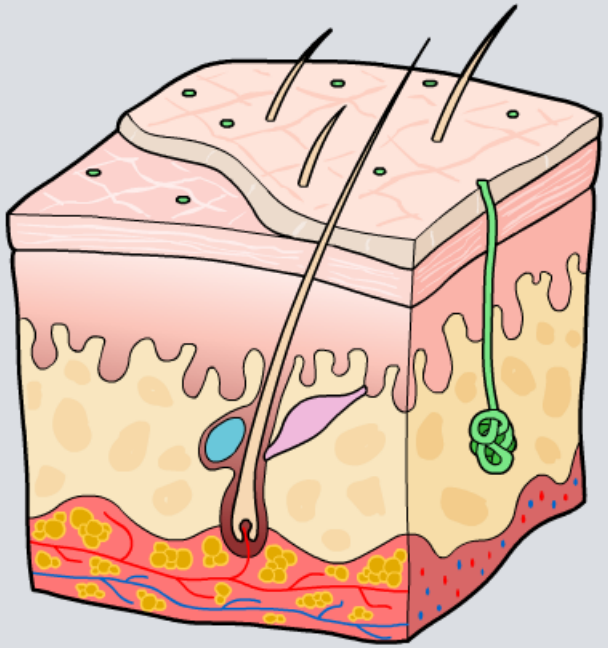
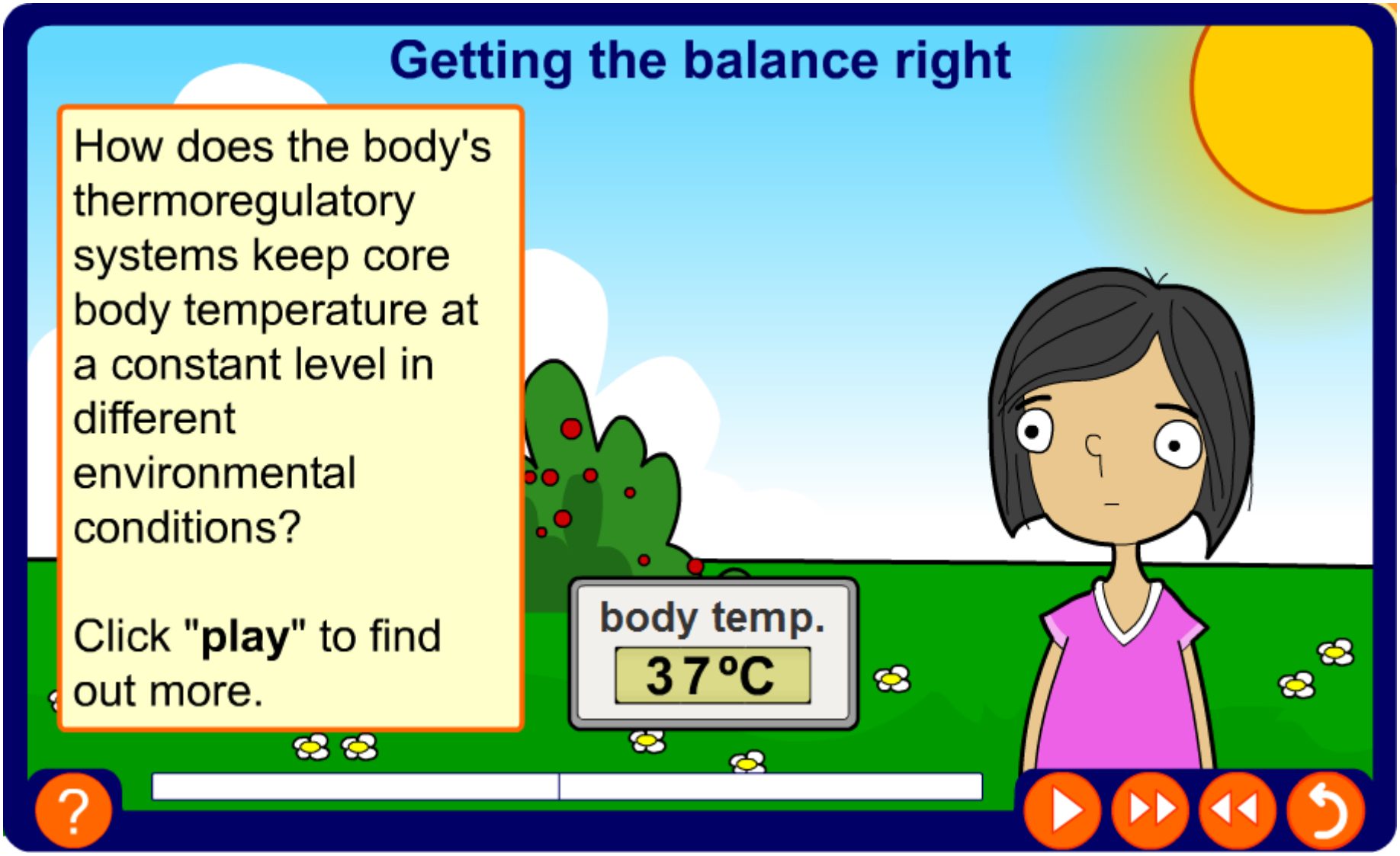
Thermoregulation



