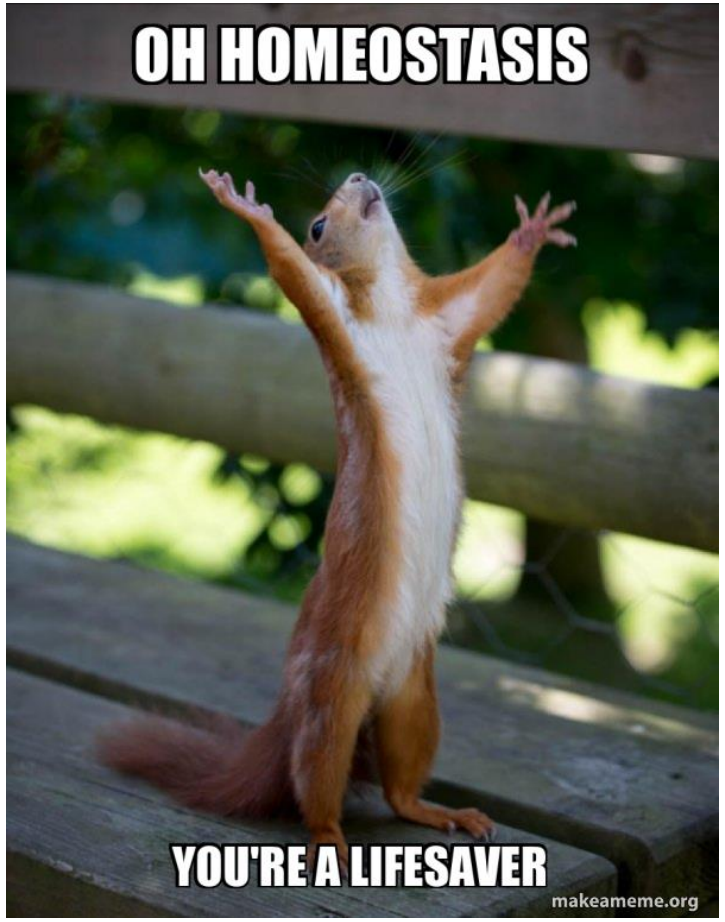
What is homeostasis?



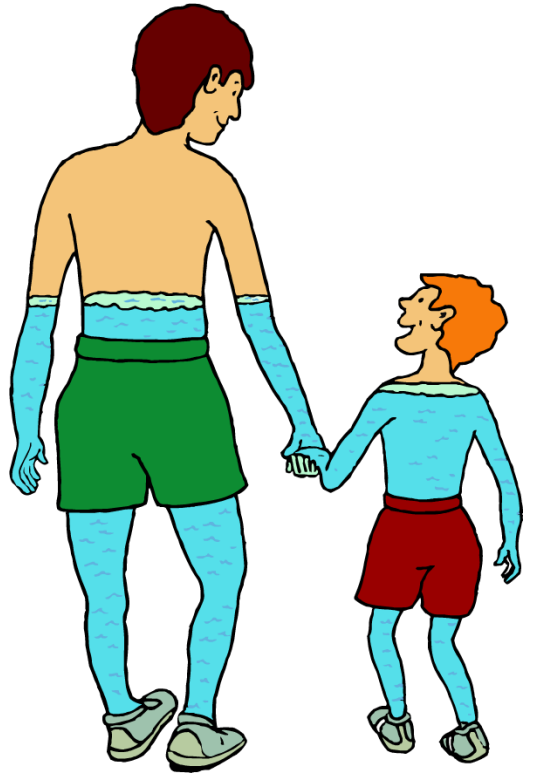
Why is Homeostasis important?

What is homeostasis?

The body uses so much energy, even during sleep, because it must **maintain a constant internal environment**.

This process of keeping things the same is called **homeostasis**.

