Connection: B5.10 – The endocrine system

Connection – answers Triple only

A1 thermoregulatory centre in brain has receptors that detect blood temperature and the skin has temperature receptors that send impulses to the thermoregulatory centre

A2

Blood vessels dilate, sweating increased, hair lays flat

A3

Blood vessels constrict, sweating decreased, skeletal muscles contract to cause shivering, hair stands up to trap heat

Lesson 10: B5.10 – The endocrine system

Connection

Q1. What happens to your reaction time with practise?

Q2. How do stimulants such as caffeine affect your reaction time?

Q3. Why is a computer better than a ruler for measuring reaction time?

Activation

LI: Recall the major endocrine glands and the hormones they secrete

https://www.youtube.com/watch?v=HXPCQBD_WGI

1. Make a note of the title and the LI
2. Read pages 190-191
3. Make a list of keywords – define those you don't know
4. Draw and label figure 5.28
5. Draw and label fig 5.29

Demonstration

Attempt questions 1-6
In 10 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9

Consolidation

Complete and self assess the relevant past paper question for this topic - From the B5 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Answers: B5.10 –The endocrine system

Connection

1 reaction time decreases
2 stimulants reduce your reaction time
3 The measurement of time is more accurate as the resolution of time by the computer is greater (fractions of a second)

Demonstration

1 to produce hormones, or chemical messengers (that produce an effect on target organs).

2 target organs/effectors.

3 pancreas.

4 ovaries.

5 it acts on other glands, causing them to secrete hormones.

6 growth hormone.

Lesson 11: B5.11 – Controlling blood glucose

Connection

Q1. List the 6 endocrine glands

Q2. Match them to their appropriate hormone

Q3. Why s the pituitary called the master gland

Activation

LI: Explain how insulin controls blood glucose levels

https://www.youtube.com/watch?v=77oyUdNZ054
https://www.youtube.com/watch?v=OYH1deu7-4E

1. Make a note of the title and the LI
2. Read pages 192-193
3. List key words and define those you don't know
4. Draw and label figure 5.30
5. Draw and label fig 5.32

Consolidation

Complete and self assess the relevant past paper question for this topic - From the B5 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Demonstration

Attempt questions 1-6
In 10 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9

Answers: B5.11 – Controlling blood glucose

Connection

1 Pituitary, thyroid, pancreas, adrenal, ovaries/testis
2 Many (TSH, ACTH, FSH, LH, STH), thyroxine, insulin, adrenalin, oestrogen, testosterone
3 The pituitary gland is responsible for regulating all other endocrine glands

Demonstration

1 insulin.

2 it causes glucose to move into our body's cells.

3 it increases for a time (as it is absorbed into the bloodstream from the gut), then falls as insulin is secreted.

4 60 minutes.

5 70-100 mg of glucose per 100 cm3 of blood.
It is important to maintain blood glucose as it is needed for cells for respiration to make energy. If blood glucose goes too high kidney failure or death can result. Similarly, if blood glucose decreases too much a person can fall unconscious and die.

6 a combination of the actions of the hormones insulin and glucagon.
when blood glucose concentration increases, insulin is secreted by the pancreas, which causes glucose to be taken up by the cells; the glucose is then used for respiration or converted to glycogen in the cells of the liver and in muscles; when blood glucose falls, glucagon is secreted by the pancreas, which causes glycogen to be broken down in the liver and released into the bloodstream.

Lesson 12: B5.12 – Diabetes

Connection

Q1. Which hormone decreases our glucose levels?

Q2. Describe what happens to glucose levels before and after a meal

Q3. What is the role of glucagon?