Finding the right balance

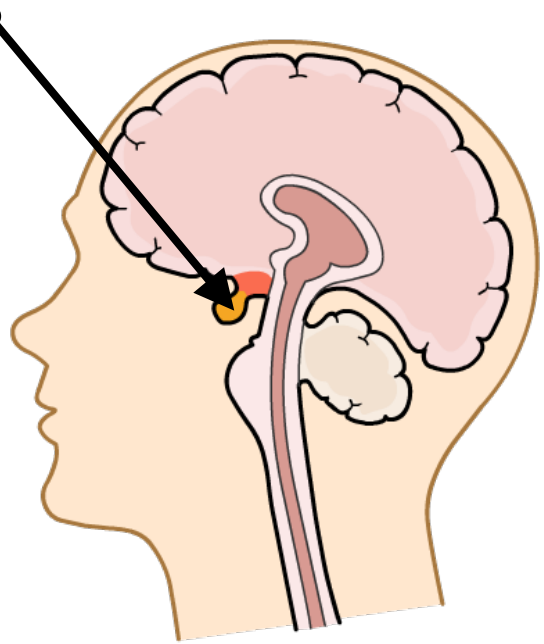


How is temperature controlled?

Body temperature is monitored and controlled by temperature receptors in the skin and brain.

These receptors detect changes in the temperature of blood flowing through those areas.

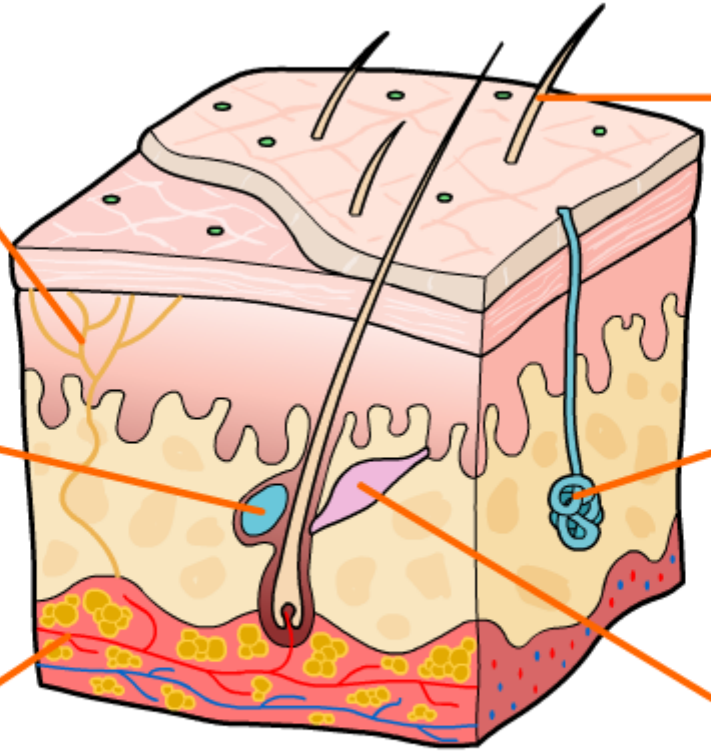
The thermoregulatory center in the brain is called the **hypothalamus**.



If body temperature deviates from 37 °C, the hypothalamus and skin receptors send out electrical signals that trigger actions or behaviors that increase or decrease heat loss.

What's in skin?

Match the labels to the skin structures.



? ? ? ? ? ?

hair

solve

Why do we shiver?

When core body temperature drops, muscles begin to twitch. This rapid contraction and relaxation of the muscles is called **shivering**.

Shivering generates heat, which raises body temperature.

