AQA GCSE Biology Paper 2 Revision

Homeostasis and Response

Revision Session

Content you will **NOT** be assessed on

5.1 Homeostasis

Key Term	Definition
Homeostasis	

Conditions in the body controlled by homeostasis include:

Water Levels

Blood Glucose Concentration

Body Temperature

CS/F CS/H SS/F SS/H

5.1 Homeostasis

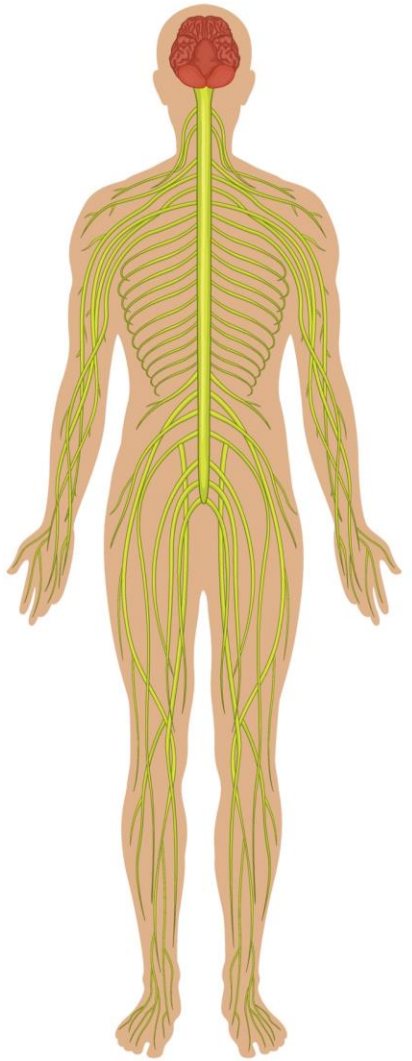
These automatic control systems may involve nervous responses or chemical responses. All control systems include:

Part of Control System	Example	Description
Receptors		
Coordination Centre		
Effectors		

5.2.1 Structure and Function

Think
Pair
Share

What is the nervous system?



It is a system that enables animals to react to their surroundings and to coordinate their behaviour.

It is made up of the central nervous system which includes the brain and spinal cord as well as the peripheral nervous system which includes nerves.

CS/F CS/H SS/F SS/H

5.2.1 Structure and Function

Think
Pair
Share

What is the nervous system?

Information is passed from:

Stimulus

↓

Receptor

↓

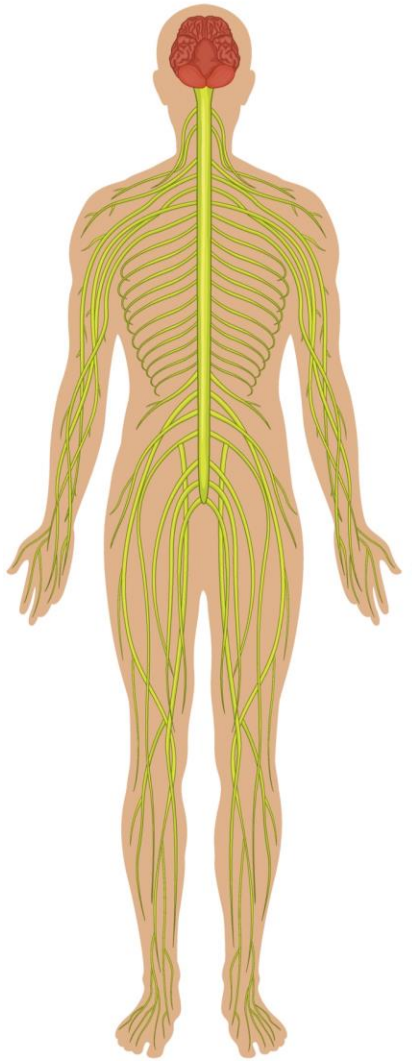
Coordinator

↓

Effectors

↓

Response



CS/F CS/H SS/F SS/H

5.2.1 Structure and Function

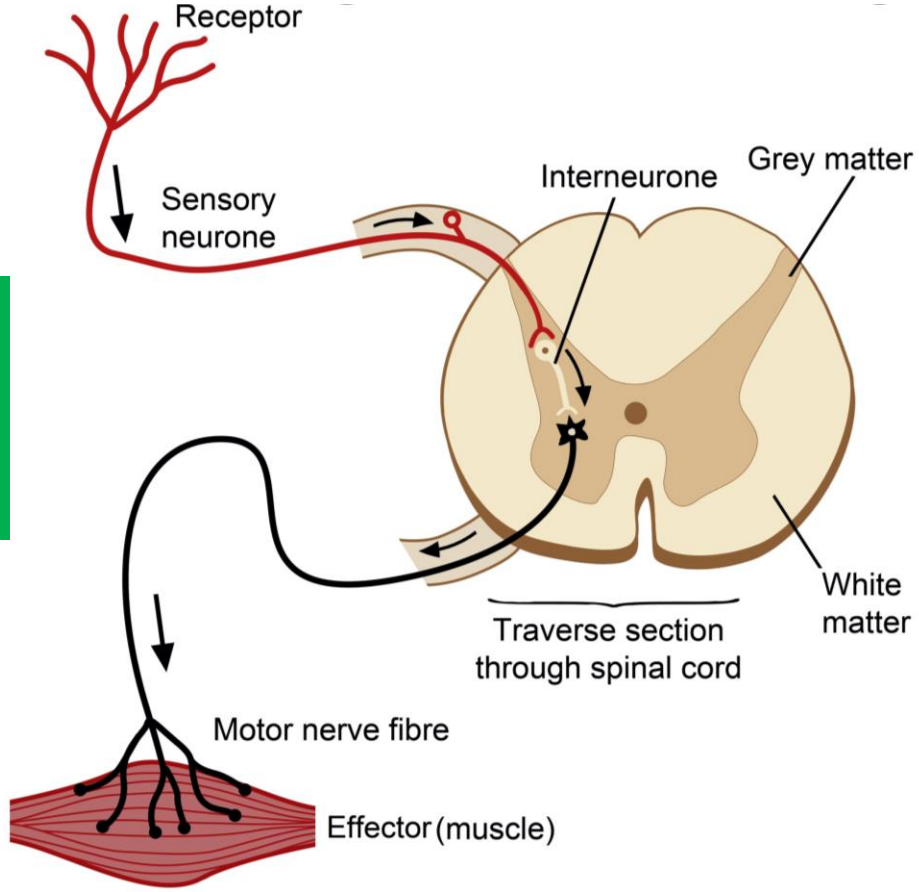
Key Term	Definition
Nervous System	
Central Nervous System	
Sensory Neurone	
Synapse	
Relay Neurone	
Motor Neurone	

5.2.1 Structure and Function

Think
Pair
Share

Why are reflex arcs important?

A reflex is a fast, automatic response that protects us from harm.



CS/F CS/H SS/F SS/H

5.2.1 Structure and Function

Think
Pair
Share

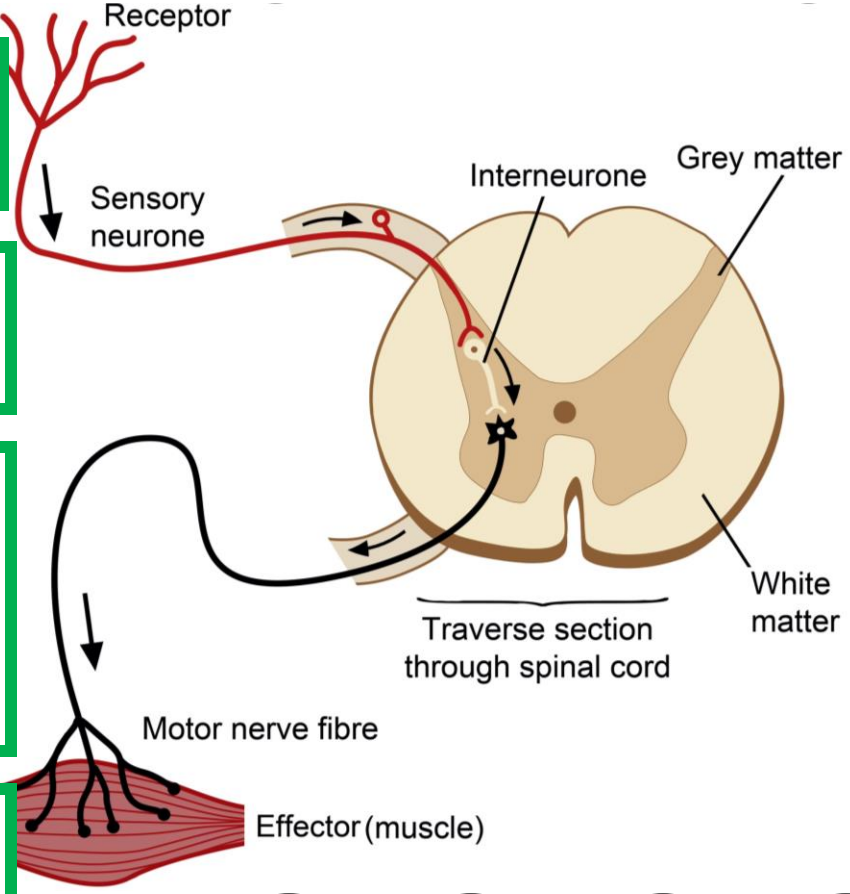
What happens during a reflex action?

Receptor detects a change and generates an electrical impulse.

Impulse travels along the sensory neurone and crosses a synapse.

The impulse is processed by a relay neuron and the impulse then travels along a motor neurone to the effector.

The effector brings about a response.



CS/F CS/H SS/F SS/H

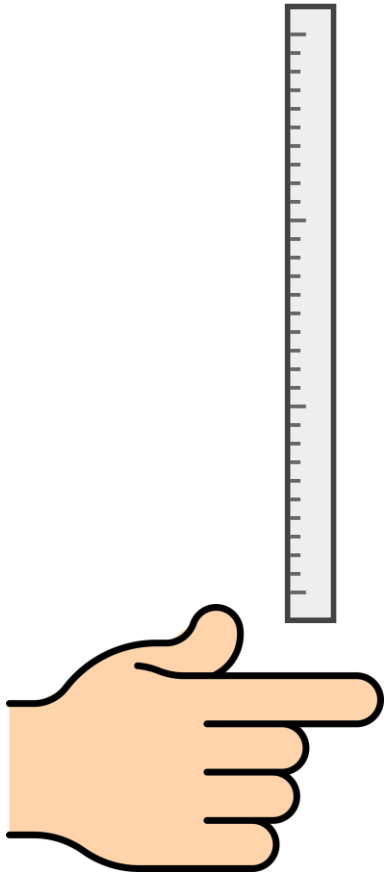
5.2.1 Structure and Function

Think
Pair
Share

How can we determine someone's reaction time?

1.
Person catching sits down, rests weaker arm across the table, with the hand overhanging the edge.

2.
Person dropping the ruler holds it so that the bottom end of the ruler is in line with the catches thumb and forefinger.



CS/F CS/H SS/F SS/H

5.2.1 Structure and Function

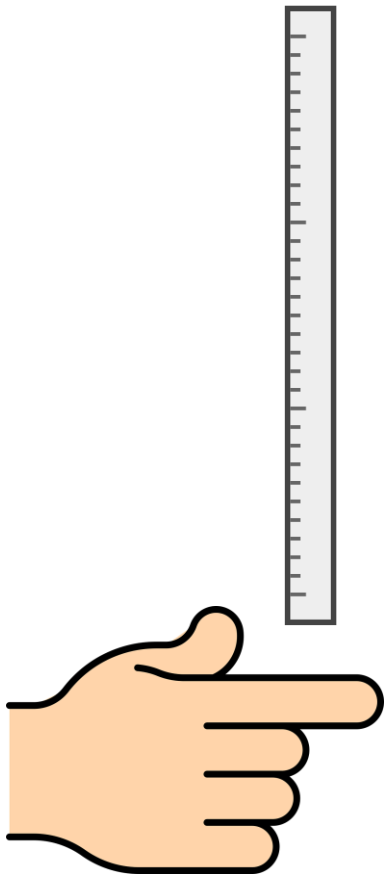
Think
Pair
Share

How can we determine someone's reaction time?

3.
Without warning the ruler is dropped.

4.
The other person catches the ruler and the distance the ruler fell is recorded.

5.
Repeat this several times.



CS/F CS/H SS/F SS/H

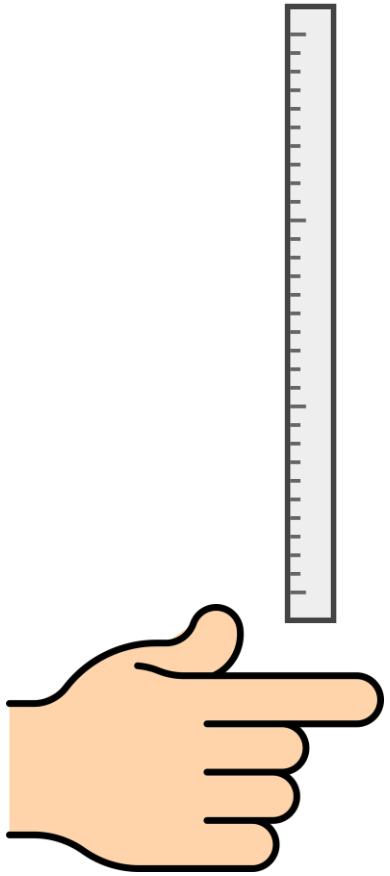
5.2.1 Structure and Function

Think
Pair
Share

How can we determine someone's reaction time?

6.
Identify outliers and calculate an average distance dropped.

7.
Convert this distance dropped to a reaction time using a table.`



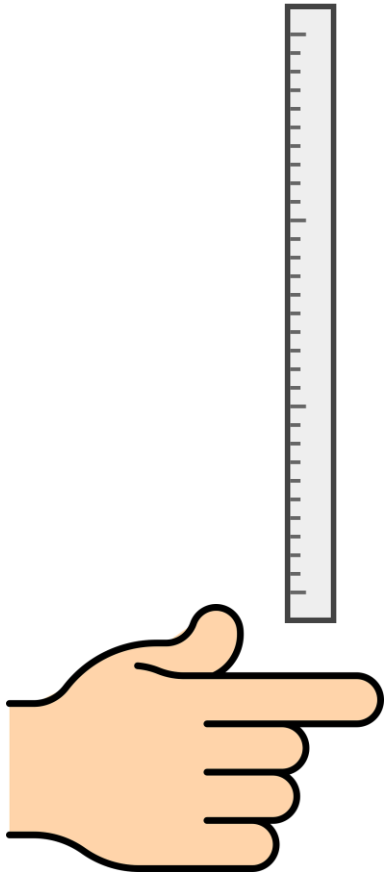
CS/F CS/H SS/F SS/H

5.2.1 Structure and Function

Think
Pair
Share

How can we determine someone's reaction time?

We can use this method to investigate the effects of caffeine, practice and tiredness on someone's reaction time.



CS/F CS/H SS/F SS/H

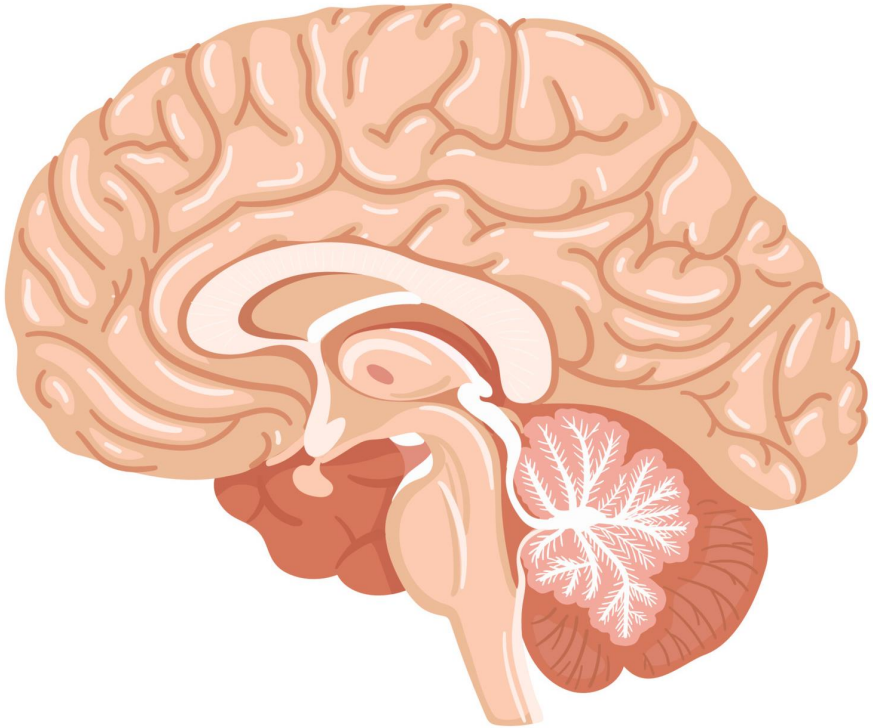
5.2.2 The Brain

Think
Pair
Share

What is the function of the brain?

The brain is an organ that controls complex behaviours.

It is made of billions of interconnected neurones and has different regions that carry out different functions.

