Exercise walk-through

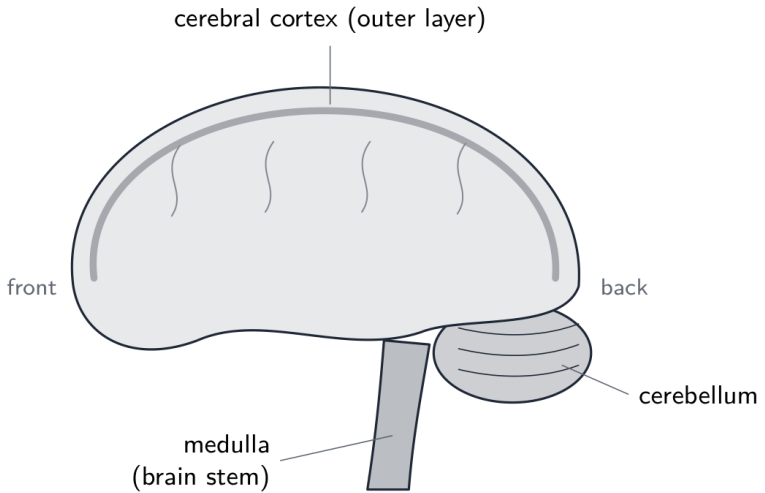
5.2
The brain, eye and temperature – biology only (4.5.2.2–4.5.2.4)

AQA · GCSE · Biology

The brain (biology only)

- the **cerebral cortex** : consciousness, intelligence, memory and language;
- the **cerebellum** : balance and muscle coordination;
- the **medulla** : unconscious activities such as the heartbeat and breathing.

Figure: The brain (biology only)



- The brain from the side: **cerebral cortex**, **cerebellum** and **medulla**
- Match each part of the diagram to the text.

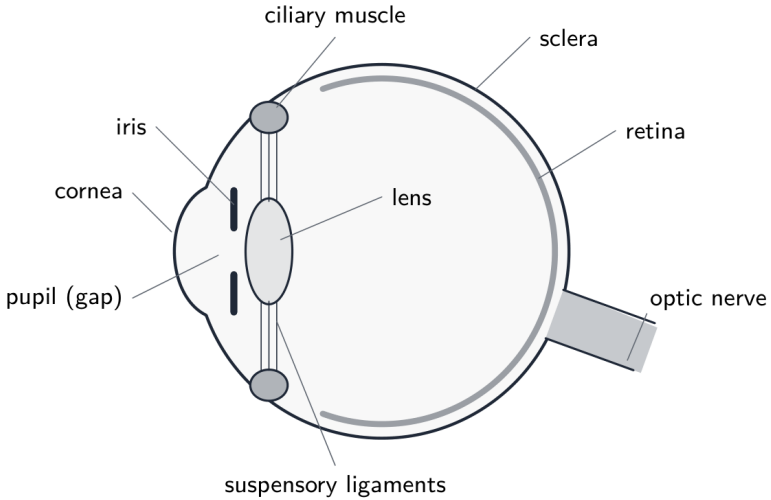
The eye (biology only)

- The **retina** contains receptor cells sensitive to light intensity and colour.
- The **optic nerve** carries impulses from the **retina** to the brain.
- The **sclera** is the tough white outer layer.

The eye (biology only) (2)