Goosebumps involuntarily appear when a person becomes cold. Goosebumps are caused by the tiny muscles at the base of body hairs pulling the hairs erect.

The upright hairs trap an insulating layer of air, which helps reduce heat loss.

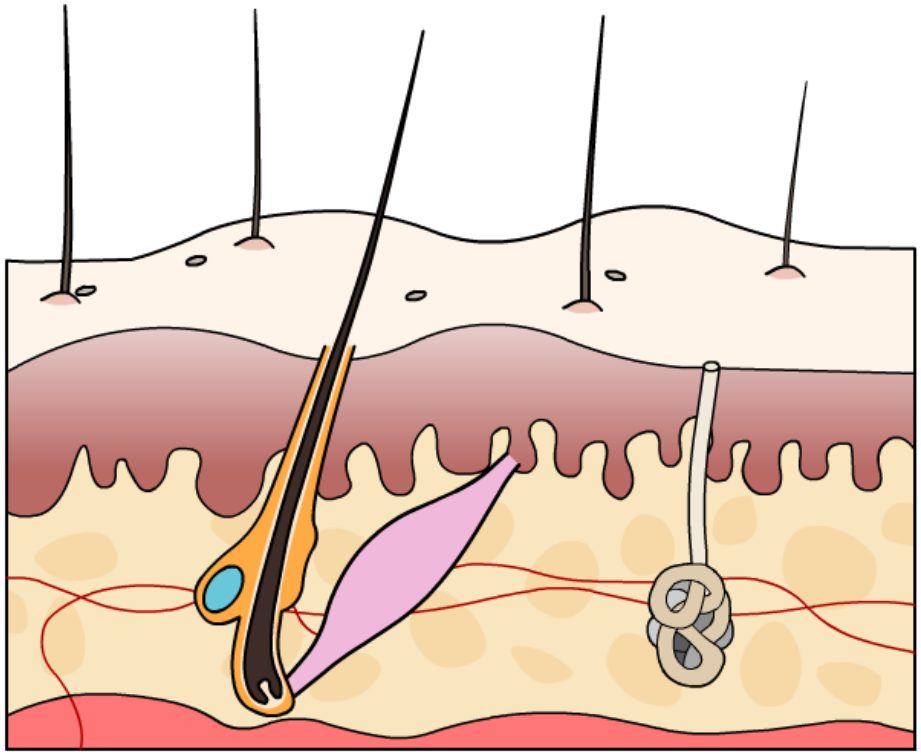
Vasoconstriction and warming up

Why do people go pale when they are cold?

When core body temperature falls, blood vessels in the skin get narrower. This is called **vasoconstriction**.

Vasoconstriction is caused by contraction of the muscular wall of the blood vessels.

This reduces the volume of blood flowing near the skin surface, and reduces the amount of heat lost from the body.



Vasodilation and cooling down

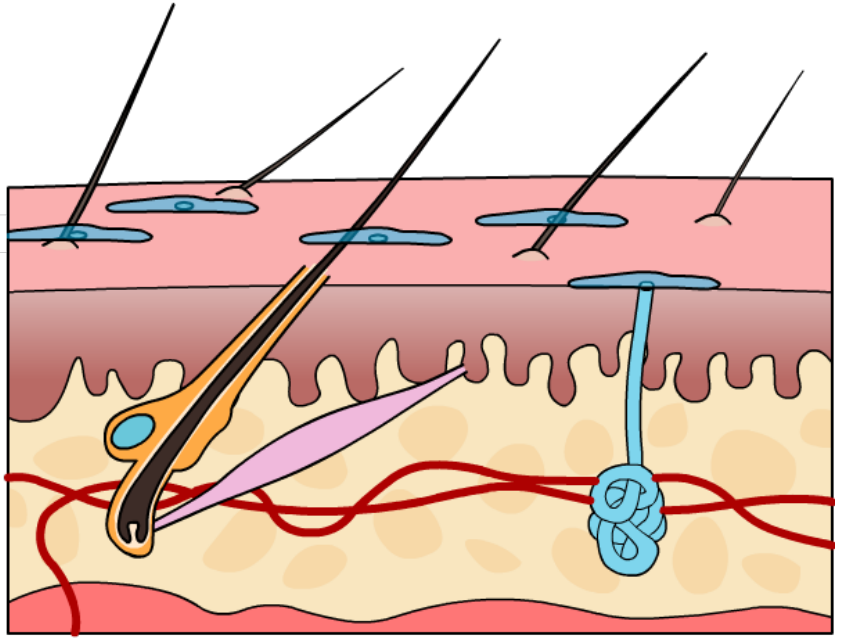
Why do people turn red when they are hot?