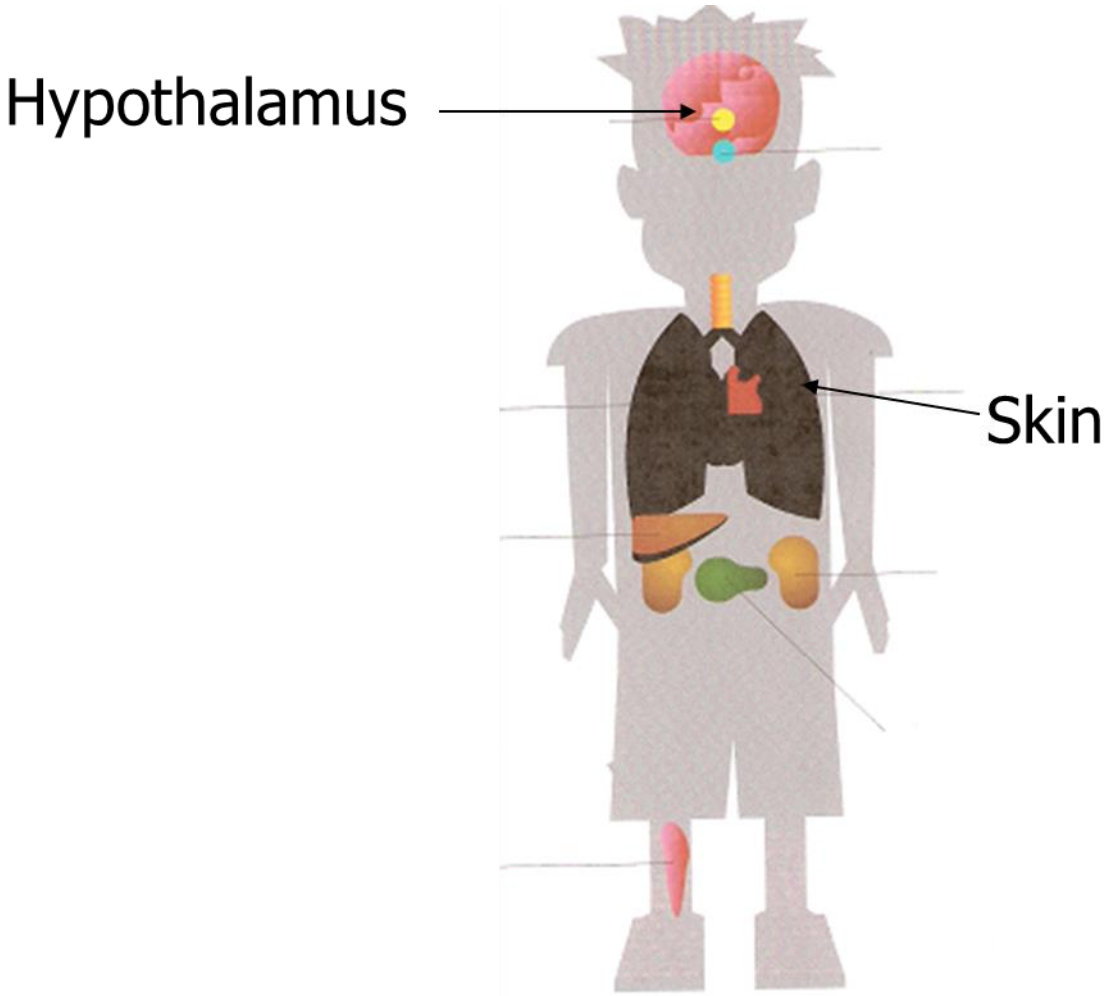
Nervous and hormonal control systems ensure that the body maintains a constant temperature.