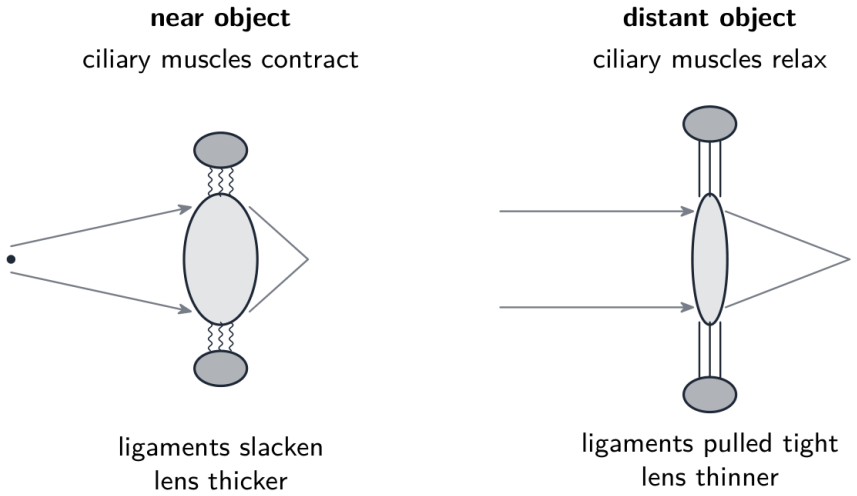
- The **cornea** is the transparent front, which refracts light into the eye.
- The **iris** controls the size of the **pupil** , the hole that lets light in.
- Ciliary muscles and suspensory ligaments change the shape of the **lens** .

Figure: The eye (biology only)



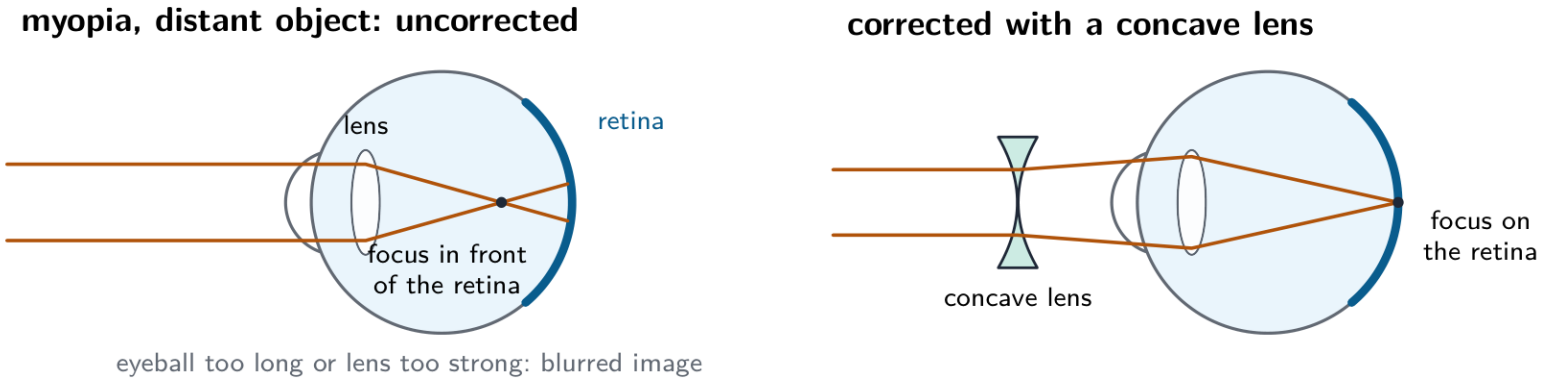
- Eye section: the **pupil** is an opening; ligaments connect ciliary muscles to the **lens**.
- Match each part of the diagram to the text.

Figure: The eye (biology only) (2)