When core body temperature rises, blood vessels in the skin get wider. This is called **vasodilation**.

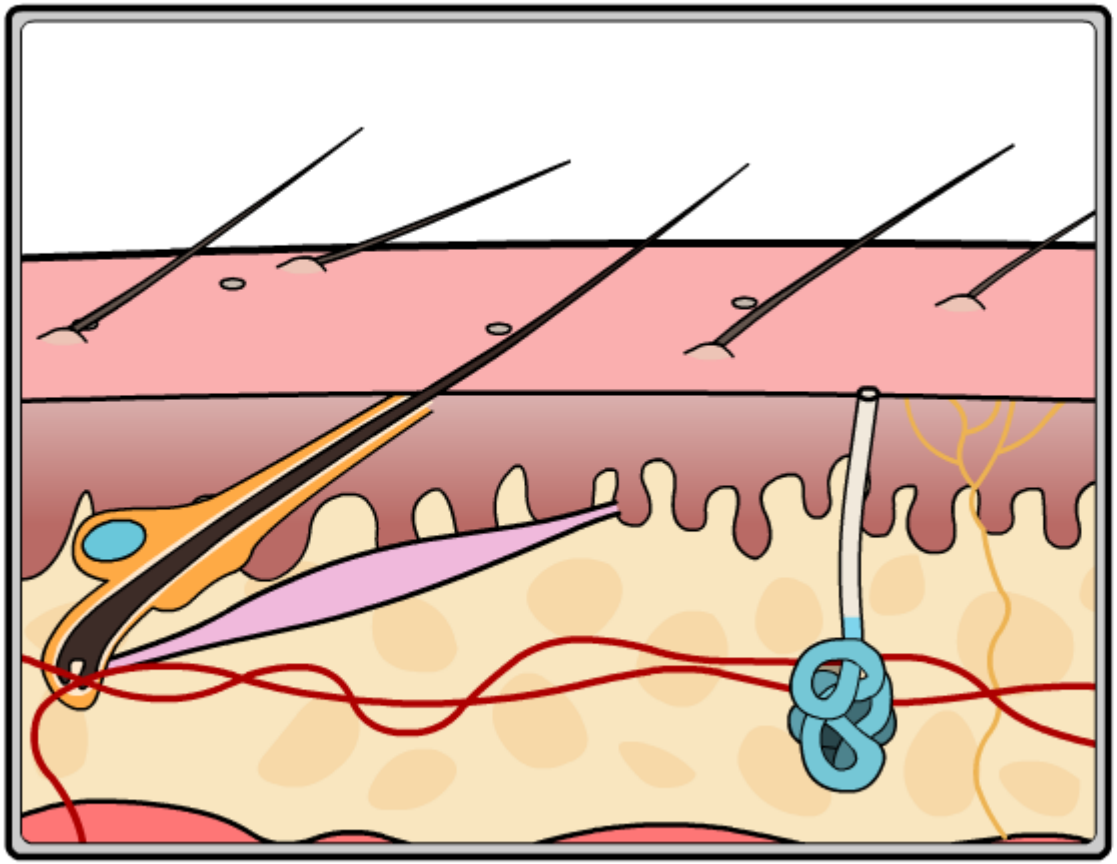
Vasodilation allows a larger volume of blood to flow near the skin surface, transferring heat to the environment. This cools the body down.

Additional cooling occurs with the production of sweat from sweat glands.

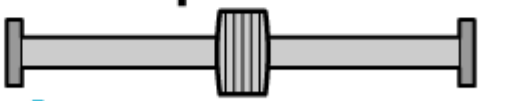
As the sweat evaporates, it transfers heat away from the body.



How does skin respond to temperature change?