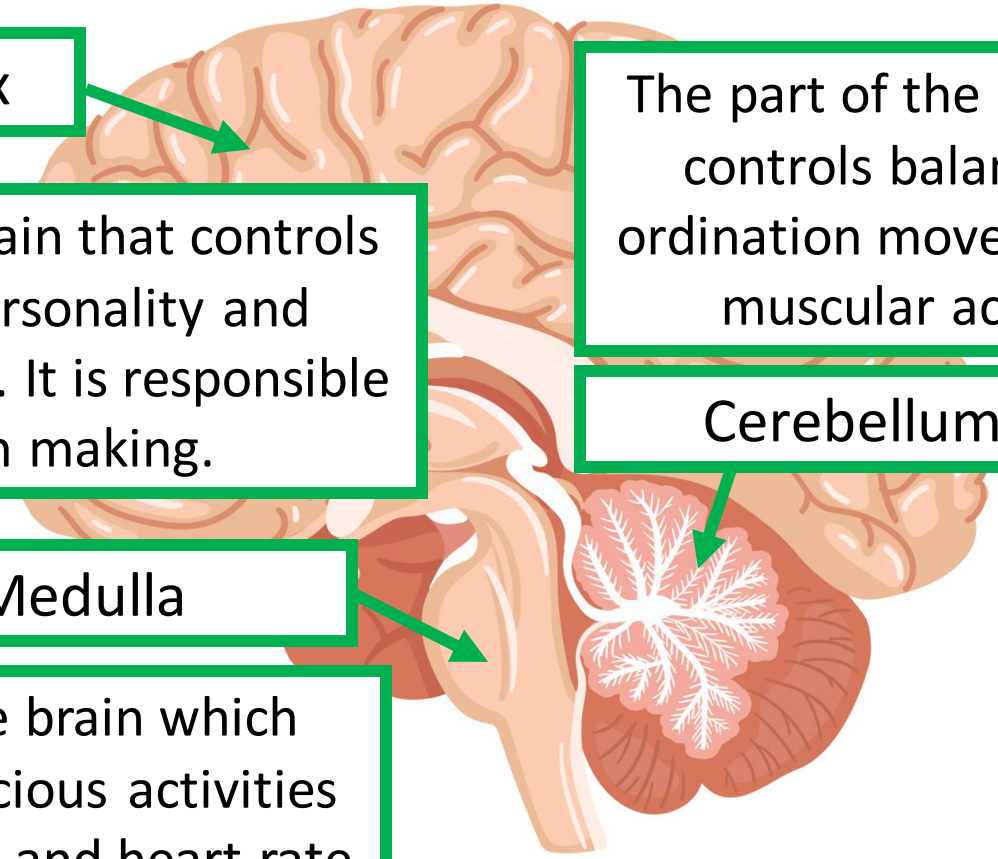


CS/F CS/H SS/F SS/H

5.2.2 The Brain

Think
Pair
Share

What are the different regions of the brain and what are their functions?



Cerebral Cortex

The part of the brain that controls intelligence, personality and conscious thought. It is responsible for decision making.

The part of the brain that controls balance, co-ordination movement and muscular activity.

Cerebellum

Medulla

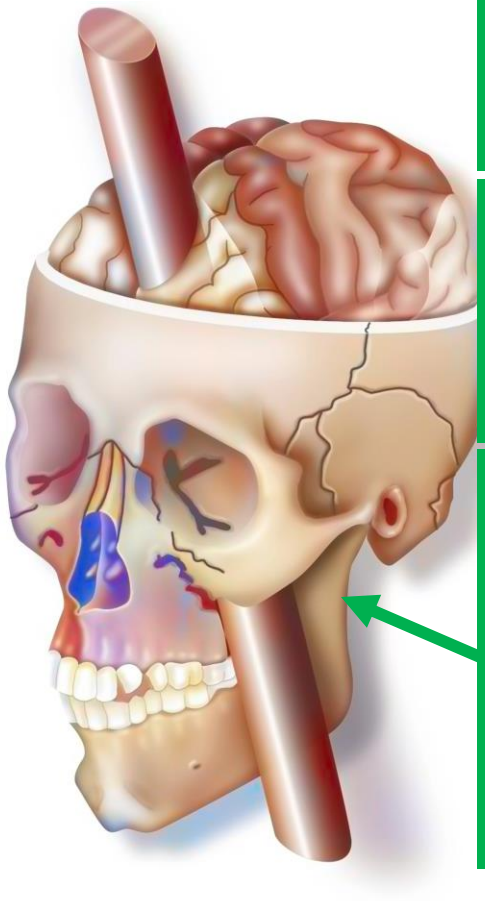
The part of the brain which controls unconscious activities such as breathing and heart rate.

CS/F CS/H SS/F SS/H

5.2.2 The Brain

Think
Pair
Share

How do we know what different regions of the brain do?



One way we know about what different parts of the brain do is through studying patients with brain damage.

This involves identifying the area of the brain that someone has damaged and observing the result of this.

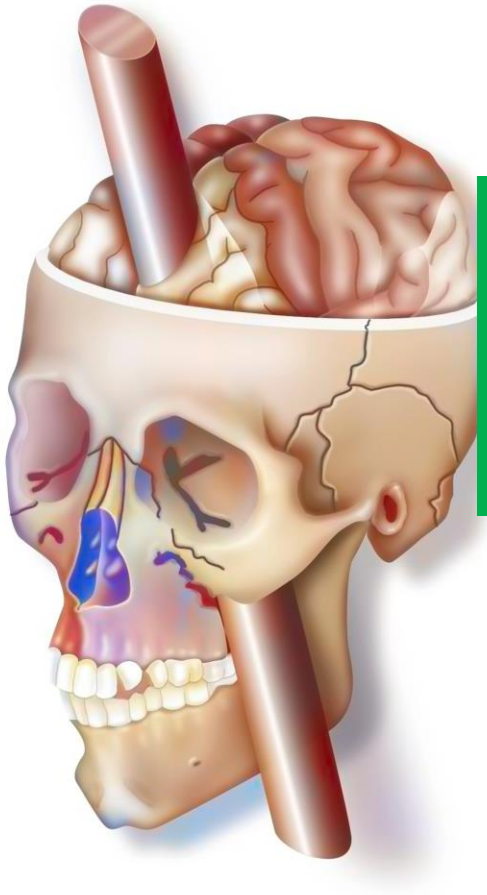
For example, in the 1800's Phineas Gage was working, and an iron rod went through his skull. He survived, bit his personality was changed. This was due to the parts of the brain that he had damaged.

CS/F CS/H SS/F SS/H

5.2.2 The Brain

Think
Pair
Share

How do we know what different regions of the brain do?



There are ethical concerns around obtaining consent. If the person being studied has brain damage, they may not be capable to making informed choices.

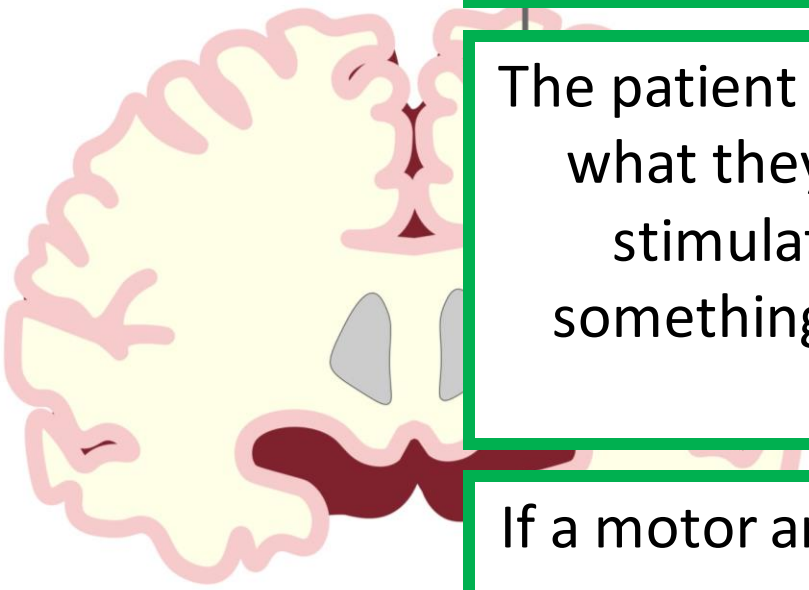
CS/F CS/H SS/F SS/H

5.2.2 The Brain

Think
Pair
Share

How do we know what different regions of the brain do?

Another way of mapping the brain involves electrically stimulating different parts of the brain by using a weak electrical current.



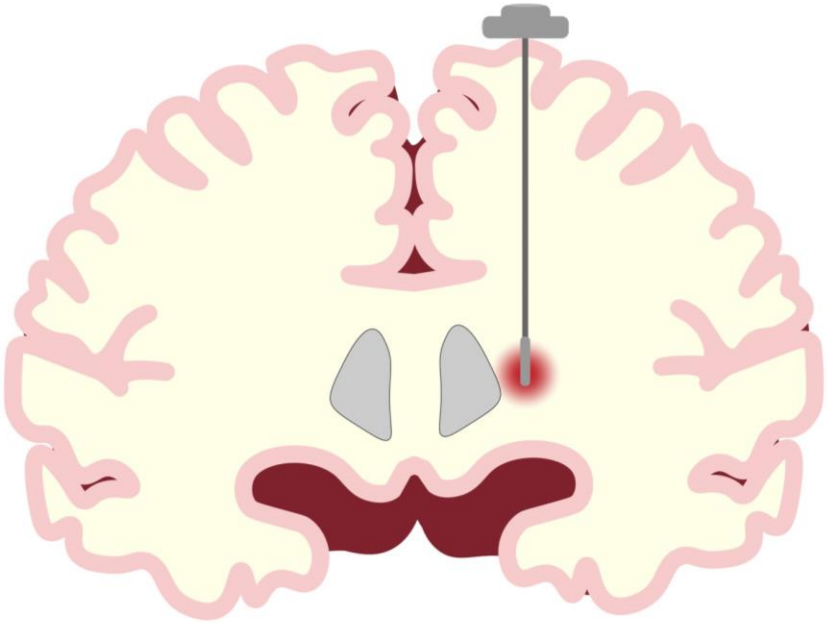
The patient is awake and so is able to describe what they experience when their brain is stimulated. This may be that they see something, remember something or smell something.

If a motor area of the brain is stimulated, they will move involuntary.

5.2.2 The Brain

Think
Pair
Share

How do we know what different regions of the brain do?



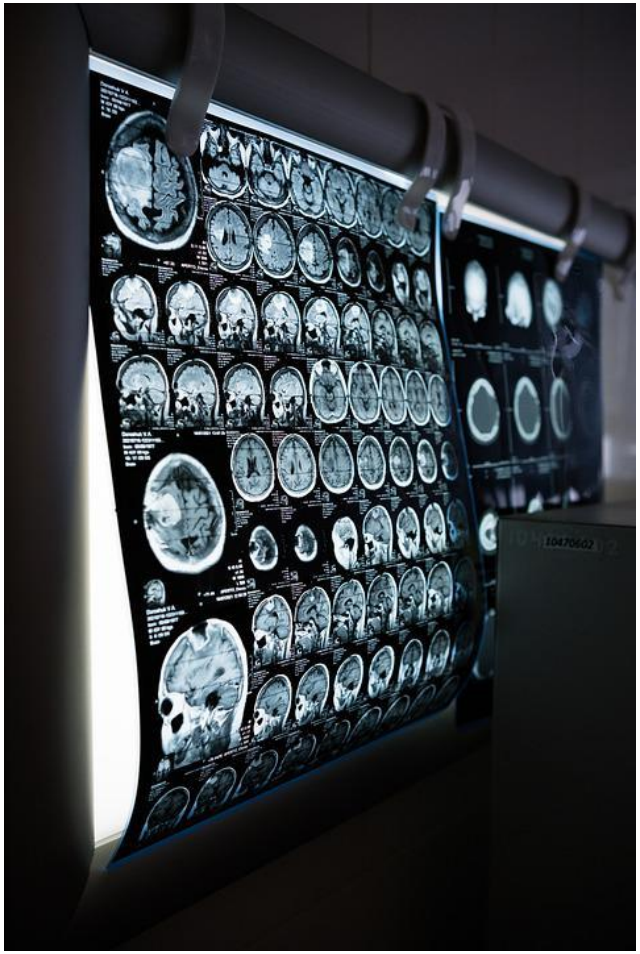
There are risks with the procedure which can raise concerns.

CS/F CS/H SS/F SS/H

5.2.2 The Brain

Think Pair Share

How do we know what different regions of the brain do?



Another way of mapping the brain is using MRI scanning techniques.

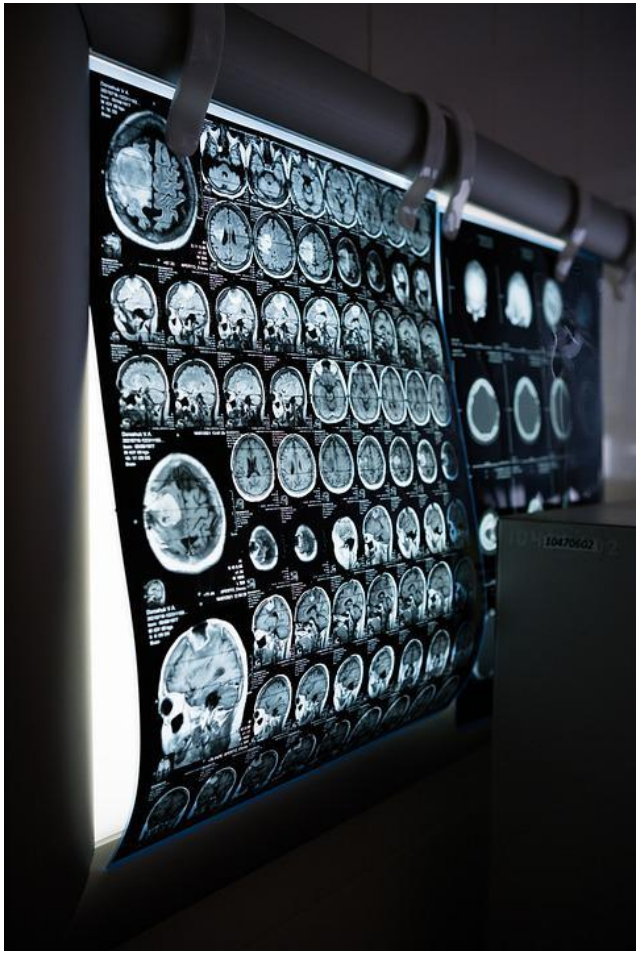
This involves using strong magnetic fields and radio waves to study the brain. A patient's brain is scanned while they are doing a certain task and the scientists see what parts of the brain are active.

CS/F CS/H SS/F SS/H

5.2.2 The Brain

Think
Pair
Share

How do we know what different regions of the brain do?



Procedure is relatively safe and can be used to locate the general area that for different functions of the brain.

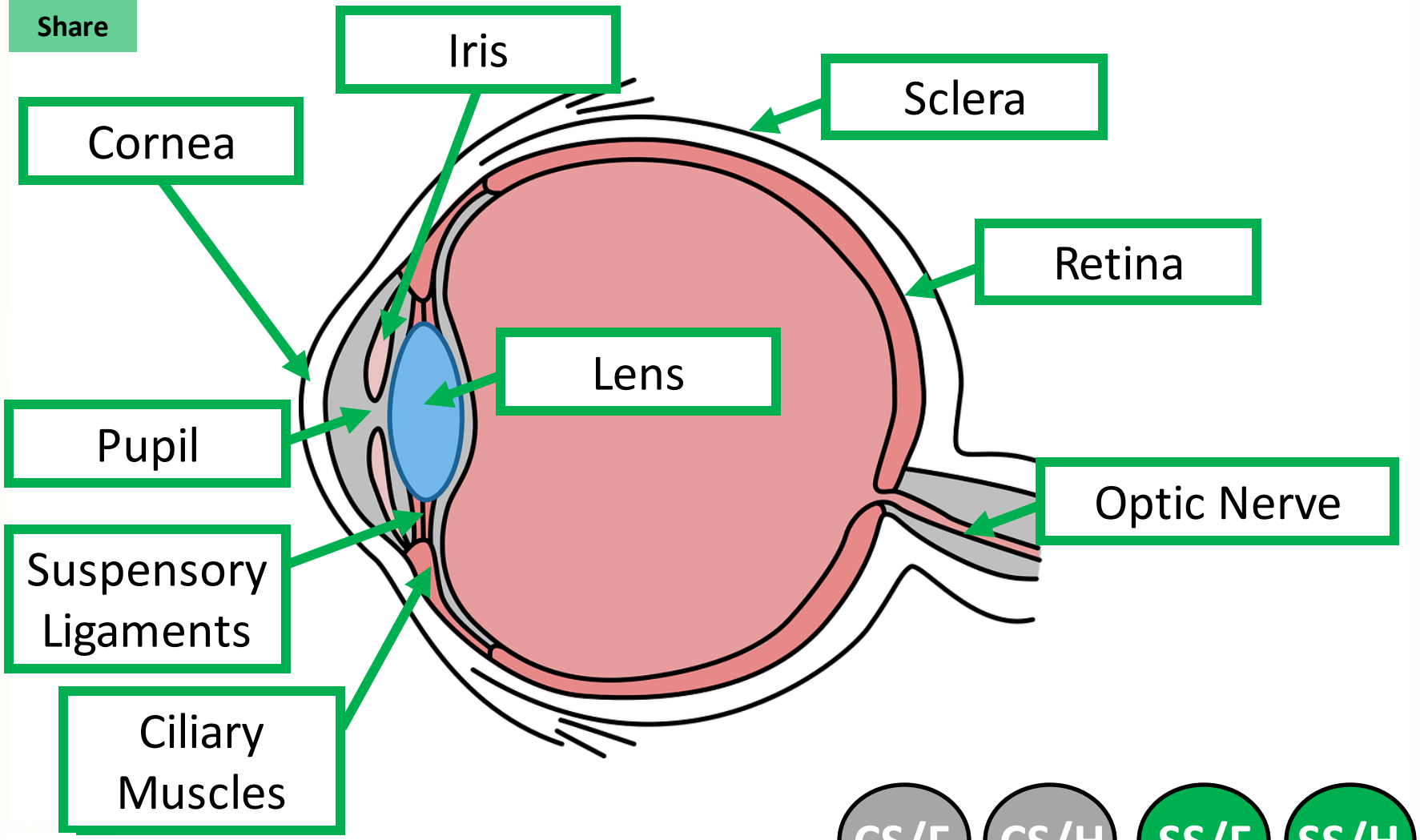
The person having the scan will need to stay completely still which may not be possible if the person has a condition such as Parkinson's.

CS/F CS/H SS/F SS/H

5.2.3 The Eye

Think
Pair
Share

What are the different parts of the brain?



