Thermoregulation

Our body functions most efficiently at 37°C. The blood temperature is monitored by the brain and if it varies from 37°C, various changes are brought about. The means by which our body maintains a constant temperature is called thermoregulation.

Use the words below to complete the missing gaps on the thermoregulation flow diagram.
You may use a word more than once.

Word Bank

Homeostasis
Thermoregulation
Enzymes
Hypothalamus
Impulses
Vasodilation
Vasoconstriction
Stimulus
Response
Negative
feedback
Glucoregulation
Osmoregulation

• Hypothalamus • Lie flat • Decreases • More sweat • Warming mechanisms • Less sweat • Vasoconstriction • Stand up • Shivering • No shivering • Contraction • Increases • 37°C • Evaporation • Cooling mechanisms • Vasodilation

HOMEOSTASIS: Body temperature (Thermoregulation)

Thermostat in _____ (in the brain) activates _____ _____.

RESPONSES:
1) Sweat glands produce _____ _____ to increase heat loss by _____.
2) Skin blood vessels get wider (_____) to increase heat loss by radiation.
3) Hairs on the skin _____ _____ to reduce insulation and increase heat loss.
4) _____ occurs.

Body temperature _____. Cooling mechanisms are switched off by thermostat in _____.

Normal body temperature (_____).

STIMULUS: Increased body temperature (e.g. during activity or in hot surroundings).

Normal body temperature (_____).

STIMULUS: Decreased body temperature (e.g. in cold surroundings).

Body temperature _____. Warming mechanisms are switched off by thermostat in _____.

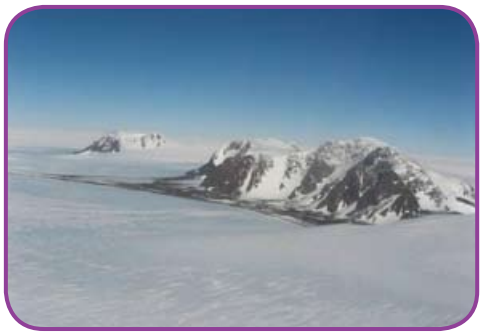
Thermostat in _____ (in the brain) activates _____ _____.

RESPONSES:
1) Sweat glands produce _____ _____ to reduce heat loss by _____.
2) Skin blood vessels get narrower (_____) to reduce heat loss by radiation.
3) Hairs on the skin _____ _____ to trap air between them as insulation and decrease heat loss.
4) _____ occurs and the _____ of muscles generates heat.

Equipped for a challenge

Chilling facts:

- The continent of Antarctica makes up nearly 9% of the Earth's landmass.
- 99% of it is covered in ice.
- Britain could fit into the continent more than 50 times.
- During summer Antarctica has 24-hour sunlight.
- The interior can plummet to -90°C in the winter (metals become brittle and crack at this temperature.)
- No life forms exist in Antarctica except cold-adapted species such as mosses and lichens, penguins and fur seals.



No human can survive this icy and vast continent without the correct kit and preparation!

Activity

Imagine you are about to embark on an expedition to the South Pole with Lieutenant Polly Hatchard RN (Royal Navy). You are going to trek 112m (180km) on this "giant white treadmill", as described by Polly.

In the table below, list what items of kit you will take and explain the life saving function that it will play.

Remember!

As well as considering the conditions of Antarctica, you must also bear in mind that you will be carrying your kit bare handed from beginning to end. So pack well but travel light!

Equipment	Function

The physical challenge

Listen to Polly explaining her gruelling yet inspiring experiences during the expedition. In the table below, note any physical reactions or challenges that she describes and the precautions or methods that she used to deal with them. You will need to identify which homeostatic process is involved in her reaction and then write your notes in the corresponding row.

Homeostatic process	Controls which factor?	Physical reactions and challenges	Precautions and preventions
Thermoregulation	Temperature	E.g. "I was shivering"	E.g. "I wore layers to keep warm"
Osmoregulation	Water and Ions		
Glucoregulation	Blood Glucose		