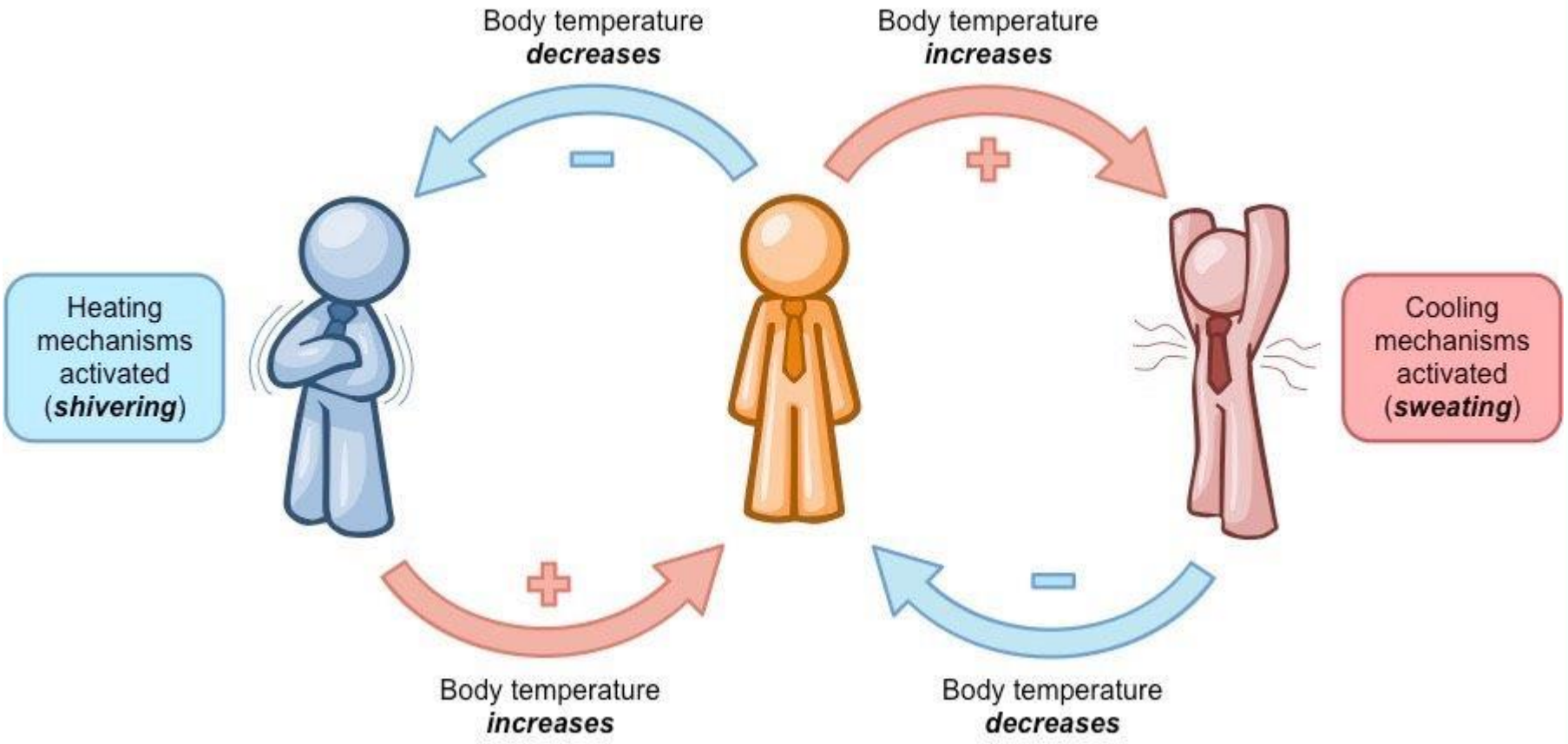
Homeostasis makes sure that the body has a steady temperature and levels of water, ions and blood sugar.

Homeostasis allows the body's cells and **enzymes** to work at their optimum level. *Describe what happens to enzymes if they are too hot*