CS/F CS/H SS/F SS/H

5.2.3 The Eye

Think
Pair
Share

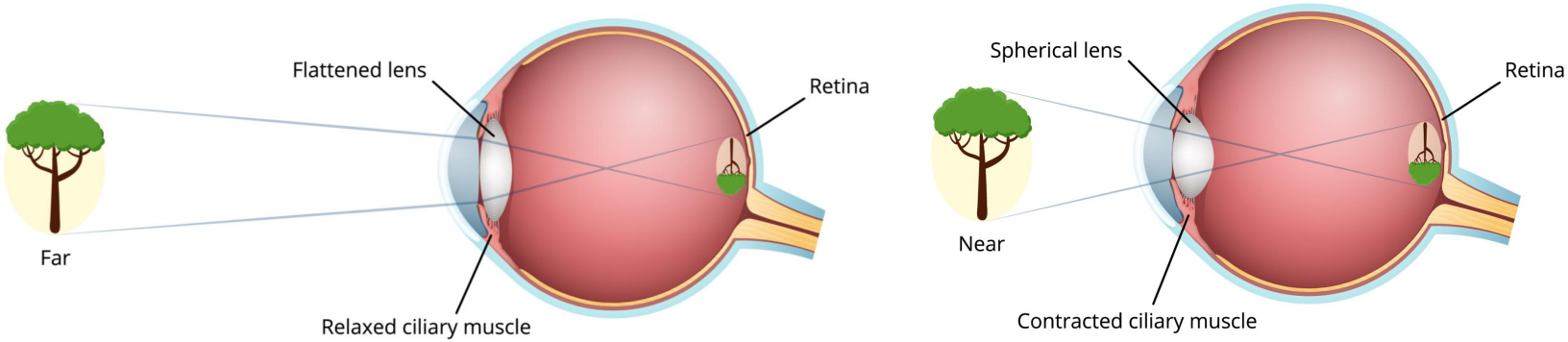
What is the function of the different structures?

Key Term	Definition
Retina	
Optic Nerve	
Sclera	
Cornea	
Iris	

5.2.3 The Eye

Think
Pair
Share

How can we focus on near and far objects?



Key Term	Definition
Accommodation	

5.2.3 The Eye

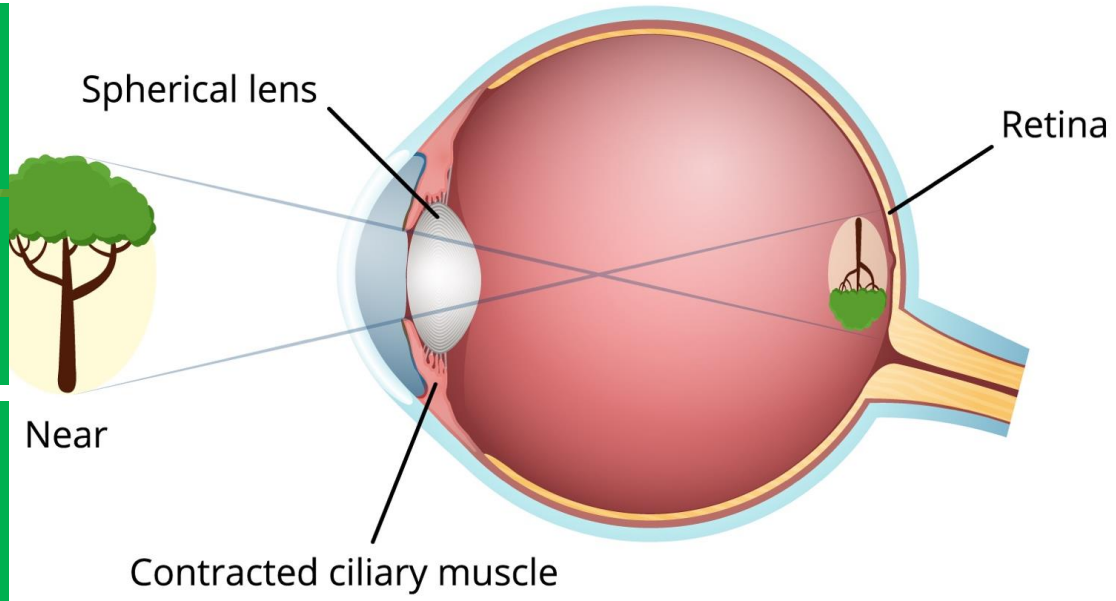
Think
Pair
Share

How can we focus on a near object?

The ciliary muscles contract.

The suspensory ligaments loosen.

The lens is thicker and contracts light more strongly.



CS/F CS/H SS/F SS/H

5.2.3 The Eye

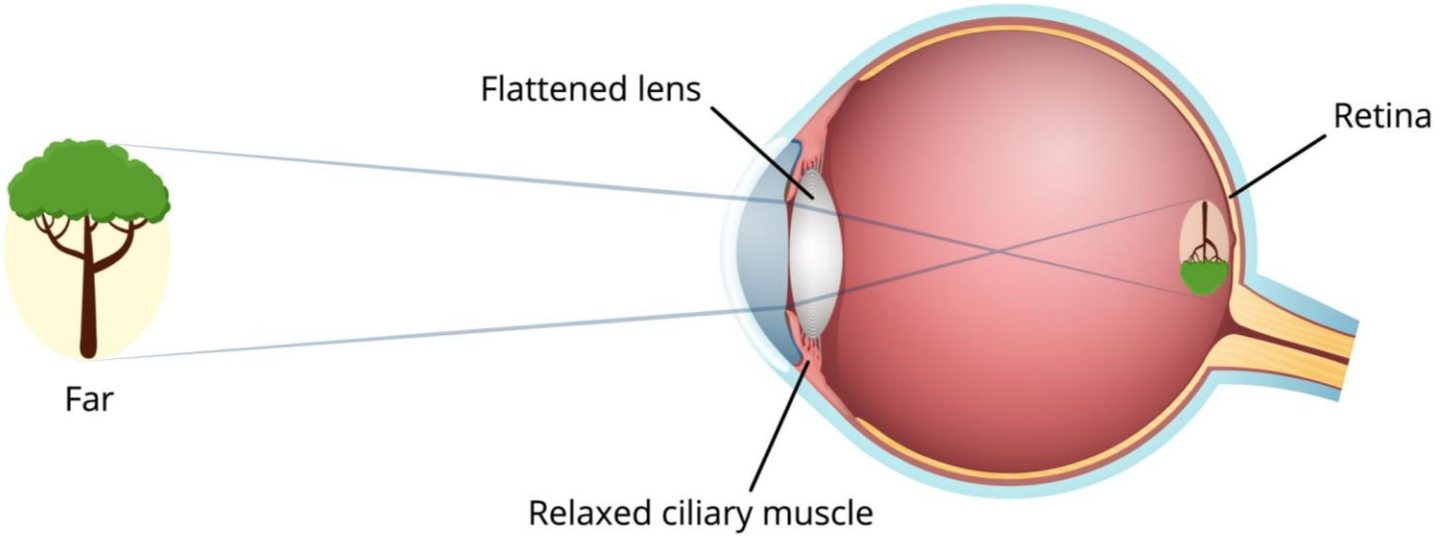
Think
Pair
Share

How can we focus on a far object?

The ciliary muscles relax.

The suspensory ligaments are pulled tight.

The lens is then pulled thin and only slightly refracts light rays.

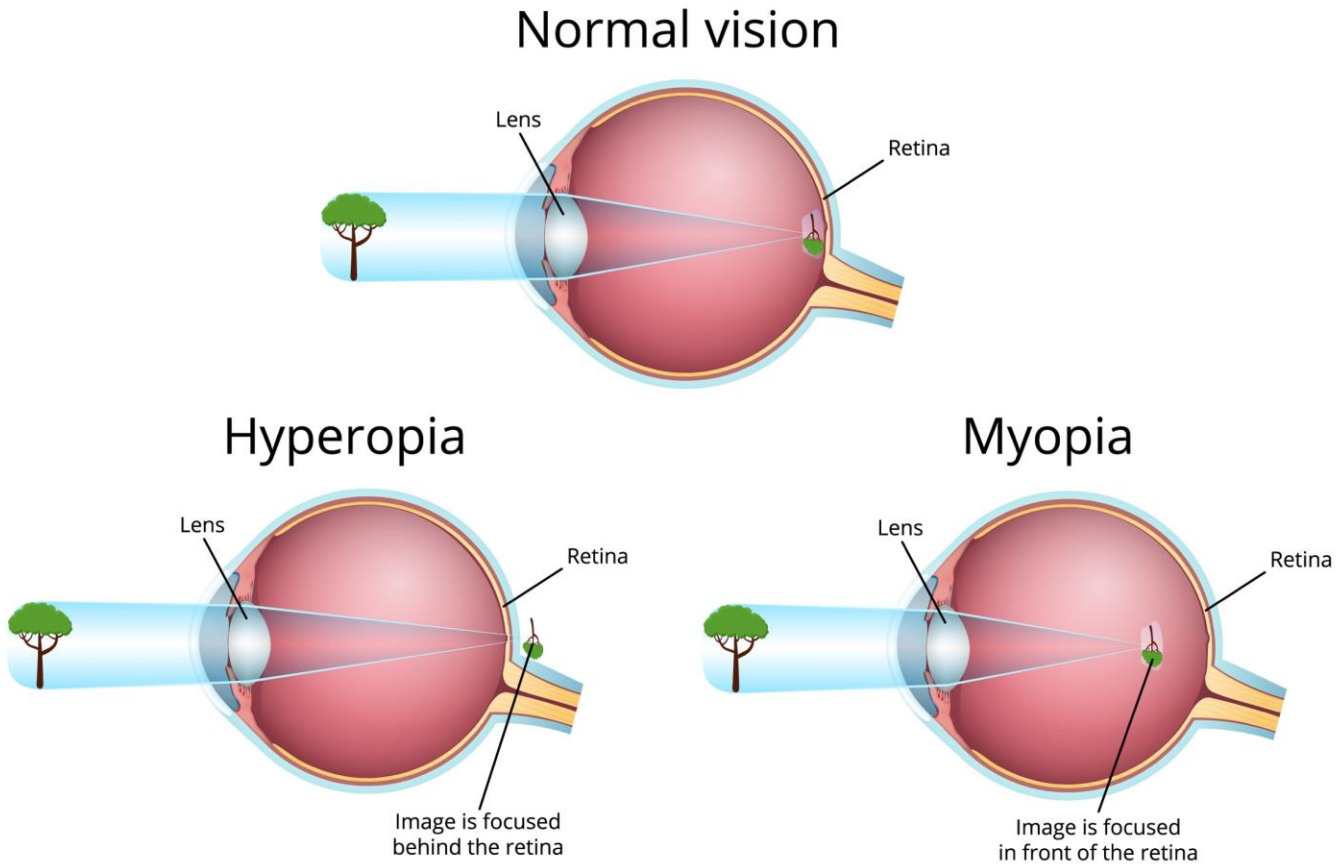


CS/F CS/H SS/F SS/H

5.2.3 The Eye

Think
Pair
Share

What are some common defects of the eye?



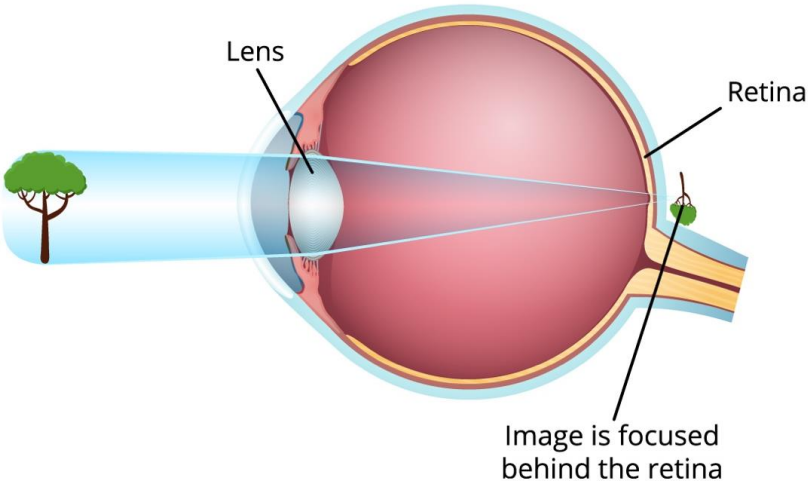
CS/F CS/H SS/F SS/H

5.2.3 The Eye

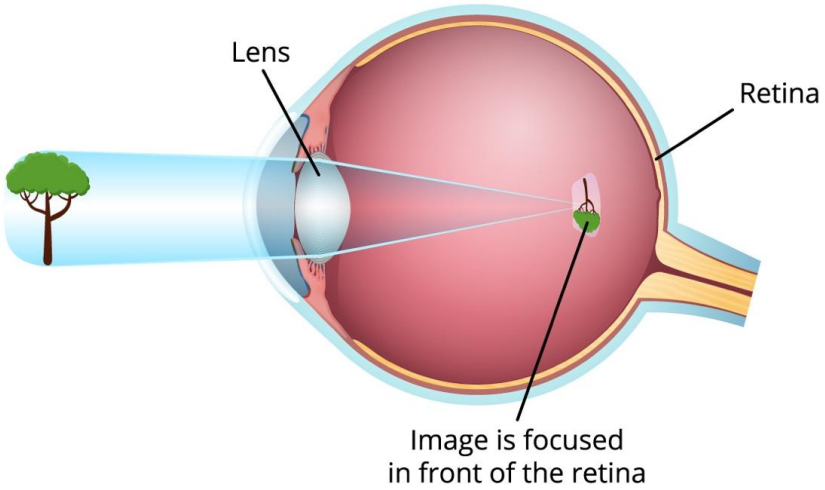
Think
Pair
Share

What are some common defects of the eye?

Hyperopia is otherwise known as long sightedness.



Myopia is otherwise known as short sightedness.



The rays of light do not focus on the retina.

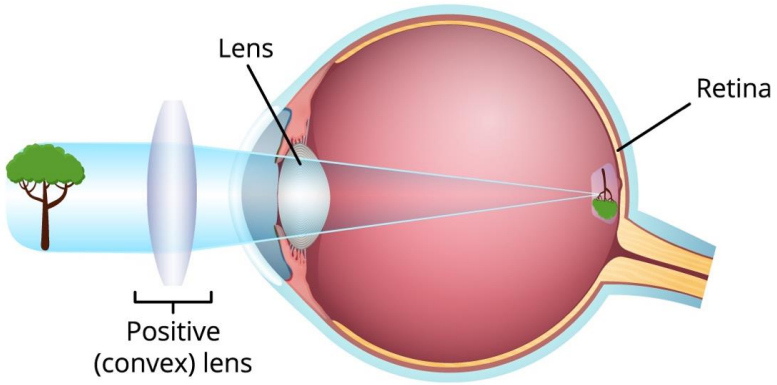
CS/F CS/H SS/F SS/H

5.2.3 The Eye

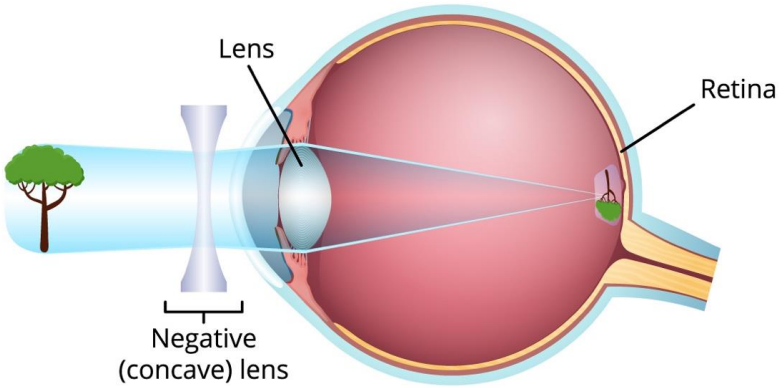
Think
Pair
Share

How are these defects corrected?

Hyperopia correction



Myopia correction



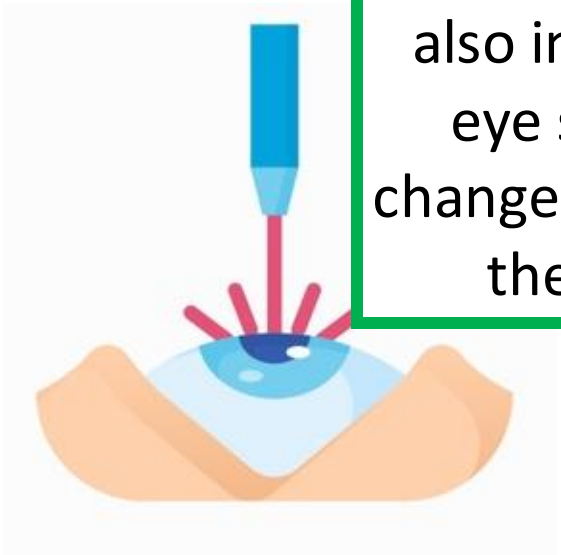
Generally, these defects are treated with spectacle lenses which refract the light rays so that they do focus on the retina.

CS/F CS/H SS/F SS/H

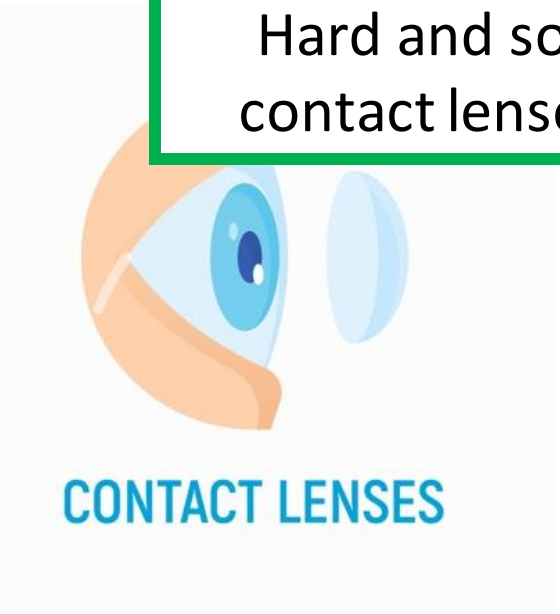
5.2.3 The Eye

Think
Pair
Share

How are these defects corrected?



New technologies also include laser eye surgery to change the shape of the cornea.

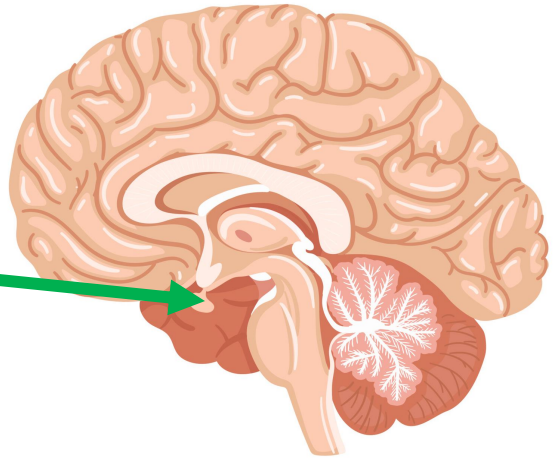


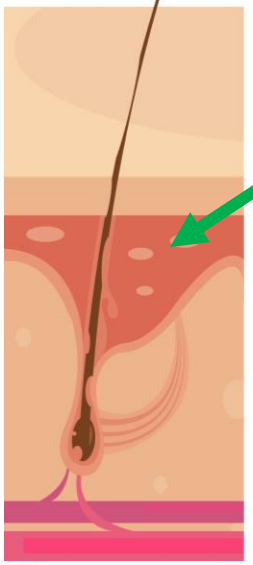
Hard and soft contact lenses.