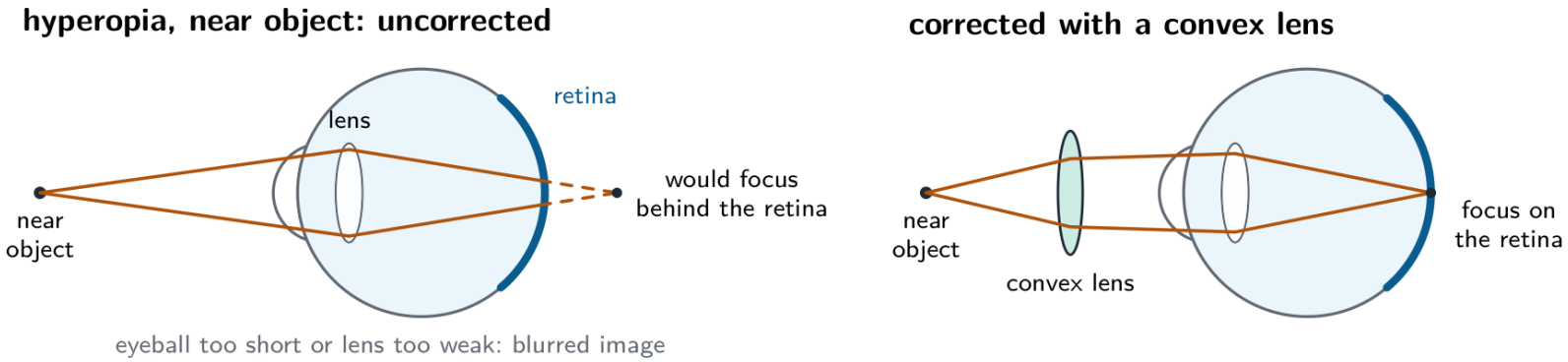
- Near and distant focusing: muscle contraction changes ligament tension and **lens** shape.
- Match each part of the diagram to the text.

Figure: The eye (biology only) (3)



- **Myopia**: light from a distant object focuses in front of the **retina**; a **concave lens** corrects it
- Match each part of the diagram to the text.

Figure: The eye (biology only) (4)



- **Hyperopia**: light from a near object would focus behind the **retina**; a **convex lens** corrects it
- Match each part of the diagram to the text.

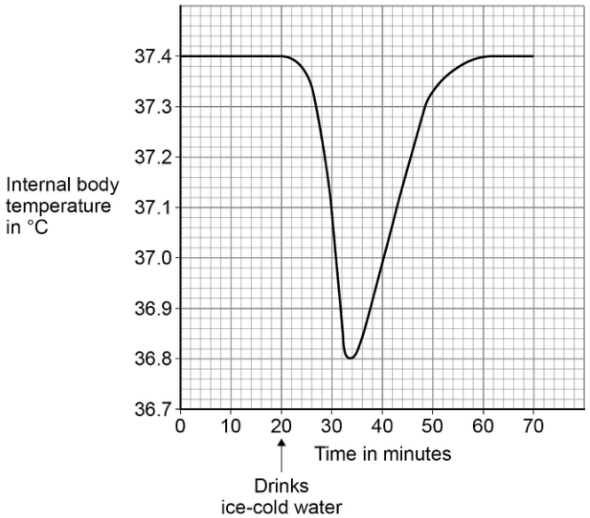
Controlling body temperature (biology only)

- the blood vessels supplying the skin capillaries widen (**vasodilation**), so more blood flows near the surface and more energy is transferred to the surroundings;
- **sweat glands** release more **sweat** , which transfers energy away from the skin as it evaporates.
- the blood vessels supplying the skin capillaries narrow (**vasoconstriction**), so less blood flows near the surface and less energy is lost;

Controlling body temperature (biology only) (2)

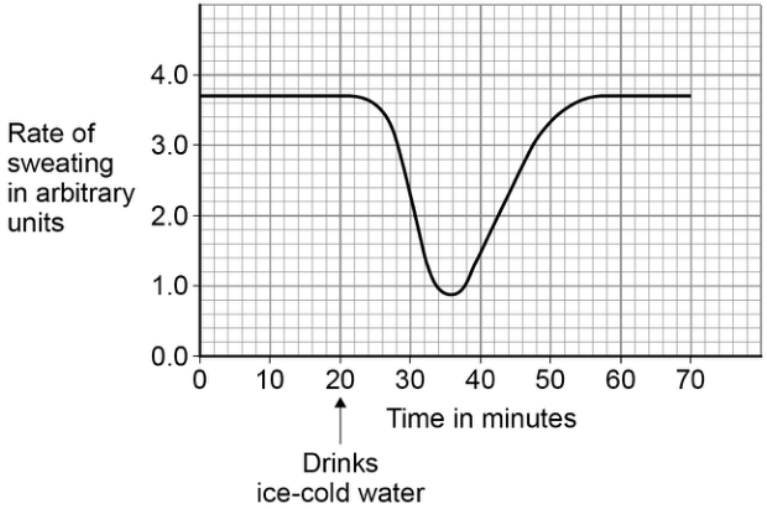
- sweating stops;
- skeletal muscles contract and relax rapidly (shivering), and the extra respiration releases energy that warms the body.