Activation

LI: Compare Type 1 and Type 2 diabetes

https://www.youtube.com/watch?v=wZAjVQWbMlE
https://www.youtube.com/watch?v=4punwpjnN5M

1. Make a note of the title and the LI
2. Read pages 194-195
3. Make a list of the key words and define those you don't know
4. Draw and label figure 5.34

Demonstration

Attempt questions 1-7
In 10 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9

Consolidation

Complete and self assess the relevant past paper question for this topic - From the B5 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Answers: B5.12 – Diabetes

Connection

1 insulin
2 glucose levels drop before a meal, afterwards levels are high but return to normal due to the effect of insulin
3 when glucose levels drop glucagon causes the liver to break down glycogen back into glucose and release it back into the blood to increase blood glucose levels

Demonstration

1 when the pancreas is unable to produce enough, or any, insulin.

2 the body's cells are unable to take up glucose; the glucose concentration in the blood increases; glucose is excreted in the urine; fat and protein are used for energy; the person loses weight; if left uncontrolled, the kidneys will fail, and the person will die.

3 the person's body cells lose their sensitivity/no longer respond to insulin; caused by lifestyle of high energy, 'fast' food and an inactive life.

4 the person fasts for 8-12 hours, and their blood glucose is measured; the person then takes in glucose, and their blood glucose tested 2 hours later; their blood glucose concentration will indicate how well they are able to regulate the glucose taken in.

5 The non-diabetic eats meals at around 8am, 12 noon and 4.30pm, insulin is released and helps return blood-glucose levels to normal (normal amount of glucose in the blood) The type 2 diabetic with treatment eats at the same times, the treatment means they are able to regulate the levels of glucose in their blood to near normal levels The type 2 diabetic without treatment also eats at the same times, but they have lost their sensitivity to the insulin being released and so the level of glucose in their blood does not return to normal levels in between meals.

6 type 2 diabetes tends to cluster in families; so genetics will have an effect; but the people in a family are also likely to have a similar diet, i.e. an environmental effect; a western diet is known to be a cause.

7 there is a (strong) correlation between body weight/BMI and Type 2 diabetes; the relative risk of diabetes increases markedly as the person becomes overweight and obese; the relative risk in women is over double that in men.

Lesson 13: B5.13 – Diabetes recommendations

Connection

Q1. How is type 1 diabetes caused?

Q2. How is types 2 diabetes caused?

Q3. How are diabetes and obesity linked?

Activation

LI: Describe the ethical and social considerations for diabetes

https://www.youtube.com/watch?v=XJWBHfbSqEE
https://www.youtube.com/watch?v=sv9vQYxmaDQ

1. Make a note of the title and the LI
2. Read pages 196-197
3. Make a list of the key words and define those you don't know
4. Complete a health booklet to explain the treatment for type 1 and Type 2 diabetes as well as the ethical and social considerations

Demonstration

Attempt questions 1-6
In 10 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9

Consolidation

Complete and self assess the relevant past paper question for this topic - From the B5 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Answers: B5.13 – Diabetes recommendations

Connection

1 the pancreas cannot produce insulin (autoimmune disease)
2 loss of sensitivity to insulin – cells no longer respond to insulin being produced (high sugar diets)
3 obesity and an unhealthy diet is linked to type 2 diabetes.

Demonstration

1 insulin injections.

2 to manage the condition by modifying their lifestyle; involves increasing exercise and a carbohydrate-controlled diet.

3 measures taken to reduce type 2 diabetes include changing diet and lifestyle – eating less sugary drinks and food groups, exercising more, reducing alcohol intake, etc.

4 a small alcohol intake *reduces* the risk of Type 2 diabetes (<around 59 g per day in men; <48 g per day in women); the risk then increases up to around 80 g per day in men – at around 1.16 the relative risk; 53 g per day in women – at around 1.19 the relative risk; above these levels, further increase in alcohol consumption leads to no further increase in risk.

5 improve health qualities of food; if manufacturers don't, have a sugar tax imposed.

6 risk of diabetes increases with social deprivation; most deprived most likely to have poor lifestyle/diet/eat fast foods.

Lesson 14: B5.14 – Water Balance (Triple only)

Connection

Q1. What are the treatments for type 1 & 2 diabetes?