Replacement lenses in the eye.

5.2.4 Control of Body Temperature

Body temperature is monitored and controlled by the thermoregulatory centre in the brain. It contains receptors sensitive to the temperature of the blood





The skin contains temperature receptors and sends nervous impulses to the thermoregulatory centre.

CS/F CS/H SS/F SS/H

5.2.4 Control of Body Temperature

If the body temperature is too high....

Sweat glands produce sweat

Blood vessels dilate (vasodilation)

These increase the transfer of energy from the skin to the environment.

5.2.4 Control of Body Temperature

If the body temperature is too low....

Sweat glands stop producing sweat

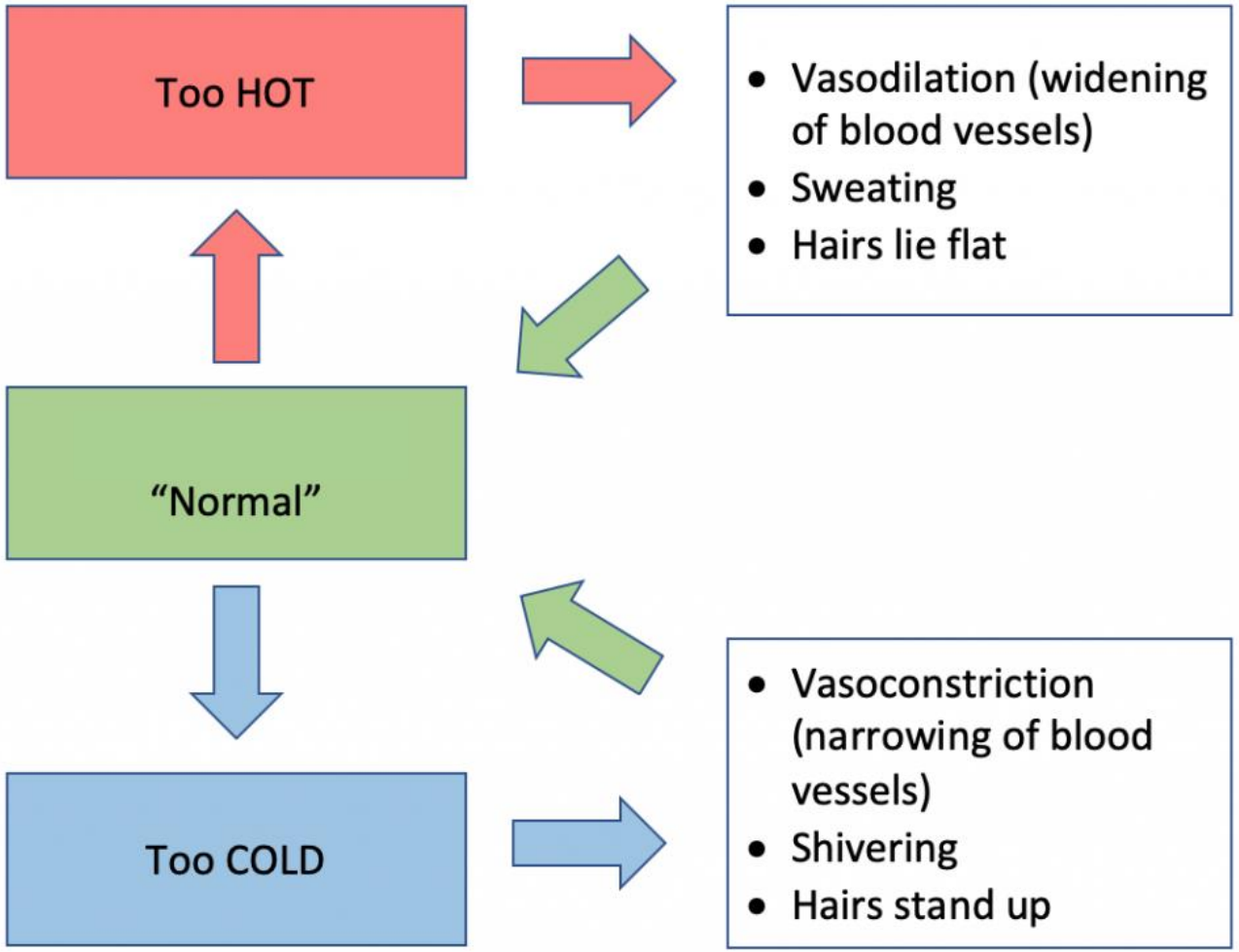
Blood vessels constrict (vasoconstriction)

Skeletal muscles contract causing shivering.

These decrease the transfer of energy from the skin to the environment.

The shivering causes more respiration to take place in the muscles which releases heat.

5.2.4 Control of Body Temperature



CS/F CS/H SS/F SS/H

Exam Practice

Humans keep their internal conditions almost constant.

Body temperature is kept within a narrow range.

When the core body temperature is too low, this is detected by the thermoregulatory centre in the brain.

Describe how the body responds when a decrease in core body temperature is detected.

Blood vessels supplying skin ..

..constrict

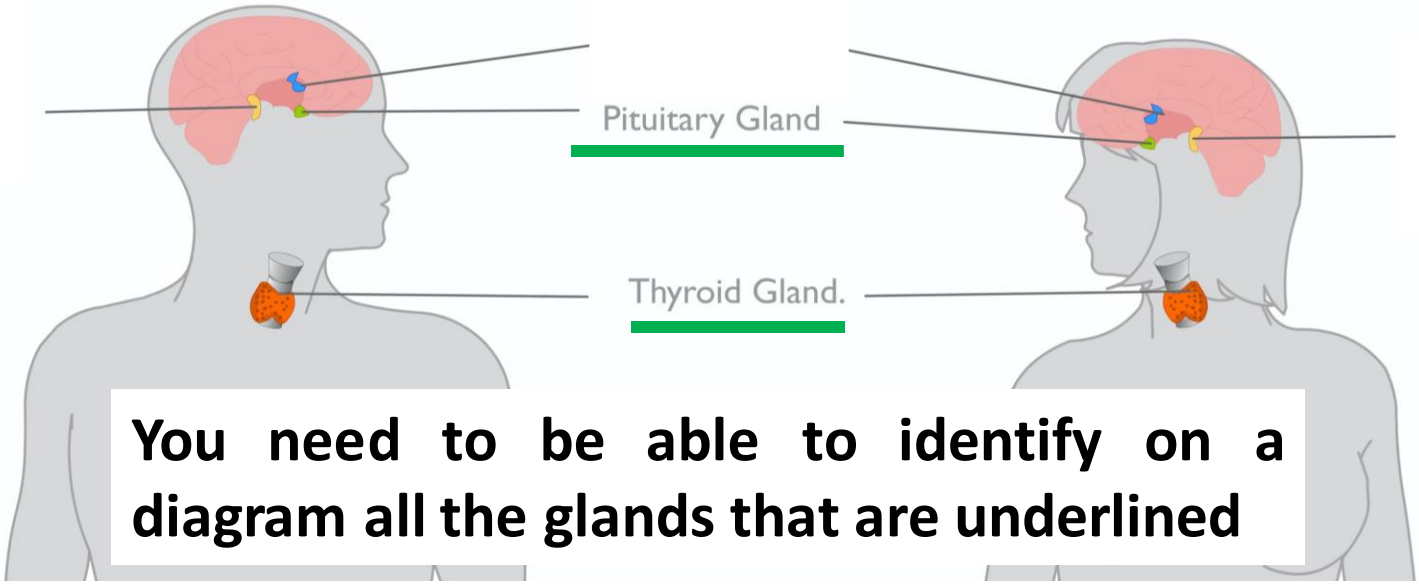
Reducing blood flow

Less energy lost to surroundings

Muscles contract causing shivering

The respiration releases thermal energy

5.3.1 Human Endocrine System



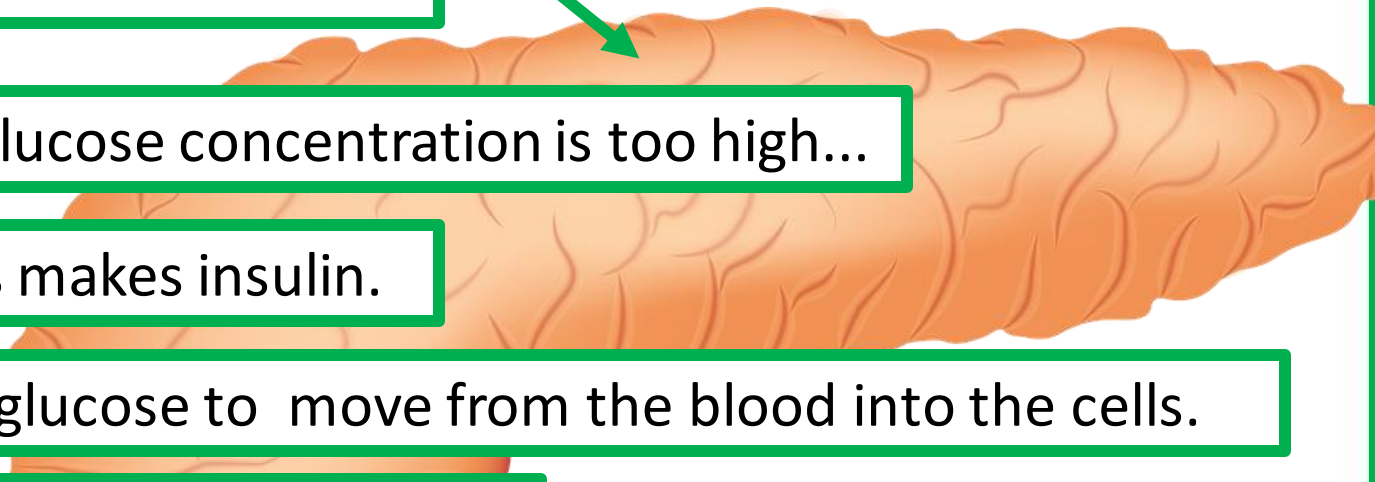
You need to be able to identify on a diagram all the glands that are underlined

- The **pituitary gland** in the brain is a '**master gland**' which secretes several hormones into the blood in response to body conditions.

- These hormones in turn act on other glands to stimulate other hormones to be released to bring about effects.

5.3.2 Control of Blood Glucose

Blood glucose concentration is monitored and controlled by the pancreas.

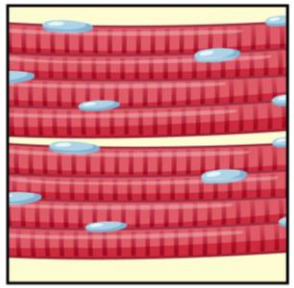


When blood glucose concentration is too high...

The pancreas makes insulin.

Insulin causes glucose to move from the blood into the cells.

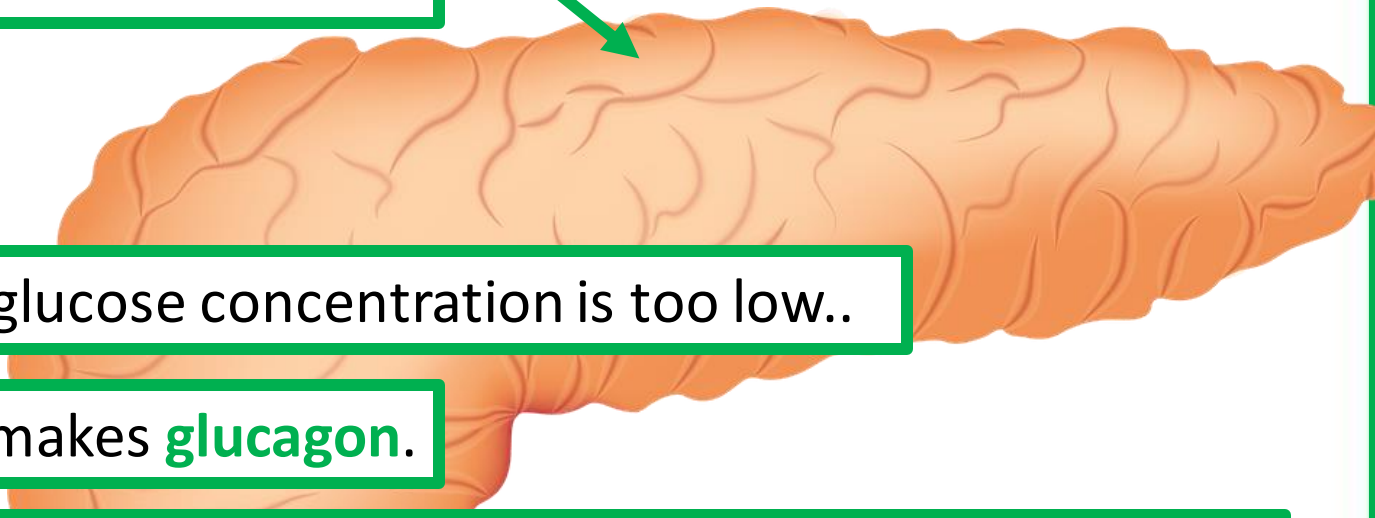
Liver and muscle cells convert glucose into glycogen for storage.



CS/F CS/H SS/F SS/H

5.3.2 Control of Blood Glucose

Blood glucose concentration is monitored and controlled by the pancreas.



When blood glucose concentration is too low..

The pancreas makes **glucagon**.

Glucagon causes glycogen to be converted into glucose and released into the blood

5.3.2 Control of Blood Glucose

Think
Pair
Share

What is diabetes?

5.3.2 Control of Blood Glucose

Think
Pair
Share

Diabetes is a disease in which the body's ability to produce or respond to the hormone **insulin** is impaired. This means that the body is unable to control **blood glucose** levels.

Type 1

The body is unable to **produce** enough insulin

Insulin is a protein/hormone released by the pancreas

Type 2

The body is unable to **respond** to the insulin produced

Risk Factor = Obesity

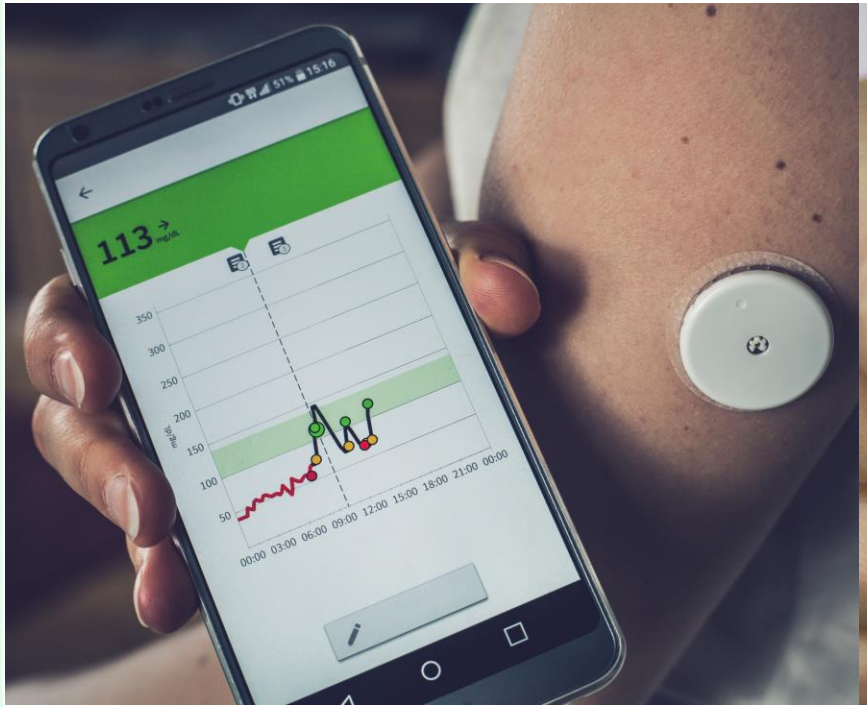
Both of these types of diabetes are characterised by uncontrolled high glucose levels.

CS/F CS/H SS/F SS/H

5.3.2 Control of Blood Glucose

Think
Pair
Share

What do these images show? Why is this been done?

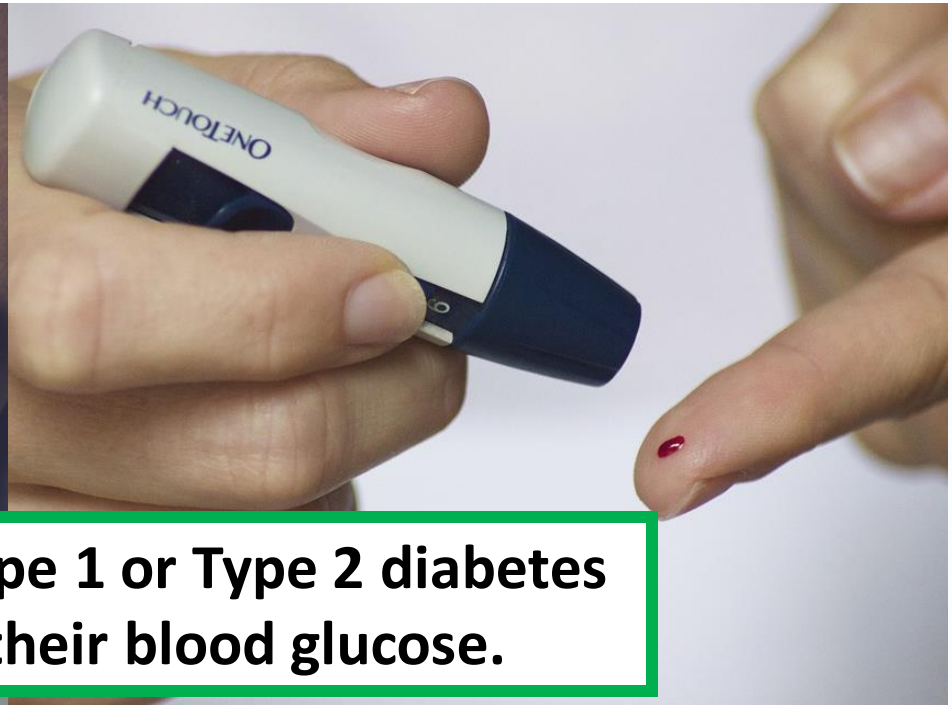


CS/F CS/H SS/F SS/H

5.3.2 Control of Blood Glucose

Think
Pair
Share

People with diabetes need to test their blood glucose regularly. This can be done using different devices. It helps someone track if their blood sugar is too high or low and helps them manage their diabetes.