Controlling temperature

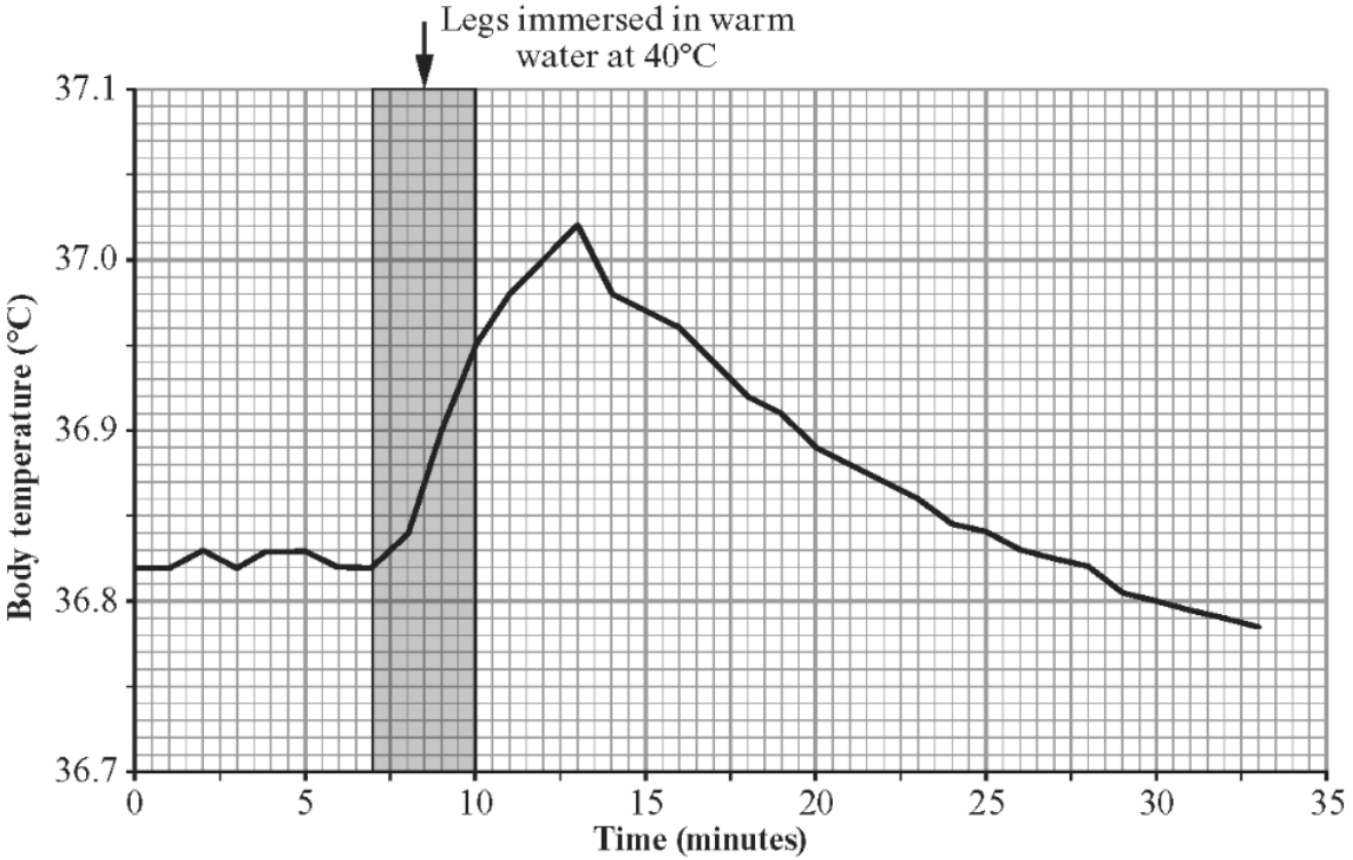


Negative feedback mechanism



What else is controlled by a negative feedback mechanism?

A scientist carried out an investigation into the body temperature of a man. The changes in the man's body temperature were measured by a clinical thermometer in his mouth. The graph below shows his body temperature over a 35 minute period. Between 7 and 10 minutes he immersed his legs, from the knees downwards, in a bath of warm water at 40°C. He then stepped out of the bath and dried his legs.



(a) Explain why the body temperature increased even though it was only the legs which were immersed in the warm water. [1]