Figure: Controlling body temperature (biology only)



- Core body temperature before and after drinking ice-cold water at 20 minutes (AQA GCSE Biology Paper 2H, June 2021, Figure 5)
- Read the axes and units first.

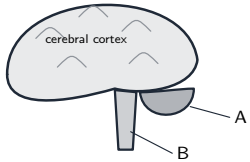
Figure: Controlling body temperature (biology only) (2)



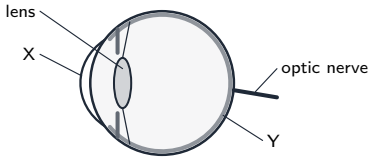
- Rate of sweating before and after drinking ice-cold water (AQA GCSE Biology Paper 2H, June 2021, Figure 6)
- Read the axes and units first.

Exercises 2.1·2.2

2.1 The diagram shows the brain. Name part A and part B. [2]

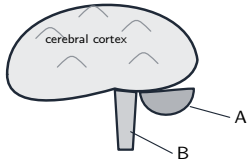


2.2 Name the parts of the eye labelled X and Y. [2]



Exercises 2.1·2.2

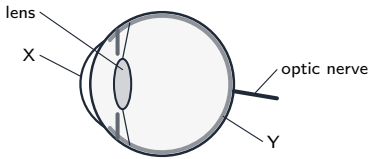
2.1 The diagram shows the brain. Name part A and part B. [2]



2.1

- A: **cerebellum**; B: **medulla**

2.2 Name the parts of the eye labelled X and Y. [2]



2.2

- X: **cornea**; Y: **retina**

Exercise 2.3

2.3 A person walks from a dark room into bright sunlight. What happens to the size of the pupil? Why is this useful? [2]



in the dark

in bright light

Exercise 2.3

2.3 A person walks from a dark room into bright sunlight. What happens to the size of the pupil? Why is this useful? [2]



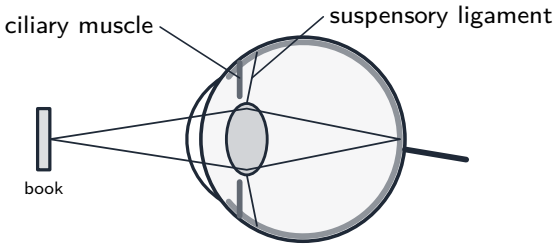
in the dark in bright light

2.3

- the pupil gets smaller; less light enters, so the retina is not damaged

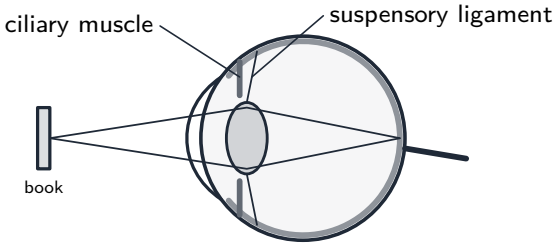
Exercise 3.1

3.1 A person looks up from a far-away object to read a book. Explain how the eye focuses on the book. [3]



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3.1

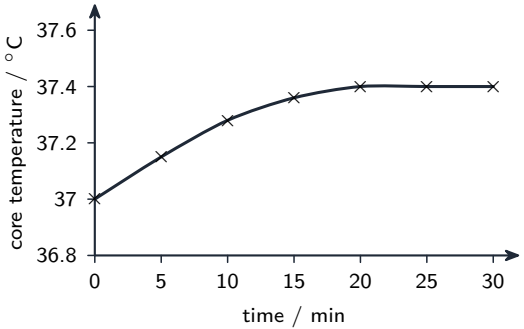
- the ciliary muscles contract
- the suspensory ligaments become loose (slacken)
- the lens becomes fatter (more curved), so it refracts light more and focuses it on the retina