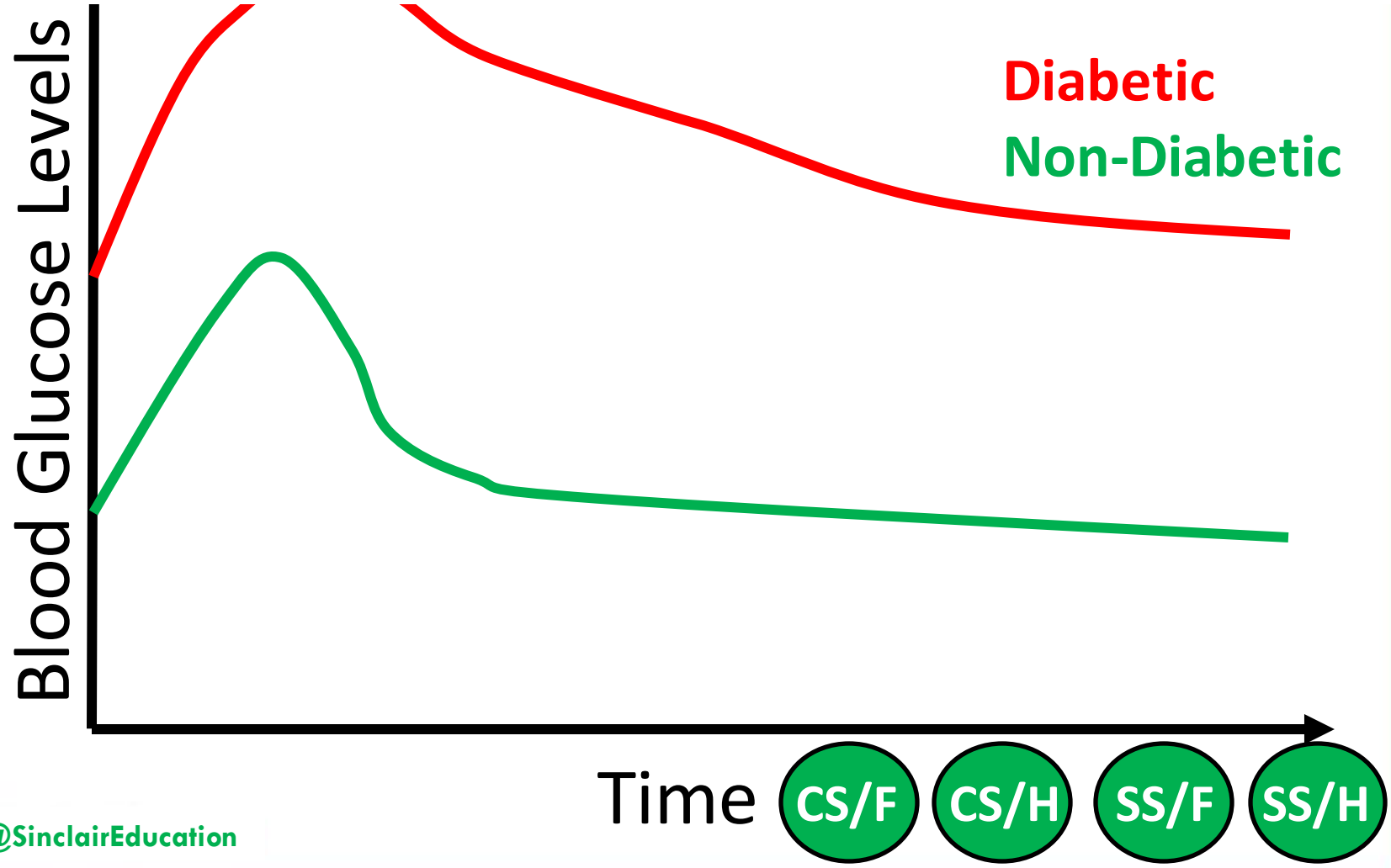


People with either Type 1 or Type 2 diabetes need to monitor their blood glucose.

5.3.2 Control of Blood Glucose

Think
Pair
Share

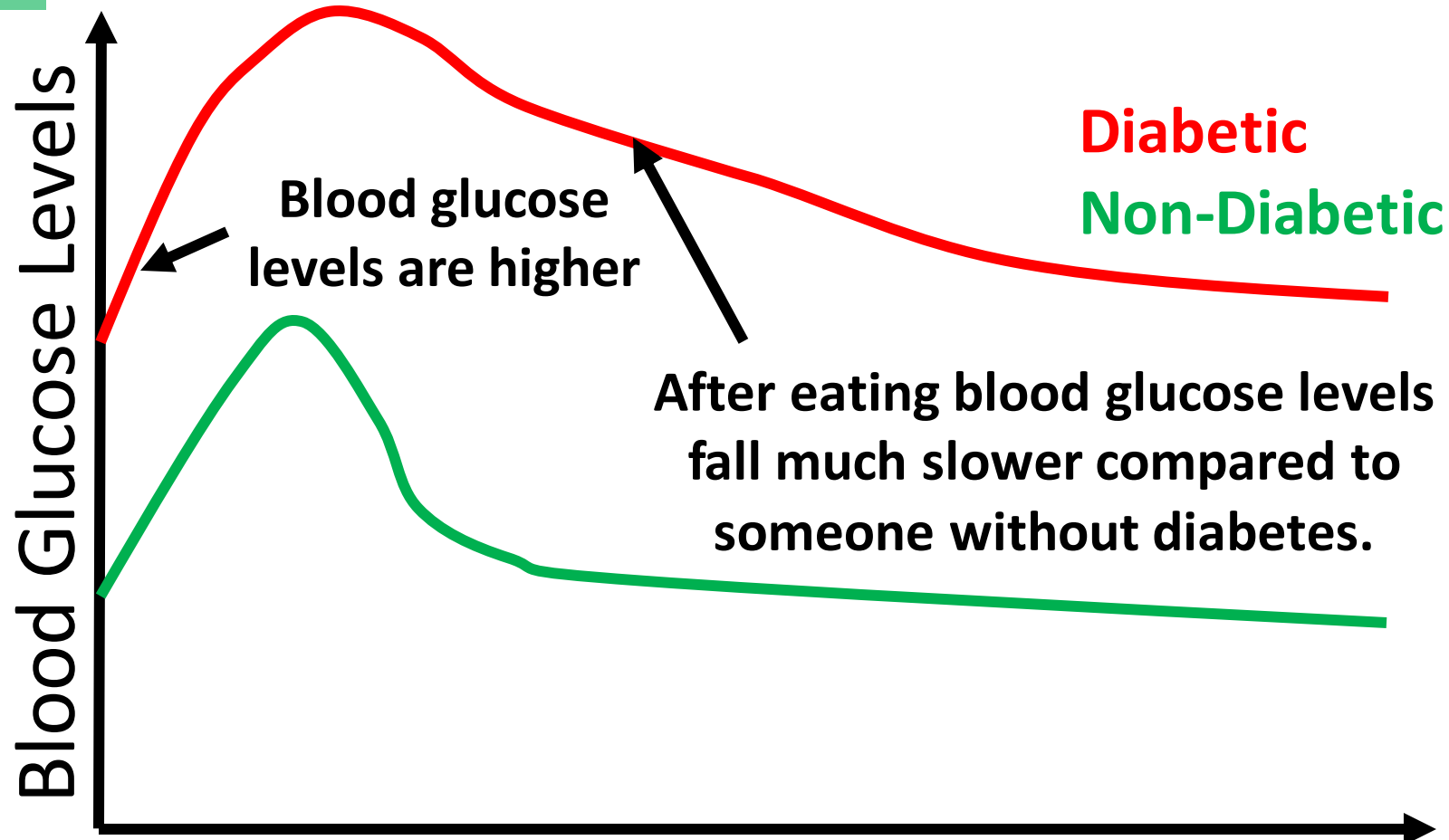
If we monitor the blood glucose after eating of someone with diabetes and someone who does not have diabetes we would get a graph that would look something like this.



5.3.2 Control of Blood Glucose

Think
Pair
Share

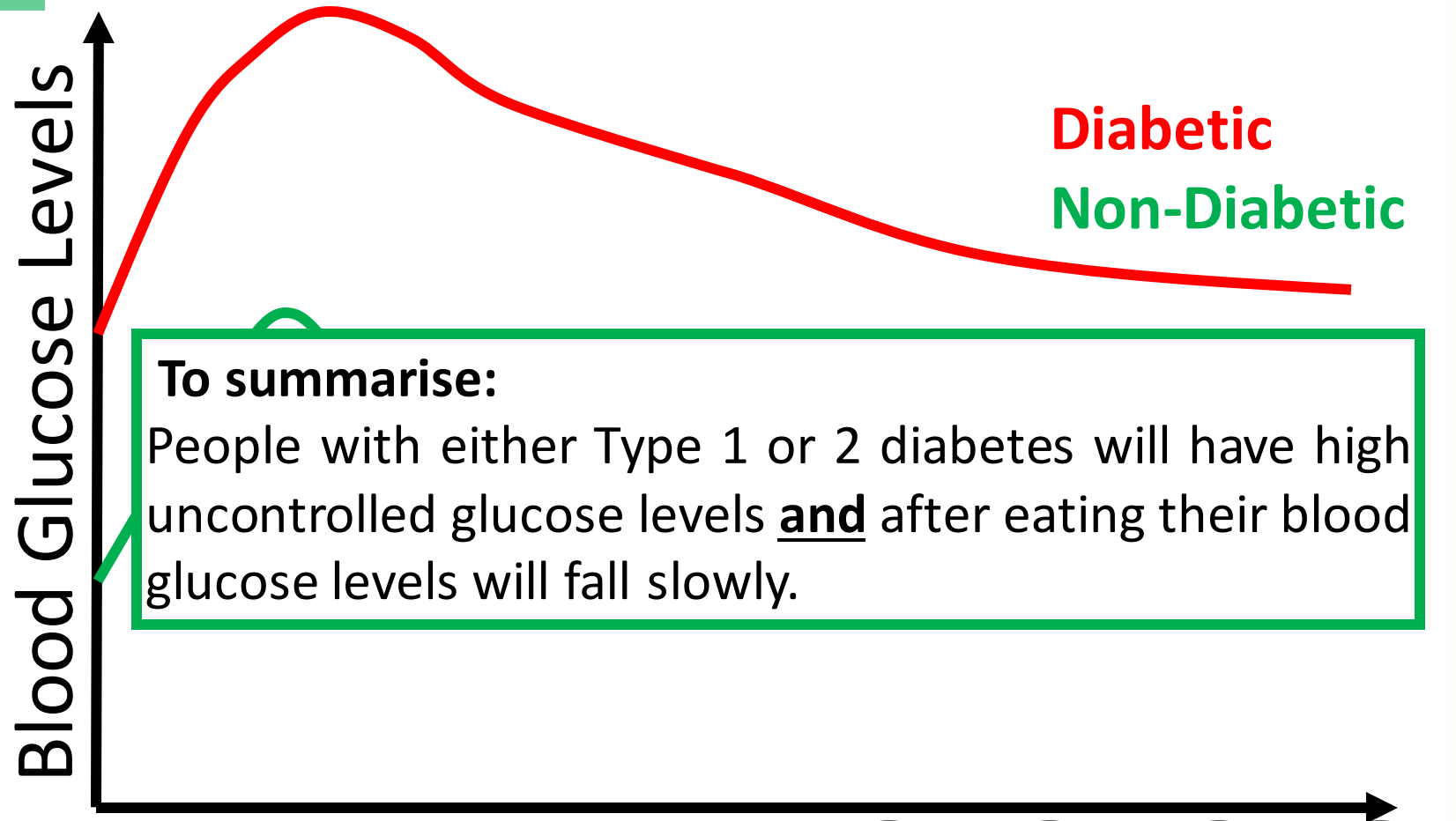
What does this graph tell us?



5.3.2 Control of Blood Glucose

Think
Pair
Share

What does this graph tell us?



To summarise:

People with either Type 1 or 2 diabetes will have high uncontrolled glucose levels **and** after eating their blood glucose levels will fall slowly.

CS/F CS/H SS/F SS/H

5.3.2 Control of Blood Glucose

Think Pair Share

What is the difference between Type 1 and Type 2 diabetes?

	Type 1	Type 2
Blood Glucose	High uncontrolled blood glucose levels that fall slowly after eating.	
Cause	The body does not **produce** enough insulin	The body does not **respond** to insulin
Insulin Levels In Blood	Low	High
Treatment	Insulin Injection	Controlled Diet and Exercise

Think Pair Share

Why must the insulin be given as an injection and cannot be taken as a tablet?

5.3.2 Control of Blood Glucose

Think Pair Share

What is the difference between Type 1 and Type 2 diabetes?

	Type 1	Type 2
Blood Glucose	High uncontrolled blood glucose levels that fall slowly after eating.	
Cause	The body does not **produce** enough insulin	The body does not **respond** to insulin
Insulin Levels In Blood	Low	High
Treatment	Insulin Injection	Controlled Diet and Exercise

Think Pair Share

Insulin is a **protein**. If it were taken as a tablet it would be **digested** by **proteases** (enzymes) in the stomach.

5.3.2 Control of Blood Glucose

You need to be prepared to interpret graphs and tables about insulin levels and identify if the person has Type 1 or Type 2 diabetes

To identify **Type 1**:

- Look for a high glucose level
- Look for a glucose level that does not fall
- Look for **low** insulin levels

Their glucose levels will be high as they don't have enough insulin to control the glucose levels.

To identify **Type 2**:

- Look for a high glucose level
- Look for a glucose level that does not fall
- Look for **high** insulin levels

Glucose does not move into liver cells as the body is not responding to insulin.

So glucose levels remain high.

This causes even more insulin to be released.

CS/F CS/H SS/F SS/H

Exam Practice

A person eats a meal containing a lot of carbohydrate. This causes an increase in the person's blood glucose concentration.

Explain how the hormones insulin **and** glucagon control the person's blood glucose concentration after the meal.

Insulin secretion

Insulin causes glucose to enter cells/liver/muscles

Glucose is converted into glycogen

Blood glucose decreases causing glucagon secretion

Glucagon causes glycogen to be converted into glucose

(5)

Exam Practice

The body cells of a person with Type 2 diabetes do **not** respond to **insulin**.

A person with Type 2 diabetes often has a higher blood **insulin** concentration than a non-diabetic person.

Explain why.

Cells absorb less glucose

Glucose concentration remains high

Pancreas secretes more insulin

(3)

Exam Practice

Compare how each type of diabetes is caused.

Suggest how each type of diabetes can be treated.

Type 1 is when not enough insulin is produced

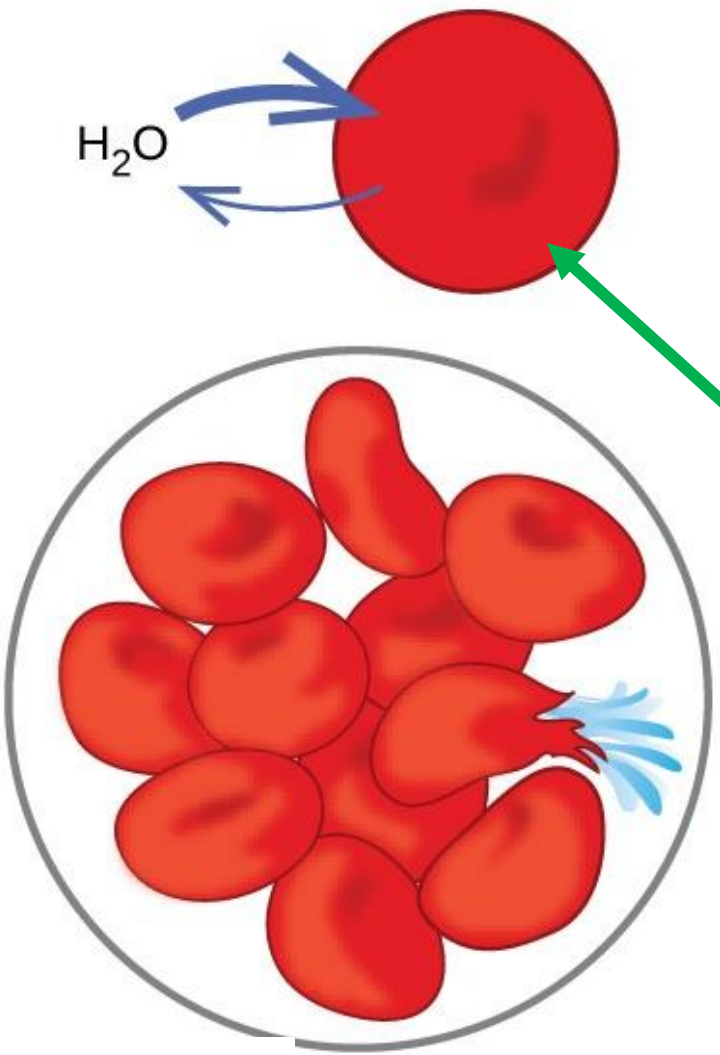
Type 2 is when the body doesn't respond to insulin

Type 1 treated with insulin injections

Type 2 treated with diet and exercise

(4)

5.3.3 Maintaining Water Balance



High water levels in the blood

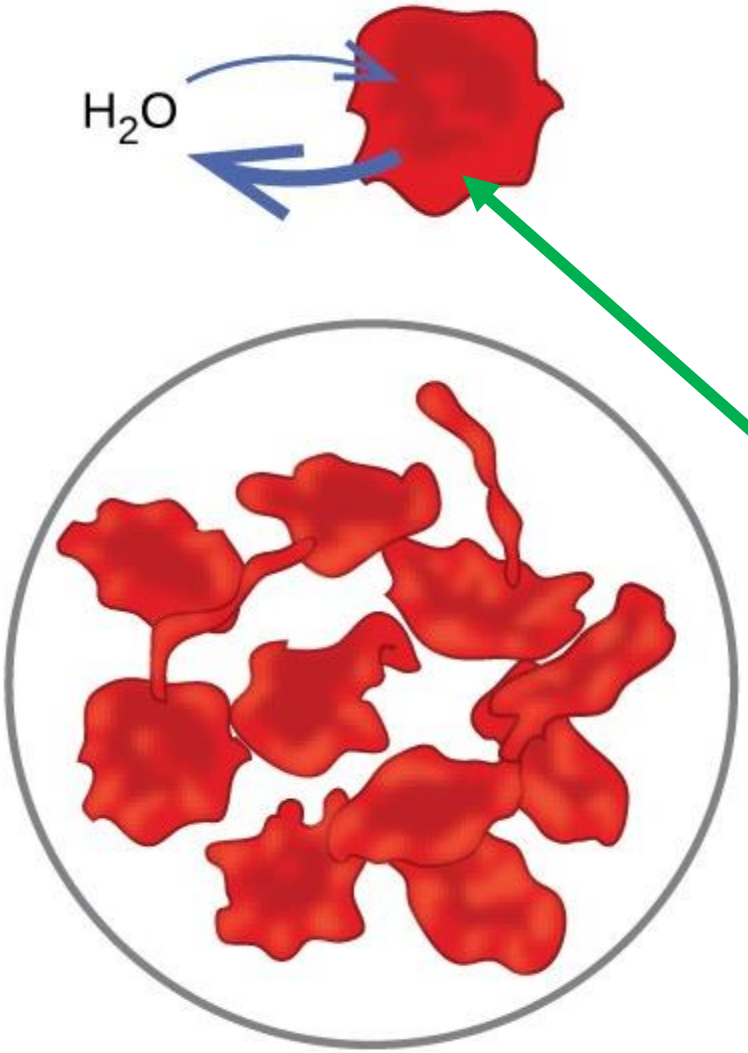
The blood is dilute

Net movement of water into the cell by osmosis.