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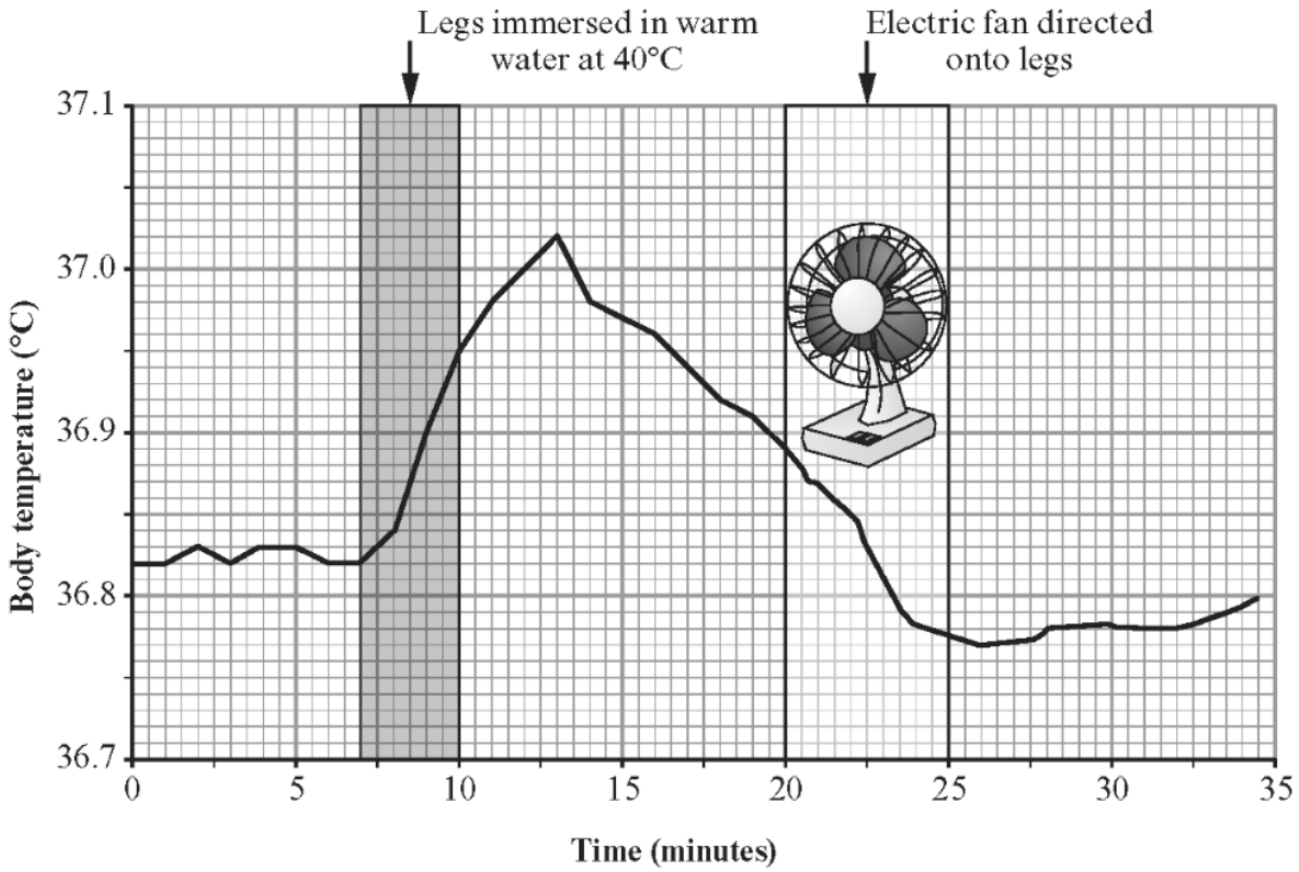
(b) The experiment was repeated. After 20 minutes an electric fan was directed onto the man's legs. The results are shown in the graph below.



Explain why the body temperature of the man dropped more quickly between 20 and 25 minutes when the fan was used. [2]

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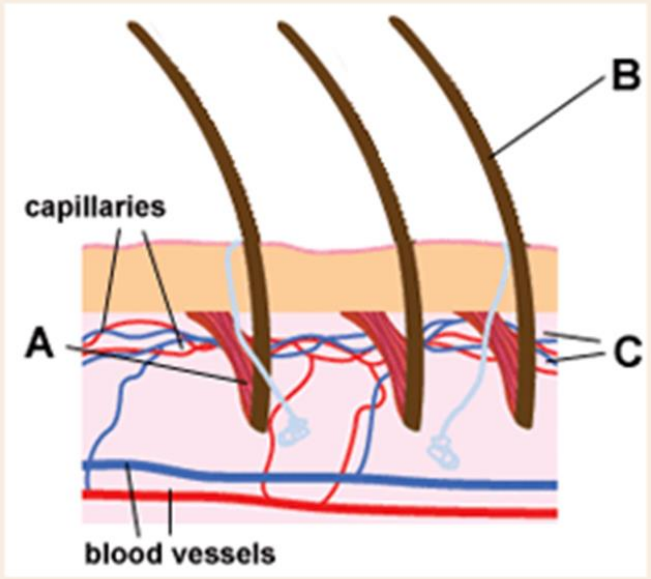
Too cold