Exercise 3.2 (a)

3.2 A person sits in a hot room at 45 °C for 30 minutes. The graph shows their core body temperature. The table shows how much sweat they made.

time / min	**0–10**	**10–20**	**20–30**
sweat made / g	8	22	30

(a) Describe how the core body temperature changed. [2]

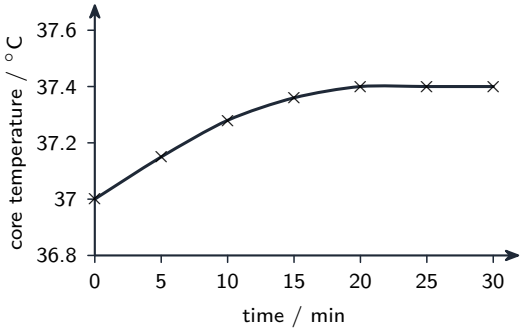


Exercise 3.2 (a)

3.2 A person sits in a hot room at 45 °C for 30 minutes. The graph shows their core body temperature. The table shows how much sweat they made.

time / min	**0–10**	**10–20**	**20–30**
sweat made / g	8	22	30

(a) Describe how the core body temperature changed. [2]



(a) it rose from 37.0 °C to about 37.4 °C in the first 20 minutes; then it stayed about the same (levelled off)

Exercise 3.2 (b)

3.2 A person sits in a hot room at 45 °C for 30 minutes. The graph shows their core body temperature. The table shows how much sweat they made.

time / min	**0–10**	**10–20**	**20–30**
sweat made / g	8	22	30

(b) Calculate the mean rate of sweating over the 30 minutes, in g/min. [3]

Exercise 3.2 (b)

3.2 A person sits in a hot room at 45 °C for 30 minutes. The graph shows their core body temperature. The table shows how much sweat they made.

time / min	**0–10**	**10–20**	**20–30**
sweat made / g	8	22	30

(b) Calculate the mean rate of sweating over the 30 minutes, in g/min. [3]

(b) total sweat $= 8 + 22 + 30 = 60$ g; $60 \div 30 =$ **2** g/min

Exercise 3.2 (c)

3.2 A person sits in a hot room at 45 °C for 30 minutes. The graph shows their core body temperature. The table shows how much sweat they made.

time / min	**0–10**	**10–20**	**20–30**
sweat made / g	8	22	30

(c) Explain how sweating cools the body. [2]

Exercise 3.2 (c)

3.2 A person sits in a hot room at 45 °C for 30 minutes. The graph shows their core body temperature. The table shows how much sweat they made.

time / min	**0–10**	**10–20**	**20–30**
sweat made / g	8	22	30

(c) Explain how sweating cools the body. [2]

(c) water in the sweat evaporates from the skin; evaporation transfers energy (heat) away from the skin

Exercise 3.2 (d)

3.2 A person sits in a hot room at 45 °C for 30 minutes. The graph shows their core body temperature. The table shows how much sweat they made.

time / min	**0–10**	**10–20**	**20–30**
sweat made / g	8	22	30

(d) Explain how the body responds when its core temperature falls too low. [6]

Exercise 3.2 (d)

3.2 A person sits in a hot room at 45 °C for 30 minutes. The graph shows their core body temperature. The table shows how much sweat they made.

time / min	**0–10**	**10–20**	**20–30**
sweat made / g	8	22	30

(d) Explain how the body responds when its core temperature falls too low. [6]

(d) points to include:

- the thermoregulatory centre in the brain detects the fall in blood temperature; receptors in the skin also send impulses
- blood vessels supplying the skin capillaries narrow (vasoconstriction)
- so less blood flows near the surface and less heat is lost to the air
- muscles shiver: they contract quickly and respire, which releases heat
- sweating stops, so less heat is lost by evaporation
- the core temperature rises back towards 37 °C (negative feedback)

Levels: **5–6** a full, logical answer with correct biology and correct terms; **3–4** several correct points, partly linked; **1–2** one or two relevant points.