The cells swell and can burst.

CS/F CS/H SS/F SS/H

5.3.3 Maintaining Water Balance



Low water levels in the blood.

The blood is concentrated.

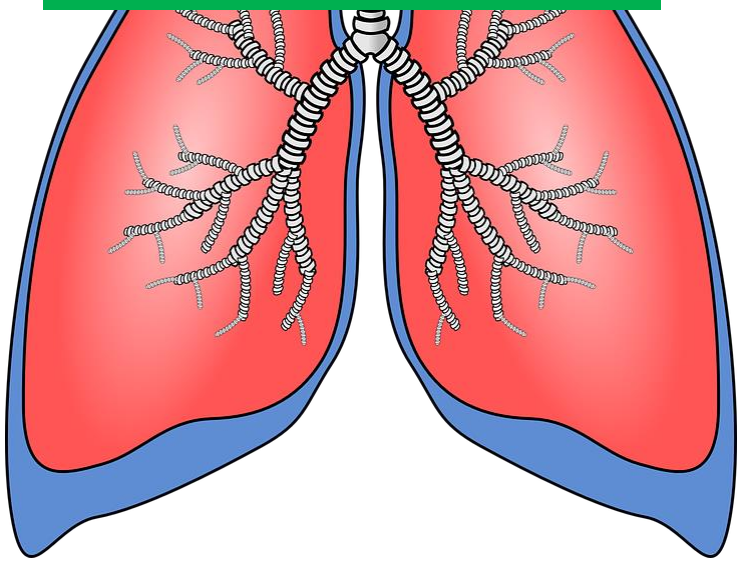
Net movement of water out the cell by osmosis.

The cells shrink and wont function properly.

CS/F CS/H SS/F SS/H

5.3.3 Maintaining Water Balance

Water leaves the body via the lungs during exhalation.



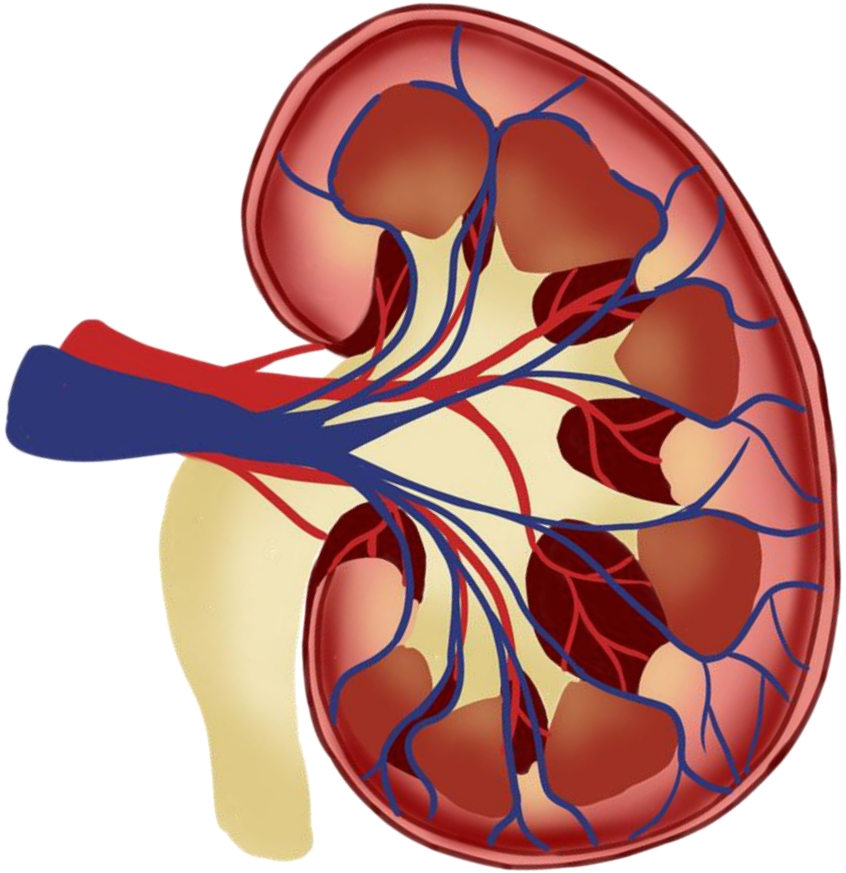
Water, ions and urea are lost from the skin in sweat.

There is no control over the water, ions or urea loss by the lungs or skin.

CS/F CS/H SS/F SS/H

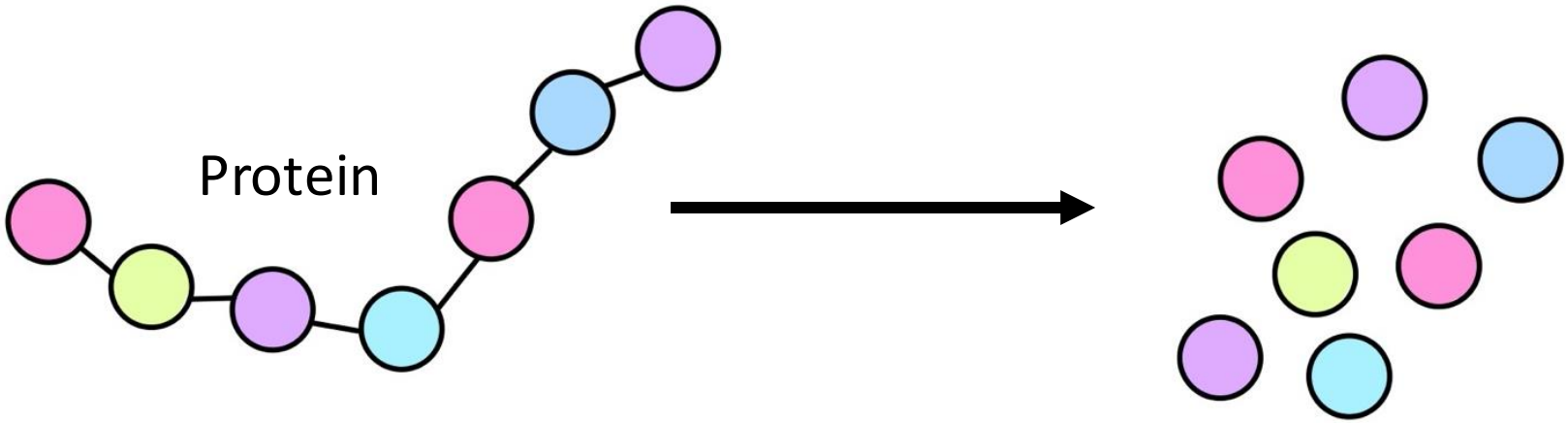
5.3.3 Maintaining Water Balance

Excess water, ions and urea are removed via the kidneys in the urine.



CS/F CS/H SS/F SS/H

5.3.3 Maintaining Water Balance



The digestion of proteins from the diet causes an excess of amino acids.

These need to be secreted.

CS/F CS/H SS/F SS/H

5.3.3 Maintaining Water Balance

In the liver amino acids are deaminated to make ammonia.

Ammonia is toxic.

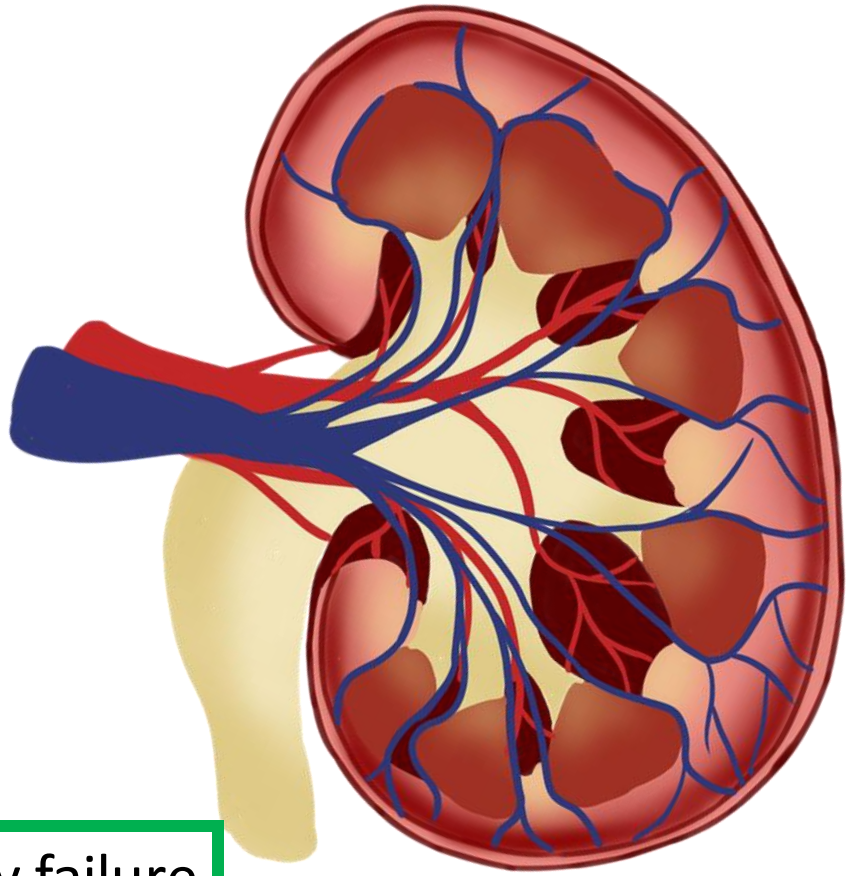
It is immediately converted to urea for safe excretion

CS/F CS/H SS/F SS/H

5.3.3 Maintaining Water Balance

The kidneys maintain the water balance of the body.

The kidneys produce urine by filtration of the blood and selective reabsorption of useful substances such as glucose, some ions and water.



People who suffer from kidney failure may need a transplant or dialysis.

CS/F CS/H SS/F SS/H

5.3.3 Maintaining Water Balance

Unfiltered flood high in urea is taken from a blood vessel in the arm

The blood is mixed with thinners to prevent clotting.

The blood enters the dialysis machine where the blood and dialysis fluid are separated by a partially permeable membrane.

CS/F CS/H SS/F SS/H

5.3.3 Maintaining Water Balance

Dialysis fluid contains:

A glucose conc similar to normal level in the blood.

A conc of ions similar to that in normal blood plasma.

No urea

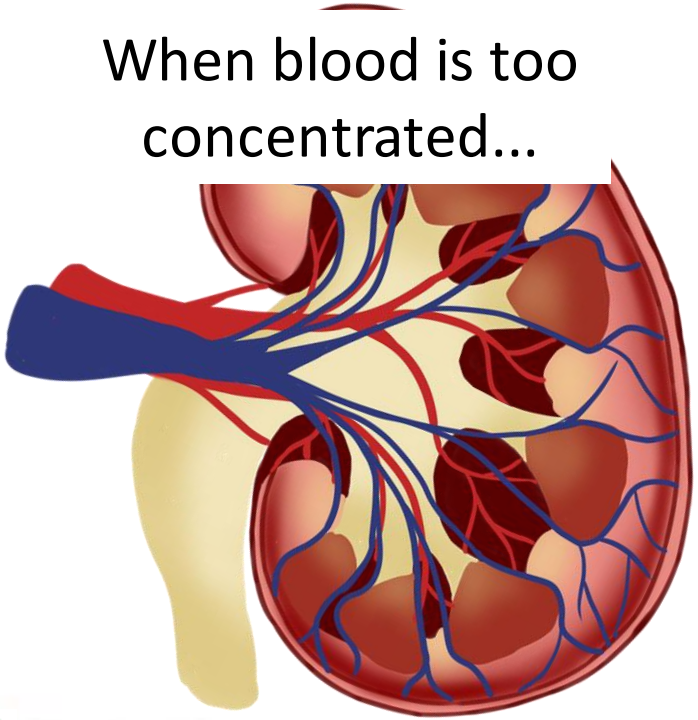
The urea is removed from the blood by diffusion and the water/ion balance is restored.

CS/F CS/H SS/F SS/H

5.3.3 Maintaining Water Balance

Key Term	Definition
ADH	

When blood is too concentrated...



The pituitary gland releases ADH.

This increases the permeability of the kidney tubules.

More water is reabsorbed.

Small volumes of concentrated urine is made.

CS/F CS/H SS/F SS/H

Exam Practice

A man is walking across a desert.

The man has used up his supply of drinking water.

Explain how the gland you named in part **(a)** and the kidneys reduce water loss.

Blood concentration becomes higher

ADH is secreted

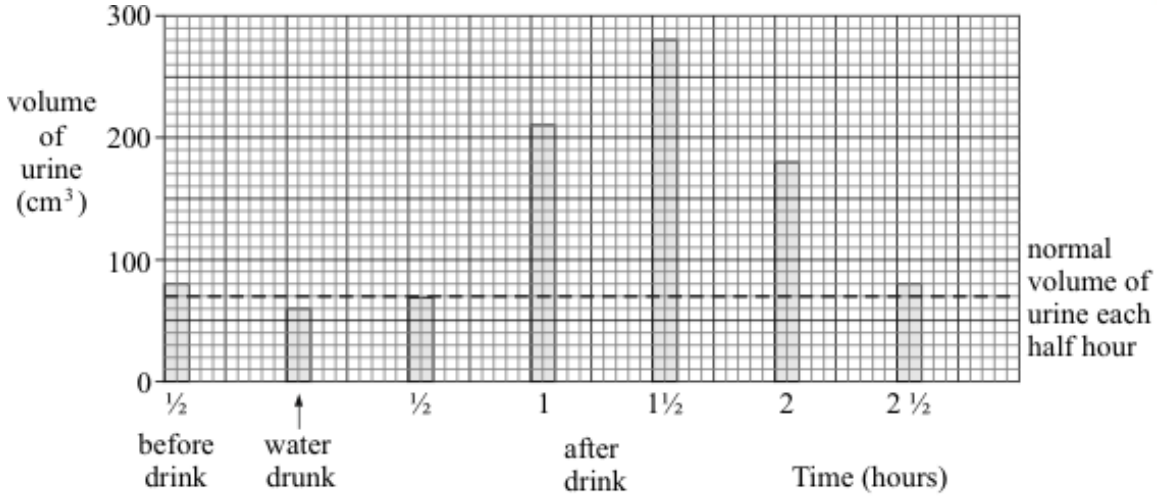
Kidney tubules increase in permeability

Increased water absorption

Small volumes of concentrated urine produced

(3)

Exam Practice



Describe, in as much detail as you can, how drinking the water affected the volume of urine produced afterwards.

no effect for first half hour/until 1 hour
rises to 210cm³/to 3x level after 1 hour
rises to 280cm³/to 4x level after 1½ hour
reference to 280cm³/1½ hour as maximum level
falls to (near) normal after 2½ hours
comparison of rates of change e.g. rapid then slower rise and/or steady fall
not all of 800cm³ excreted (extra to normal)

(5)

5.3.4 Hormones in Reproduction

- During puberty reproductive hormones cause secondary sex characteristics to develop.
- **Oestrogen** is the main female reproductive hormone produced in the ovary. At puberty eggs begin to mature and one is released approximately every 28 days. This is called **ovulation**.
- **Testosterone** is the main male reproductive hormone produced by the testes and it stimulates sperm production.

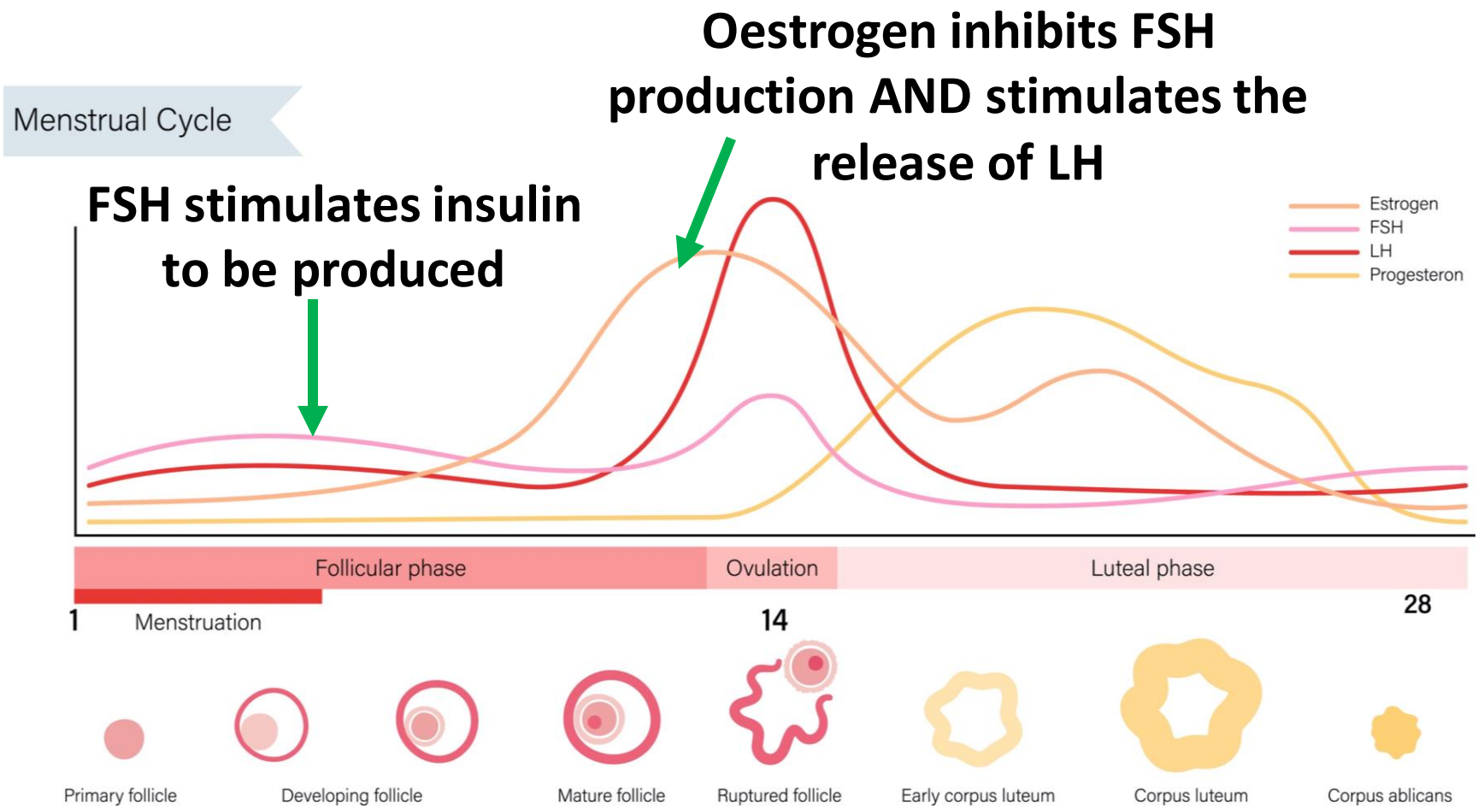
5.3.4 Hormones in Reproduction

- Several hormones are involved in the menstrual cycle of a woman.