Q2. Give an ethical consideration regarding diabetes

Q3. Give a social consideration regarding diabetes

Activation

LI: Explain how water balance in the body occurs and why it is important

https://www.youtube.com/watch?v=kmRh_yRbAR4

1. Make a note of the title and the LI
2. Read pages 198-199
3. Make a list of the key words and define those you don't know
4. List 3 ways the body loses water (green)
5. Why is osmosis important and what happens to cells with too much/little water in them (blue)?
6. Describe deamination use fig 5.41 (purple)

Consolidation

Complete and self assess the relevant past paper question for this topic - From the B5 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Demonstration

Attempt questions 1-6 pages 198-199
In 10 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9

Answers: B5.14 – Water balance (Triple only)

Connection

1 Type 1 – insulin injections. Type 2 – healthy diet and exercise

2 Any 1 of:

-Insisting that people tackle obesity – your lifestyle is your ow choice

-Targeting people for different ethnic backgrounds when making policy – not their fault that people from some ethnic backgrounds are more likely to get diabetes

-Food companies have ethical responsibility to produce healthy foods at a reasonable price – unfair if you cant afford to buy healthy food

3 risk of diabetes is highest amongst the most deprived of the population

Demonstration

1 0.4 dm3/400 cm3.

2 lungs.

3 the cells become dehydrated; the cells are unable to function properly as water is required for the chemical reactions that go on inside the cells/cell metabolism.

4 The recommendation is that the workforce should have regular access to drinking water because it is good for general health and is vital for the efficient functioning of our cells, thus reducing the amount of sickness generally. When we are working in warm environments, we lose more water through sweating and from our lungs and so will need to drink more water to maintain a safe level of water in our body. If we are thirsty, we may already have already lost 2% water by body weight and are dehydrated – we need to have access to drinking water before we feel thirsty, otherwise we can lose concentration and this may be dangerous in the workplace. If we lose as much as 5% we lose our ability to work and this would have a significant impact on production.

5 we cannot store excess amino acids.

6 the amino group of the amino acid is removed as ammonia by deamination; ammonia is quickly converted to urea.

Lesson 15: B5.15 – The kidneys (Triple only)

Connection

Q1. List 3 ways water is lost

Q2. Why is water content of cells important?

Q3. What happens in deamination?

Activation

LI: Describe how the kidneys produce urine

https://www.youtube.com/watch?v=gWnIFIdDeto

1. Make a note of the title and the LI
2. Read pages 200-201
3. Make a list of the key words and define those you don't know
4. Draw and label fig 5.4
5. Draw and label fig 5.44

Demonstration

Attempt questions 1-6
In 10 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9

Consolidation

Complete and self assess the relevant past paper question for this topic - From the B5 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Answers: B5.15 – The kidneys (Triple)

Connection

1 urine, sweating, breathing
2 allows chemical reactions to occur, too little this doesn't occur efficiently, too much the cells will burst.
3 amino NH_2 group removed from amino acid, converted into ammonia (toxic) then urea and excreted - urine

Demonstration

1 filter waste substances, and substances the body doesn't need, from the blood, for removal from the body/excretion.

2 small molecules, including water, urea, glucose and ions.

3 proteins.

4 water; glucose.

5 detected by body; increase in the release of ADH by the pituitary gland; ADH acts on kidney tubules; more water is reabsorbed by the kidney tubules.

6 If less ADH is produced, less water is reabsorbed back into the blood from the kidney tubules and dilute urine is produced.

Connection: B5.16 – Negative feedback

Connection – questions (Triple only)

Q1. Why are the kidneys important?

Q2. What is selective reabsorption in the kidneys?

Q3. What is the role of ADH in the kidneys?