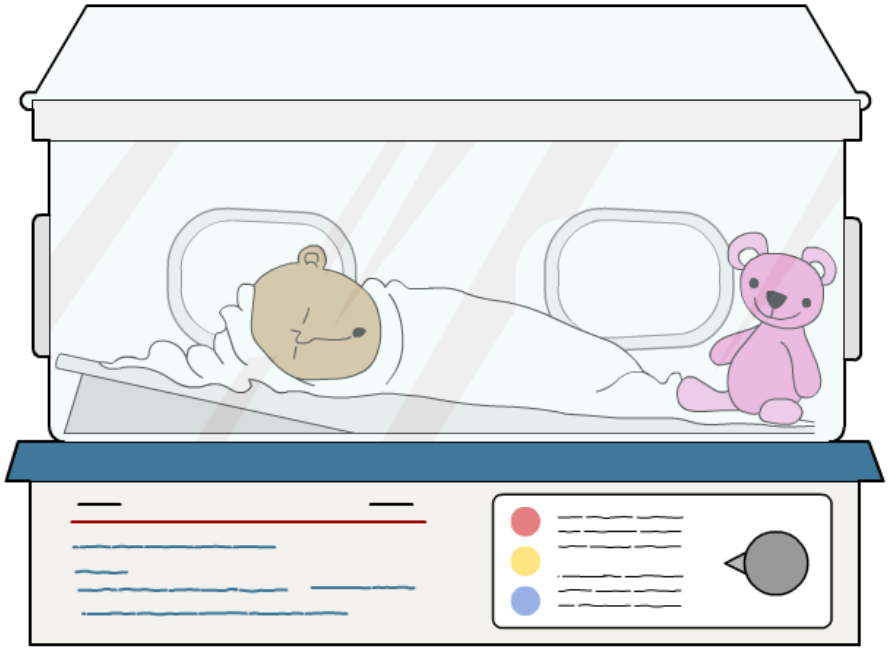


temperature



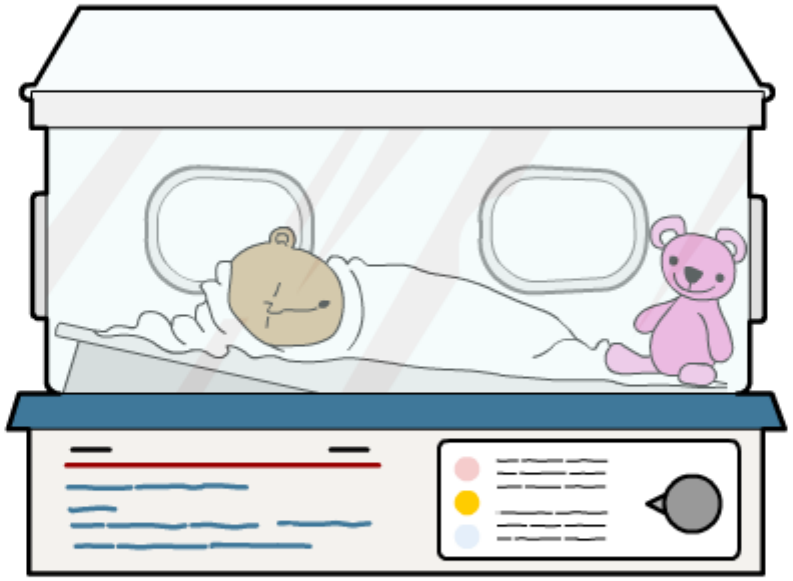
Temperature control in newborns

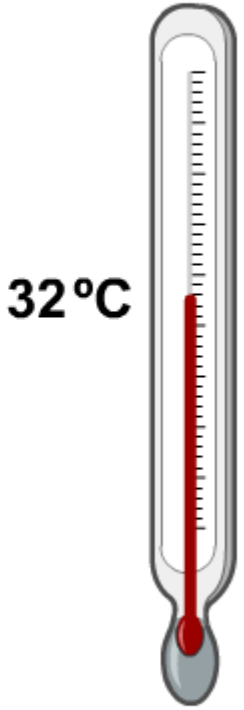
Some premature babies cannot control their own temperature. An incubator can be used to control the body temperature of premature babies, using **negative feedback**.



The air in the incubator is often kept at 32 °C. Why is it not kept at 37 °C?

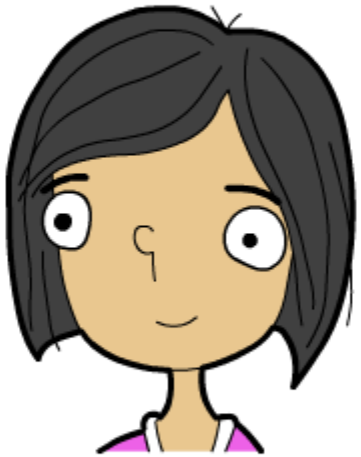
How do incubators use negative feedback?





Negative feedback in the body

How does negative feedback control body temperature?



Thermoregulation: true or false?