Hormone	Function

CS/F CS/H SS/F SS/H

5.3.4 Hormones in Reproduction



CS/F CS/H SS/F SS/H

5.3.5 Contraception

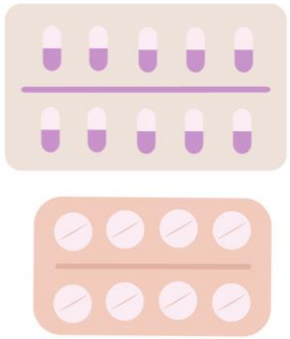
Think
Pair
Share

How can fertility be controlled?

Fertility can be controlled by a variety of hormonal and non hormonal methods of contraception.

CS/F CS/H SS/F SS/H

5.3.5 Contraception



Think
Pair
Share

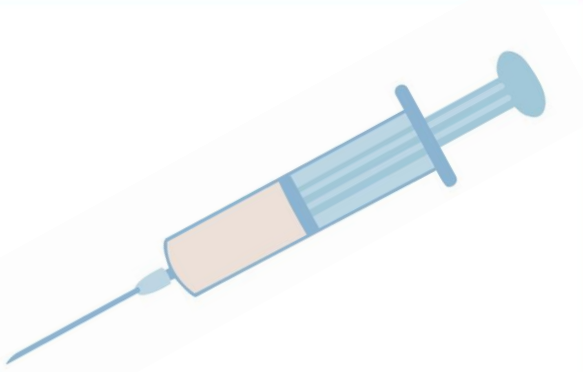
How can fertility be controlled?

Contraceptive	Hormonal/ Non-Hormonal	What it Does	+	-
Oral	Hormonal	Contain hormones to inhibit FSH production so that no eggs mature	Can reduce some types of cancer	Risk of high blood pressure.

5.3.5 Contraception

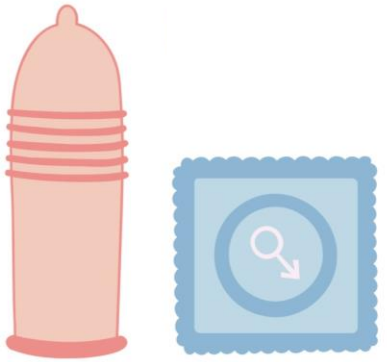
Think
Pair
Share

How can fertility be controlled?



Contraceptive	Hormonal/ Non-Hormonal	What it Does	+	-
Injection	Hormonal	Slow release progesterone to inhibit the maturation and release of eggs for a number of months	Don't have to remember to take a pill everyday.	Side effects

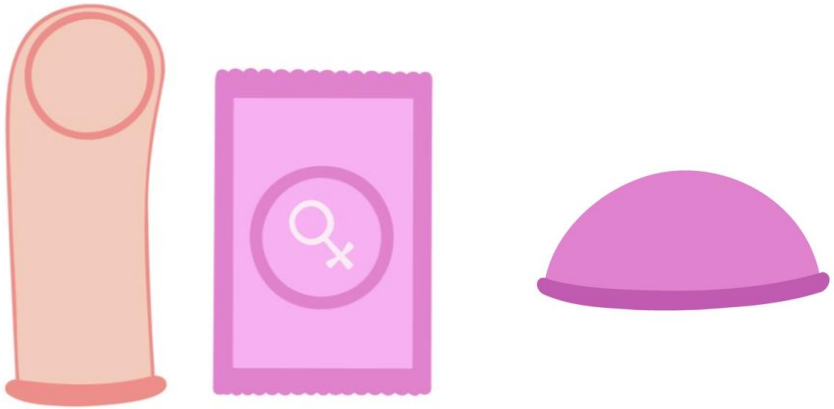
5.3.5 Contraception



Think
Pair
Share

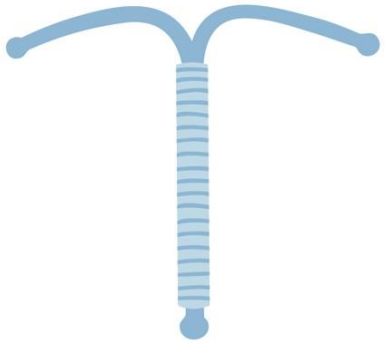
How can fertility be controlled?

Contraceptive	Hormonal/ Non-Hormonal	What it Does	+	-
Barrier Method	Non-Hormonal	Prevent the sperm reaching an egg	Easy to use	Can tear or rip.



CS/F CS/H SS/F SS/H

5.3.5 Contraception



Think
Pair
Share

How can fertility be controlled?

Contraceptive	Hormonal/ Non-Hormonal	What it Does	+	-
Intrauterine Device	Hormonal	Prevent the implantation of an embryo or release a hormone	Can remain in position for a long time	Risk of ectopic pregnancy.

5.3.5 Contraception

Think
Pair
Share

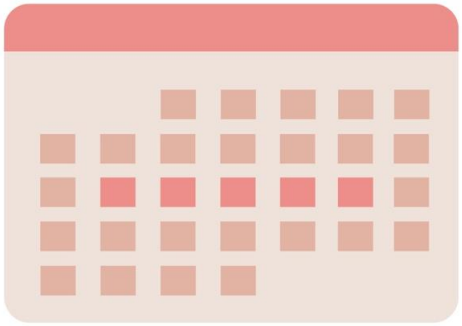
How can fertility be controlled?

Contraceptive	Hormonal/ Non-Hormonal	What it Does	+	-
Spermicidal Agents	Non-Hormonal	Kill or disable sperm	Can be added to a barrier contraceptive	Can cause allergic reactions

5.3.5 Contraception

Think
Pair
Share

How can fertility be controlled?



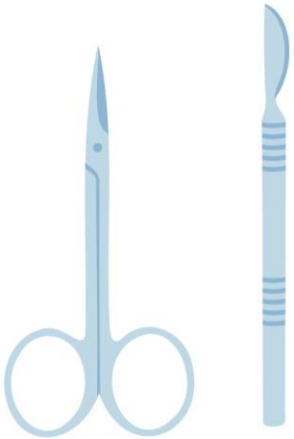
Contraceptive	Hormonal/ Non-Hormonal	What it Does	+	-
Abstaining	Non-Hormonal	Not having intercourse when an egg may be in the oviduct	Cam be used for religious reasons.	If timings are not accurate the chance of pregnancy is high.

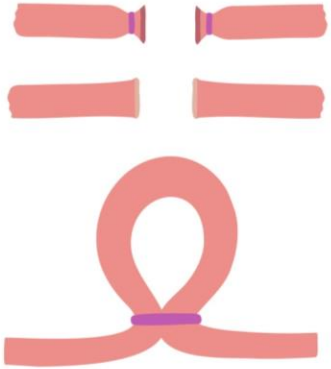
5.3.5 Contraception

Think
Pair
Share

How can fertility be controlled?

Contraceptive	Hormonal/ Non-Hormonal	What it Does	+	-
Surgical Methods	Non-Hormonal	Sterilisation	Effective a preventing pregnancy.	Can't be reversed



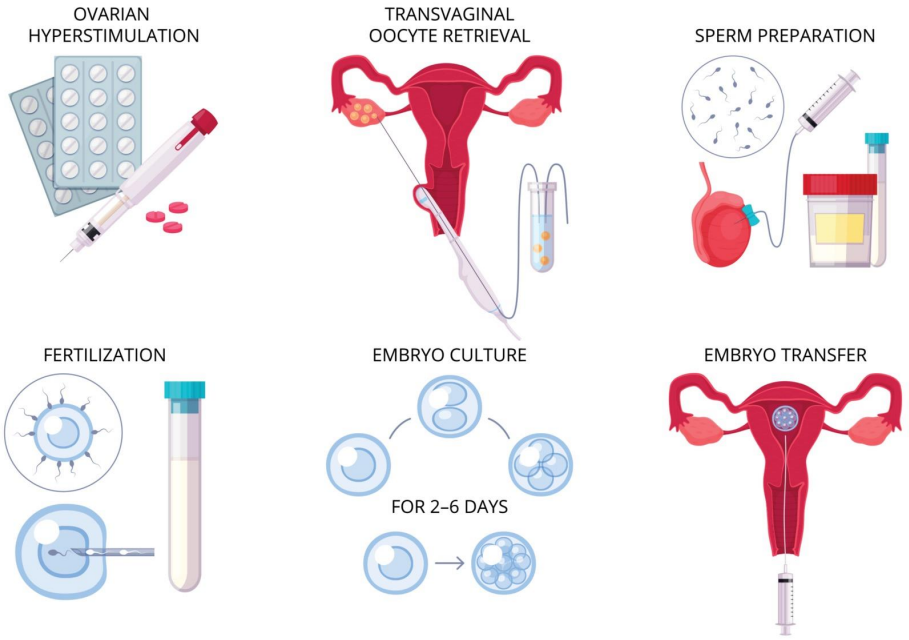


CS/F CS/H SS/F SS/H

5.3.6 Treating Infertility

Hormones can be used to help treat infertility

FSH and LH can be used as a fertility drug for a woman. She may then become pregnant in the normal way.



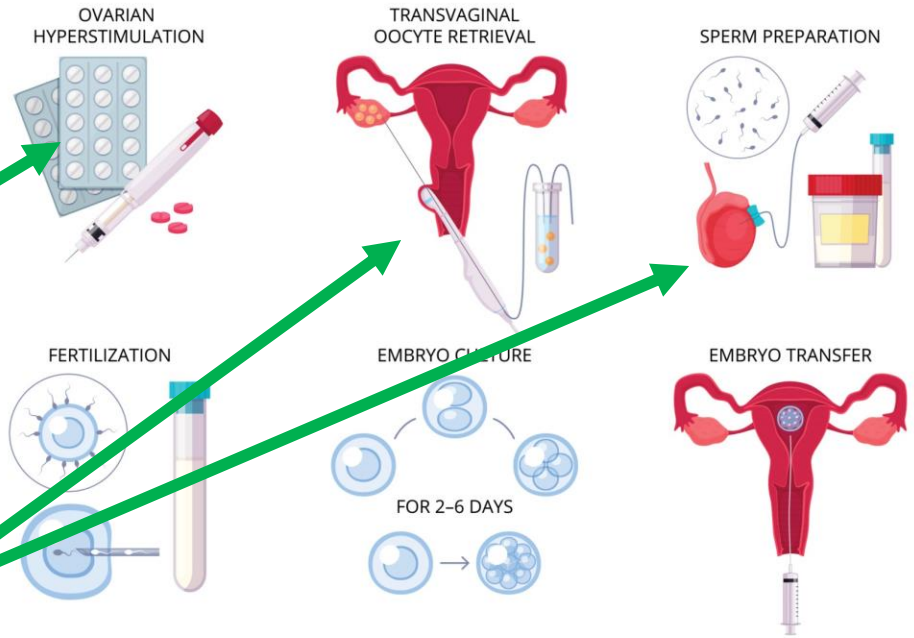
CS/F CS/H SS/F SS/H

5.3.6 Treating Infertility

In IVF:

The mother is given FSH and LH to stimulate the maturation of several eggs.

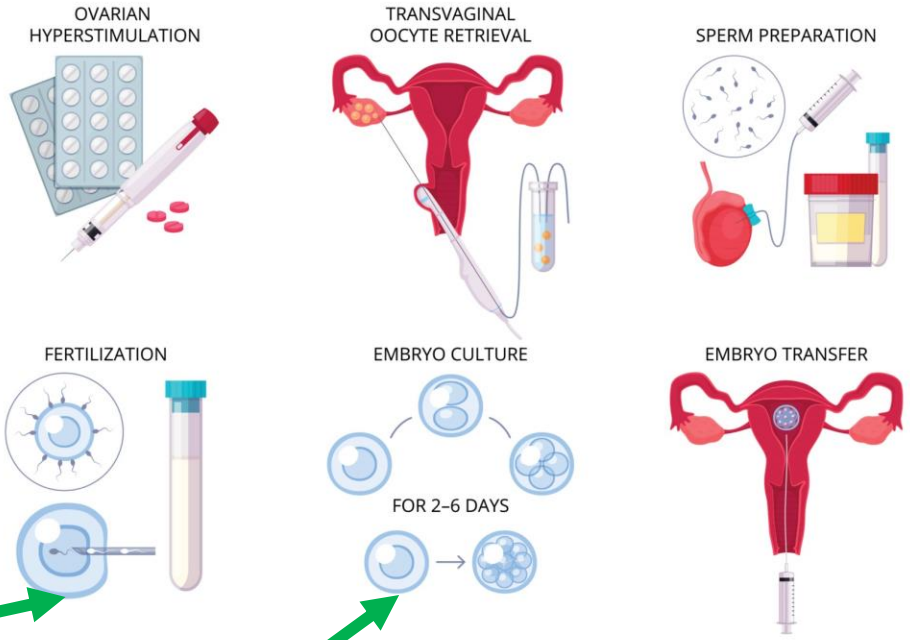
The eggs are collected from the mother and sperm is collected from the father.



CS/F CS/H SS/F SS/H

5.3.6 Treating Infertility

In IVF:

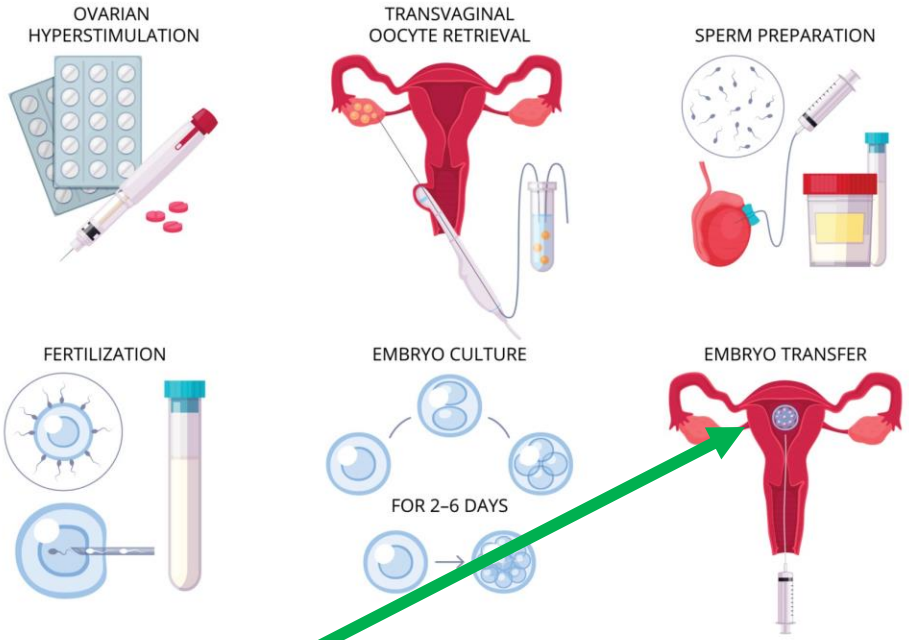


The eggs are then fertilised with the father's sperm in the lab

The fertilised eggs develop into embryos.

5.3.6 Treating Infertility

In IVF:



At the stage when they are tiny balls of cells, one or two embryos are inserted into the mother's uterus.

5.3.6 Treating Infertility

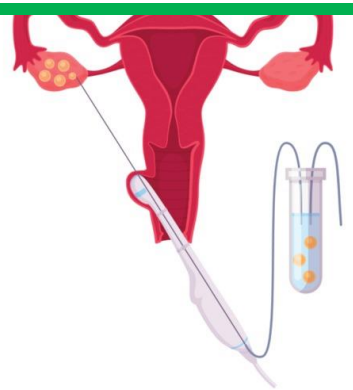
Fertility treatments can be used to give a woman the change to have a baby of her own.

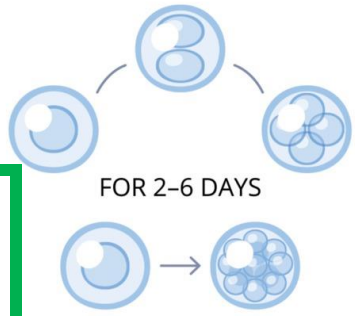
However....

It can be emotionally and physically stressful.

Success rates are not high.

It can lead to multiple births what are a risk to the babies and the mother.