Connection: B5.16 – Negative feedback

Connection – answers Triple only

A1 maintain water balance and remove waste

A2

Small dissolved molecules and ions pass into the kidneys, large ones such as proteins do not. Some of the small molecules (glucose, amino acids, sodium and chloride ions) are useful and are reabsorbed the rest are excreted. Some water is reabsorbed depending on hydration levels

A3

Blood dilute (excess water) > pituitary > ADH> less water reabsorbed > dilute urine

Blood concentrated (limited water) > pituitary > more water reabsorbed > concentrated urine

Lesson 16: B5.16 – Negative feedback

Connection

Q1. What are the treatments for type 1 & 2 diabetes?

Q2. Give an ethical consideration regarding diabetes

Q3. Give a social consideration regarding diabetes

Activation

LI: Explain the role of thyroxin and how it is controlled by negative feedback

https://www.youtube.com/watch?v=_Mts354VC7A

1. Make a note of the title and the LI
2. Read pages 202-203
3. Make a list of the key words and define those you don't know
4. Draw and label fig 5.46

Demonstration

Attempt questions 1-6
In 10 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9

Consolidation

Complete and self assess the relevant past paper question for this topic - From the B5 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Answers: B5.16 – Negative feedback

Connection

1 Type 1 – insulin injections. Type 2 – healthy diet and exercise

2 Any 1 of:

-Insisting that people tackle obesity – your lifestyle is your ow choice

-Targeting people for different ethnic backgrounds when making policy – not their fault that people from some ethnic backgrounds are more likely to get diabetes

-Food companies have ethical responsibility to produce healthy foods at a reasonable price – unfair if you cant afford to buy healthy food

3 risk of diabetes is highest amongst the most deprived of the population

Demonstration

1 increased basal metabolic rate; thin/unexplained weight loss; rapid heart rate.

2 controls rate of metabolism/metabolic rate; controls growth and development.

3 thyroid-stimulating hormone (TSH).

4 thyroxine and adrenaline.

5 when the desired effect/action of a hormone is reached, the secretion of the hormone is switched off.

6 (with a heating system/thermostat, the heating system is switched off by the effect, i.e. the temperature having been reached); the switching on and off of thyroxine secretion is not regulated by the action of the thyroxine on the thyroid gland itself; the thyroxine acts on the pituitary gland, which responds by producing another hormone (TSH) that acts on the thyroid gland.

Lesson 16: B5.17 – Kidney failure (Triple)

Connection

Q1. Why is thyroxine important?

Q2. How are levels of thyroxine controlled?

Q3. What is the principle of negative feedback?

Activation

LI: Explain how kidney dialysis works

https://www.youtube.com/watch?v=9KZHowze7lg

1. Make a note of the title and the LI
2. Read pages 204-205
3. Make a list of the key words and define those you don't know
4. Draw and label fig 5.48

Demonstration

Attempt questions 1-6
In 10 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9

Consolidation

Complete and self assess the relevant past paper question for this topic - From the B5 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Answers: B5.17 – Kidney failure (Triple)

Connection

1 Regulates metabolism
2 pituitary > TSH > thyroid >thyroxine > increased respiration
3 the system is inhibited by its own products prevent conditions changing too much in either direction (eg too hot too cold)

Demonstration

1 the filtration of wastes from a patient's blood. blood is removed from the patient's arm and circulated through the dialysis machine; wastes filter from the blood through a partially permeable membrane; the blood is returned to the arm.

2 when a person has lost their kidney function.

3 close relative, i.e. an identical twin is best; a brother, sister, father, mother, son or daughter may be suitable.

4 the patient's tissue type and blood group will already be on record and can be matched (or not) quickly when a possible donor kidney becomes available.

5 it is complex operation – the kidney needs to be connected to an artery and vein and also to the bladder; risk of rejection; Note that the usual risks associated with surgery apply – the possibility of blood clots and infection.

6 the patient needs to take immunosuppressant drugs (for the rest of their life).

Lesson 16: B5.18 – Dialysis or transplant (Triple)

Connection

Q1. What does the dialysis machine do??

Q2. What considerations help make a kidney transplant successful?