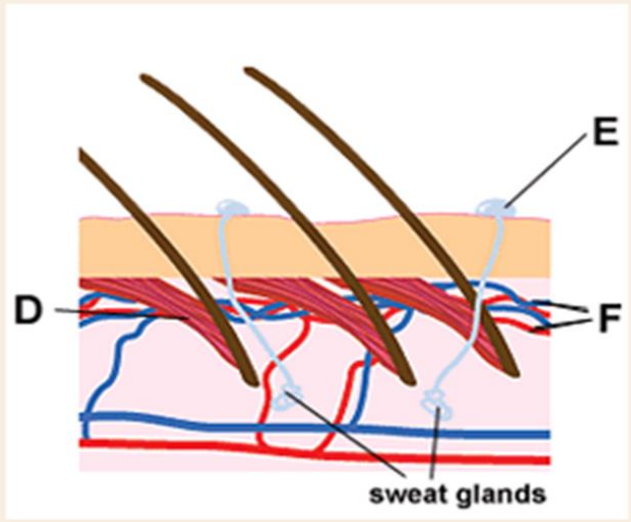


A - Hair muscles pull hairs on end.

B - Erect hairs trap air.

C - Blood flow in capillaries decreases.

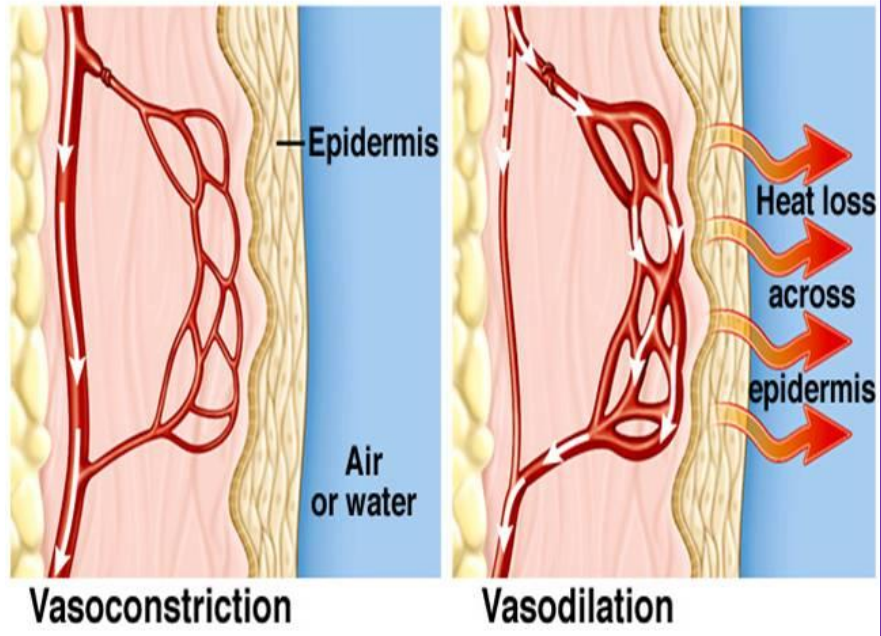
Too hot



D - Hair muscles relax. Hairs lie flat so heat can escape.

E - Sweat secreted by sweat glands. Cools skin by evaporation.

F - Blood flow in capillaries increases.



Explain the responses to being too cold.

- Appear pale
- Shivering
- Hairs stand up

Explain the responses of being too hot.

- Red
- Sweating
- Hairs flat

A person has a body temperature of 39°C, describe how it is returned to normal.

What is normal human body temperature?

How does sweating cool a person down?

How does shivering warm a person up?

Where are the thermoreceptors in the body?

Why must temperature of a human remain constant?