CS/F CS/H SS/F SS/H

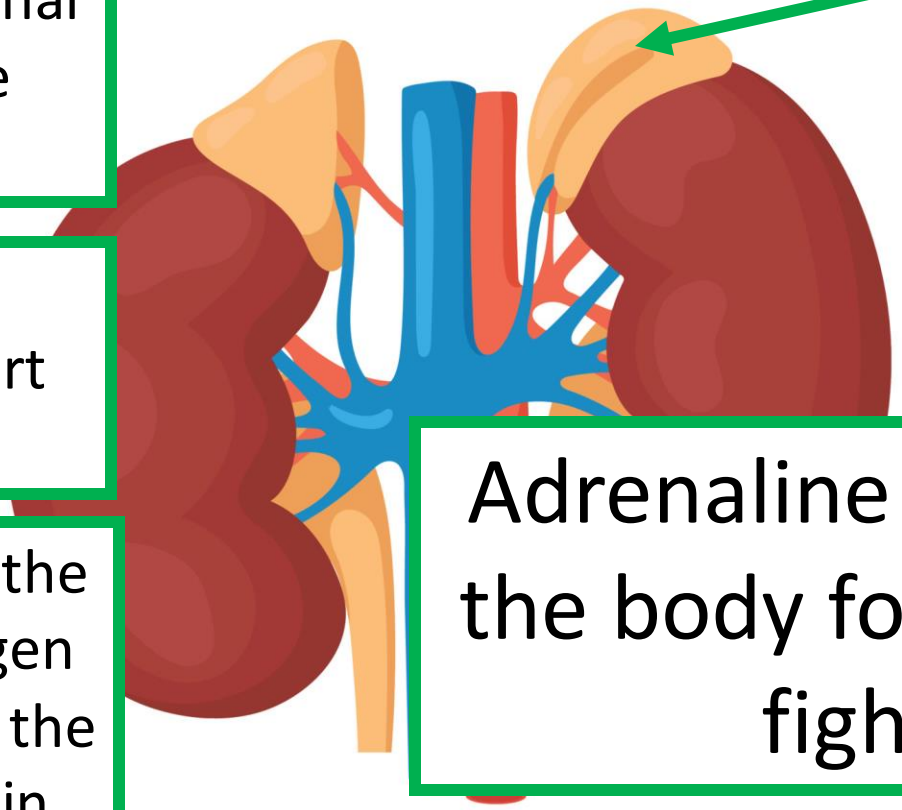
5.3.7 Negative Feedback

In times of fear or stress the adrenal glands make adrenaline.

Adrenaline increases heart rate.

This increases the supply of oxygen and glucose to the heart and brain.

These can be used for respiration.



Adrenaline prepares the body for flight or fight.

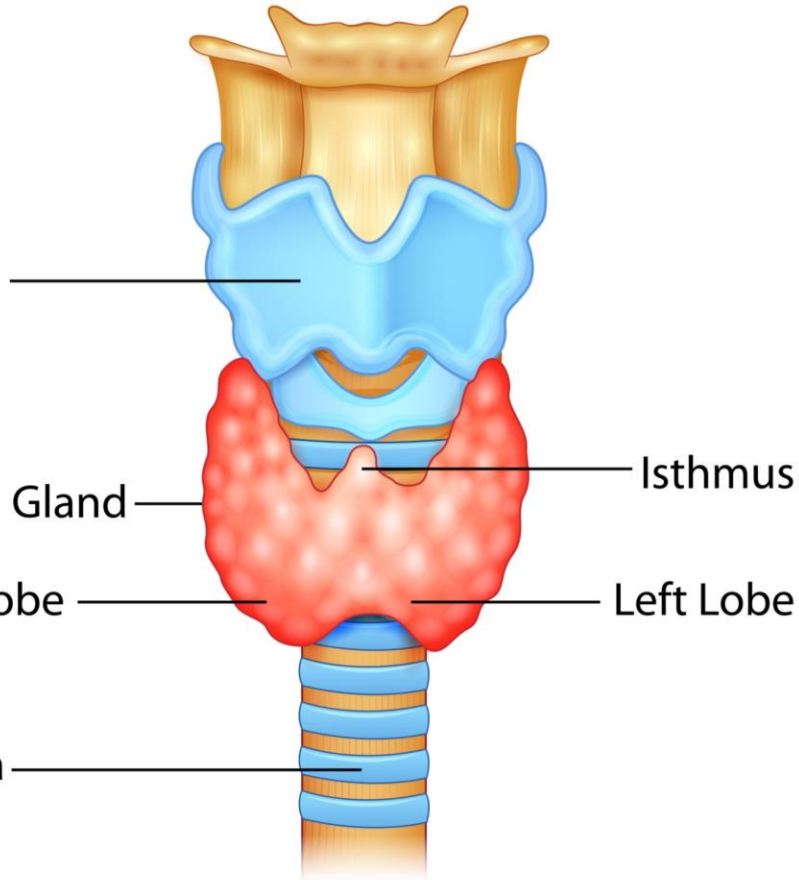
CS/F CS/H SS/F SS/H

5.3.7 Negative Feedback

The thyroid gland makes and secretes thyroxine.

Thyroxine stimulates the basal metabolic rate.

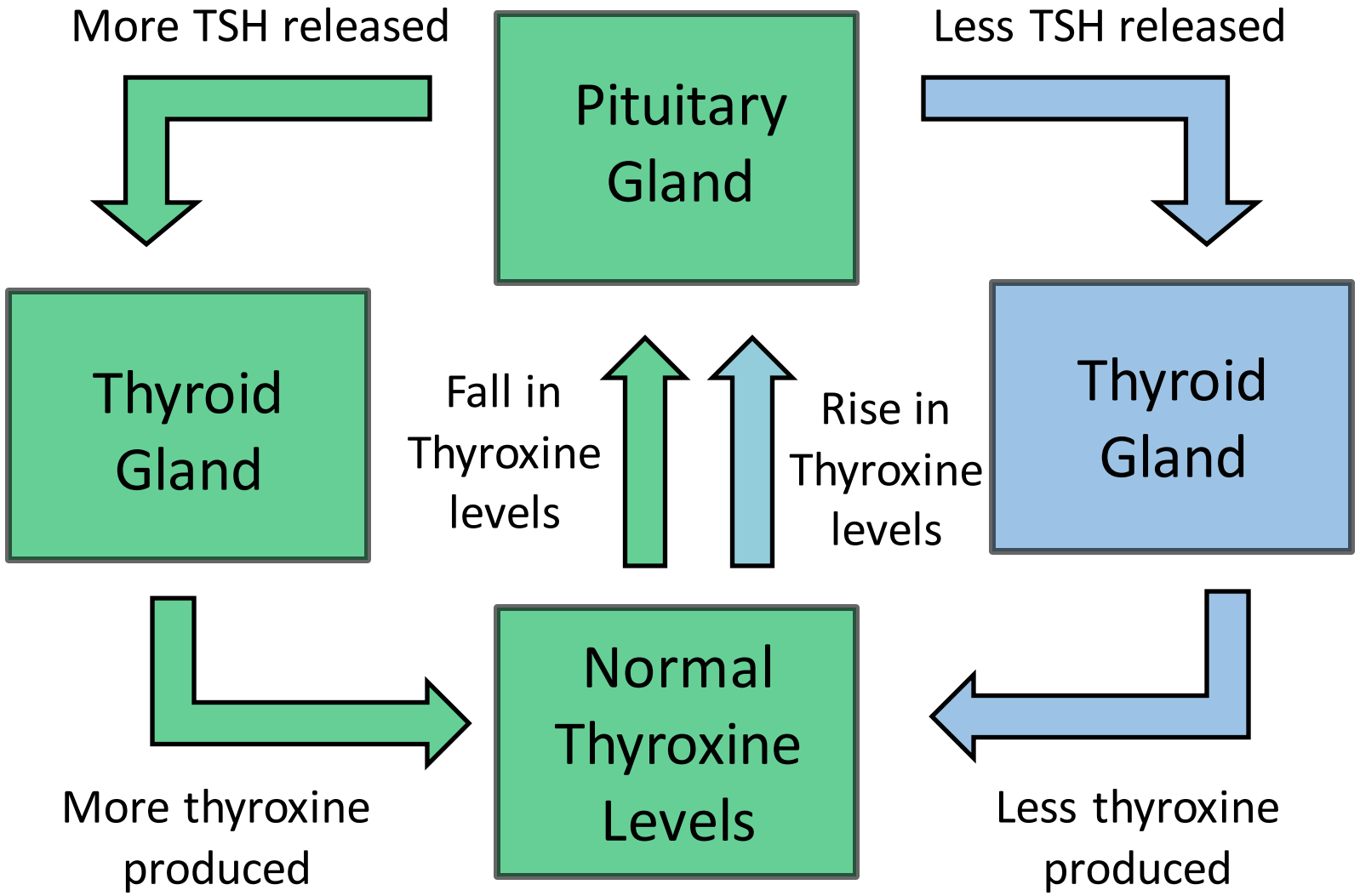
Thyroxine is important in growth and development.



It is controlled by negative feedback.

CS/F CS/H SS/F SS/H

5.3.7 Negative Feedback



CS/F CS/H SS/F SS/H

5.4.1 Control and Coordination

Plants make hormones to coordinate and control growth and responses to light and gravity.

CS/F CS/H SS/F SS/H

5.4.1 Control and Coordination

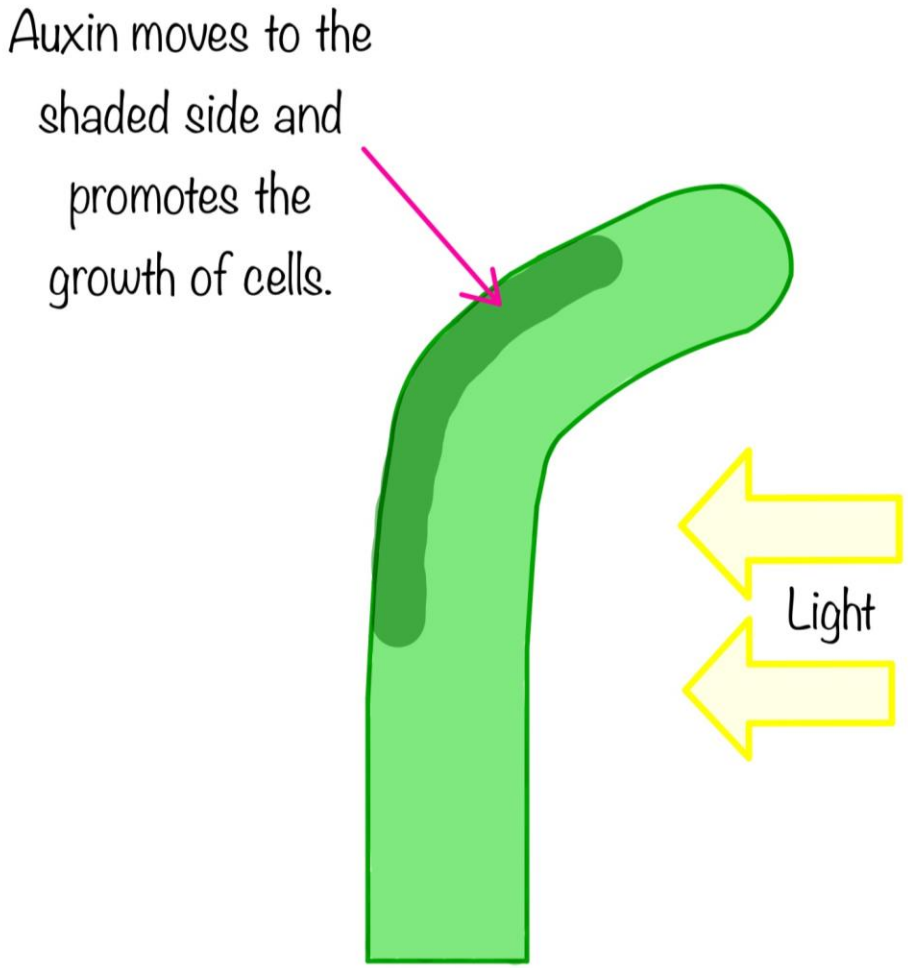
Key Term	Definition
Phototropism	
Gravitropism/ Geotropism	

5.4.1 Control and Coordination

Unequal distributions of auxin cause unequal growth rates in plant roots and shoots.

In shoots auxin promotes growth.

In roots auxin inhibits growth.



CS/F CS/H SS/F SS/H

5.4.1 Control and Coordination

Key Term	Definition
Auxin	
Gibberellins	
Ethene	

5.4.1 Control and Coordination

Think
Pair
Share

How can you determine the effect that the light has on the growth of plants?

1.
Set up 3 petri dishes with some damp cotton wool at the bottom.

2.
Add 10 seeds to each petri dish.

x10

3.
Place the petri dishes in a warm place and allow to germinate. Water equal amounts if they get dry.

CS/F CS/H SS/F SS/H

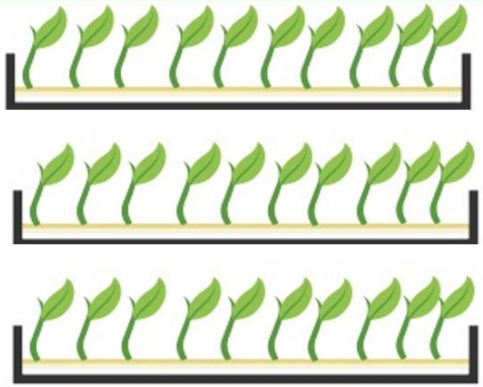
5.4.1 Control and Coordination

Think
Pair
Share

How can you determine the effect that the light has on the growth of plants?

4.

Once the seeds have germinated make sure the number of seeds on each plate is the same.



5.

Place dishes in position. One on windowsill, one in cupboard and one in partial light.

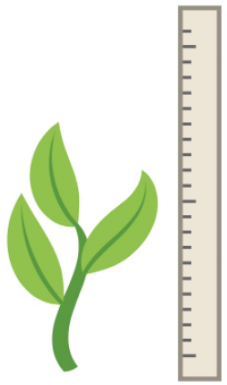
5.4.1 Control and Coordination

Think
Pair
Share

How can you determine the effect that the light has on the growth of plants?

6.

Measure the height of the seedlings each day for 7 days calculating a daily average for each location.



7.

Plot your results in a graph of mean height against time for each location.

CS/F CS/H SS/F SS/H

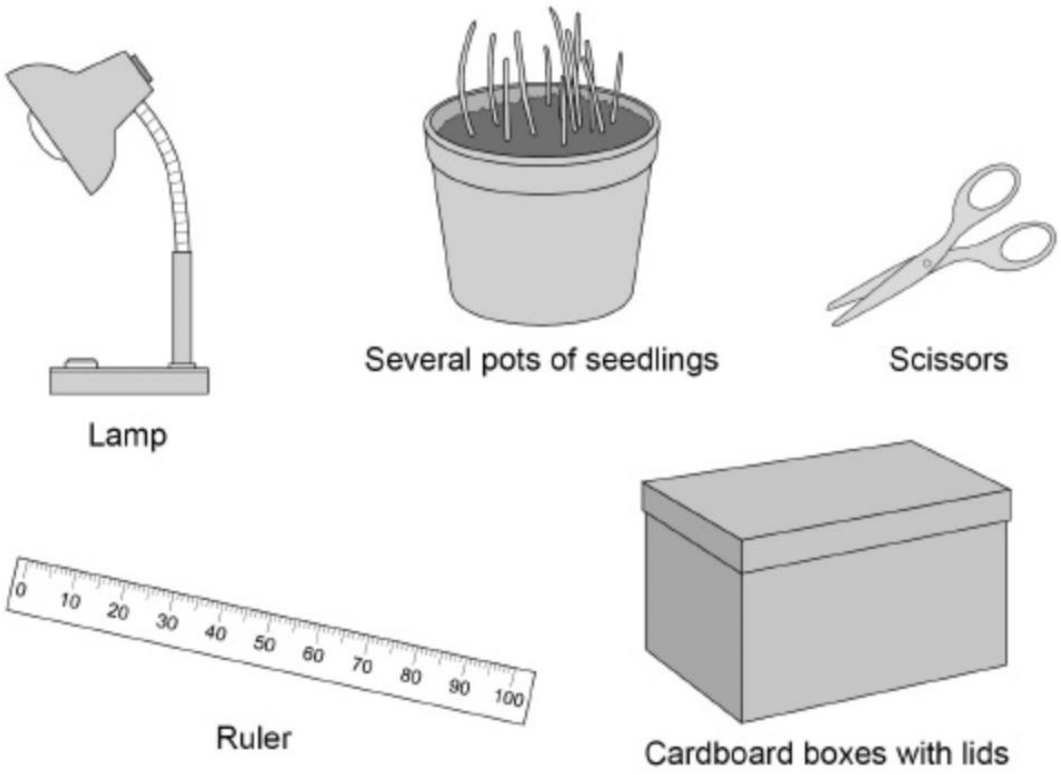
Exam Practice

Plan an investigation to show the effect of light from one direction on the growth of plant seedlings.

Include details of any controls needed.

You may use some of the equipment shown in **Figure 1** and any other laboratory apparatus.

Figure 1



Exam Practice

Plan an investigation to show the effect of light from one direction on the growth of plant seedlings.

Include details of any controls needed.

You may use some of the equipment shown in **Figure 1** and any other laboratory apparatus.

Figure 1

Level 3: The method would lead to the production of a valid outcome. All key steps are identified and logically sequenced.

5–6

Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the plan is not fully logically sequenced.

3–4

Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.

1–2

No relevant content

0

Exam Practice

Plan an investigation to show
seedlings.

Include details of any control

You may use some of the eq
apparatus.

Level 3: The method would lead to the production of a valid outcome. All key steps are identified and logically sequenced.

5–6

Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the plan is not fully logically sequenced.

3–4

Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.

1–2

No relevant content

0

several seedlings in each batch **or** one pot of seedlings in each batch
measure heights of shoots
leave some in dark with light from one side / direction in box with hole
control(s) with all-round light **or** rotating on clinostat **or** in dark
control variable(s) e.g. same temperature / water / soil type
after suitable time (at least several hours)
record appearance of seedlings re. light direction
re-measure heights of shoots
detail of how bent shoots were measured – e.g. use thread or straighten them out
calculate mean height increase for each group
use ruler / protractor to estimate angle of bending

Cardboard boxes with lids

5.4.2 Use of Plant Hormones

Think Pair Share

What uses do we have for different plant hormones?

Uses for auxin include:

Promoting growth in tissue cultures.

As weedkillers.

Rooting Powders.

CS/F CS/H SS/F **SS/H**

5.4.2 Use of Plant Hormones

Think
Pair
Share

What uses do we have for different plant hormones?

Uses for ethene include:

Used in the food industry to control ripening of fruit during storage and transport.

CS/F CS/H SS/F SS/H

5.4.2 Use of Plant Hormones

Think
Pair
Share

What uses do we have for different plant hormones?

Uses for gibberellins include:

End seed dormancy

Promote Flowering