Q3. Why are immunosuppressant drugs required?

Activation

LI: Explain how kidney failure can be treated

https://www.youtube.com/watch?v=mi34xCfmLhw

1. Make a note of the title and the LI
2. Read pages 206-207
3. Make a list of the key words and define those you don't know

Demonstration

Attempt questions 1-7
In 10 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9

Consolidation

Complete and self assess the relevant past paper question for this topic - From the B5 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Answers: B5.18 – Dialysis or transplant (Triple)

Connection

1 filters the waste products from the blood and controls glucose an ion levels at an appropriate concentration
2 donor is a close relative, the kidney is from a living donor (only need 1 kidney)
3 to reduce the risk of the transplant being rejected by the immune system.

Demonstration

1 a sudden fall in blood pressure; risk of infection.

2 some people, e.g. the elderly, are too weak; conditions such as heart disease may prevent a patient from having the operation.

3 immunosuppressant drugs must be taken; the person is able to have a much more varied diet; but lifestyle changes (stopping smoking, limiting alcohol and restricting weight) must be made to minimise risk.

4 50-60%.

5 being an organ donor; relatives overruling donor's wishes; offering organs for sale; breeding other animals specifically for organ donation.

6 these offer the possibility of genetically modifying the pigs so that the organs to be transplanted will not be rejected by the (human) patient/recipient of the organ.
Note that in the question, genetically modified is italicized. This question refers to this aspect, and not the suitability of pigs as donors, though these are suitable, owing to being readily available, and providing they're raised in a clean environment, the possibility of infection may be low. Genetically, primate donors would offer the closest match, but their close relationship increases the likelihood of transferring a virus liable to cause infection in humans. There are also ethical issues with the use of primates and the practicality of breeding primates in sufficient numbers.

7 Stop smoking, limit alcohol, healthy diet, healthy BMI.

Connection: B5.19 – Human reproduction

Connection – questions (Triple only)

Q1. What are the 2 types of dialysis and what are their risks?

Q2. What are the long term consequences of transplants??

Q3. How is the availability or organs for donation being addressed?

Connection: B5.19 – Human reproduction

Connection – answers Triple only

A1 haemodialysis (blood flows out and back into the arm) peritoneal dialysis (fluid pumped into abdomen) – issues include infection and loss of blood pressure

A2

Immunosuppressant drugs increase the risk of infection, cancer and diabetes, need to make healthy changes to lifestyle

A3

Organ donation (only 30% population carry cards), black market sales (!!!), biotechnology working to transplant GM organs from other animals (animal rights), stems cells to grow new organs (experimental)

Lesson 16: B5.19 – Human reproduction

Connection

Q1. Why is thyroxine important?

Q2. How are levels of thyroxine controlled?

Q3. What is the principle of negative feedback?

Activation

LI: Describe the roles of hormones in sexual reproduction and the menstrual cycle

https://www.youtube.com/watch?v=Vl2wRbO8LZU

1. Make a note of the title and the LI
2. Read pages 208-209
3. Make a list of the key words and define those you don't know
4. Draw and label fig 5.52
5. Draw and label fig 5.54 (H)

Consolidation

Complete and self assess the relevant past paper question for this topic - From the B5 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Demonstration

Attempt questions 1-6
In 10 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9

Answers: B5.19 – Human reproduction

Connection

1 Regulates metabolism
2 pituitary > TSH > thyroid >thyroxine > increased respiration
3 the system is inhibited by its own products prevent conditions changing too much in either direction (eg too hot too cold)

Demonstration

1 males – testosterone.
females – oestrogen and progestogens, e.g. progesterone.

2 development of secondary sexual characteristics

3 follicle stimulating hormone (FSH); luteinising hormone (LH), oestrogen and progesterone.

4 oestrogen and progesterone.

5 oestrogen and progesterone.

6 oestrogen and progesterone – negative feedback on FSH secretion.
progesterone – negative feedback on LH secretion.