KESTEVEN AND SLEAFORD HIGH SCHOOL

Biology Scheme of Learning

Year 10 – Term 5/Unit 11 Hormonal Communication

Intent – Rationale

Students have studied the principles of hormonal control and the endocrine system. They should be able to identify the main parts of the endocrine system and recall the hormones they produce. Students should recall how blood-glucose concentration is controlled, including the role of insulin. Higher-tier students should also be able to explain the role of glucagon, and clearly distinguish between glucose, glycogen, and glucagon. All students should be aware of the causes and treatments of both type 1 and type 2 diabetes. They should link this with work in B2.3 *Stem cells* and with the effect of lifestyle on type 2 diabetes in B7.4 *Diet, exercise, and disease*.

Higher-tier students should understand the process of negative feedback, particularly as applied to the hormones adrenaline and thyroxine. All students have studied hormones in human reproduction. They should recall the action of hormones in bringing about puberty. They should be aware of the role of oestrogen in the menstrual cycle in females, and of testosterone in males.

Higher-tier students should have a more detailed understanding of how hormones interact to control the menstrual cycle. Students should understand how hormones are used in the control of fertility as applied to contraception, and for higher-tier students, to infertility treatments.

Finally, students studying *AQA GCSE biology* have studied the role of hormones in plants, and the tropism responses they cause. Higher-tier students should understand the use of plant hormones in agriculture and horticulture.

Sequencing – what prior learning does this topic build upon?	Sequencing – what subsequent learning does this topic feed into?
Topic B7.1 Cells and Tissues **GCSE B1 Cells and their specialisation, diffusion, osmosis and active transport.** **GCSE B2.3 Stem cells** **GCSE B7.4 Diet exercise and disease**	• A level Unit 6 Homeostasis
What are the links with other subjects in the curriculum?	**What are the links to SMSC, British Values and Careers?**
• **EP diabetes and fertility** • **Maths interpreting graphs**	• SMSC S1, M1 M3 when learning about and discussing diabetes and fertility • BV 3,4 and 5 when discussing contraception and fertility treatments • GB4g teamwork during group activities such as the required practical
What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	**What are the opportunities for developing mathematical skills?**

FROM THE LIBRARY *Hormones-612.4* *Diabetes-362.1* *Living With Diabetes-362.1* *Everything You Ever wanted To Know About Periods-613*	• Interpreting graphs

Biology Scheme of Learning

Year 10 – Term 5/Unit 11 Hormonal Communication

Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?

Know

Explain why the pituitary gland is known as a 'master gland'. Describe the role of hormones released by endocrine glands. Describe what happens when blood glucose levels become too high or too low. Describe the difference in the causes of Type 1 and Type 2 diabetes. Explain why Type 1 diabetes is treated with insulin injections. Explain how Type 2 diabetes can be treated by changes to diet and exercise. Describe how the production of insulin for people with diabetes has developed over time. Describe the function of adrenaline and thyroxine. Compare and contrast the changes to boys and girls during puberty. Name the hormones involved in the menstrual cycle. Name the glands that produce the hormones oestrogen, progesterone, LH, and FSH. Describe the function of the hormones that control the menstrual cycle. Explain how contraceptives work. List the advantages and disadvantages of different contraceptives. Describe what is meant by infertility and suggest reasons for it. Describe the steps used in IVF. Outline the issues surrounding IVF. Describe how FSH and IVF can be used to help treat infertility.

Explain why plants need tropisms. Use diagrams and descriptions to explain how plant shoots and roots respond to light and gravity. Describe some uses of plant hormones (giberellins, ethene, and auxins) in agriculture, horticulture, and the food industry. Observe the effects of plant hormones

Apply

Interpret and explain diagrams of negative feedback control
Apply knowledge to suggest and explain how changes in hormone production could affect the body.
Plan and carry out an investigation into the effect of light on plant growth, with limited guidance.

Extend

Compare and contrast nervous and hormonal action. Explain how glucagon interacts with insulin to control blood glucose levels. Explain why it is important to control the level of glucose in the blood
Evaluate different treatments for Type 1 diabetes. Explain in detail how lifestyle choices affect the risk of developing Type 2 diabetes. Summarise how scientists are working to find a cure for diabetes.
Explain why fertility changes with age in men and women. Explain the role of each hormone in the menstrual cycle. Evaluate the advantages and disadvantages of IVF. Use different viewpoints to make an informed decision on unused IVF embryos.
Explain in detail how the production and diffusion of auxin affects the growth of shoots and roots. Predict the results of an investigation of tropisms, with detailed scientific reasons. Explain how the effects of plant hormones are useful in agriculture, horticulture, and the food industry. Evaluate the use of synthetic plant hormones.

What subject specific language will be used and developed in this topic?	**What opportunities are available for assessing the progress of students?**

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Word	Definition
ADH	Anti-diuretic hormone helps control the water balance of the body and affects the amount of urine produced by the kidney
Adrenaline	Hormone that prepares the body for fight or flight
Auxin	A plant hormone that controls the responses of plants to light and gravity
Endocrine system	The glands that produce the hormones that control many aspects of the development and metabolism of the body, and the hormones they produce
Follicle stimulating hormone (FSH)	Causes the eggs to mature in the ovary
Gibberellins	Plant hormones that are important in initiating seed germination
Glucagon	Hormone involved in the control of blood sugar levels
Glycogen	Carbohydrate store in animals
Gravitropism	The response of a plant to gravity
Hormones	Chemicals produced in one area of an organism that have an effect on the functioning of another area of the body
Insulin	Hormone involved in the control of blood sugar levels
Oestrogen	Hormone that controls the development of secondary sexual characteristics in girls at puberty, and the build-up and maintenance of the uterus lining during the menstrual cycle
Ova	Female sex cells, eggs
Ovaries	Female sex organs that produce eggs and sex hormones
Ovulation	Release of a mature egg (ovum) from the ovary
Phototropism	Response of a plant to light, controlled by auxin
Pituitary gland	Endocrine 'master gland' found in the brain that secretes a number of different hormones into the blood in response to different conditions to control other endocrine glands
Testosterone	Main male sex hormone that controls the male secondary sexual characteristics at puberty and the production of sperm
Tropism	Responses of plant roots and shoots to environmental stimuli such as light or gravity
Type 1 diabetes	A disorder where the pancreas fails to produce sufficient insulin
Type 2 diabetes	A disorder where the body cells no longer respond to insulin

- **LAQ 1 after L3**
- **LAQ 2 after L8 (Triple only)**
- **B11 End of Topic test**

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Intent – Concepts

Lesson title	Learning challenge I can	Higher level challenge I can	Suggested activities and resources
B11 L1 Principles of Hormonal control	Describe the role of hormones released by endocrine glands.	Compare and contrast nervous and hormonal action. Apply knowledge to suggest and explain how changes in hormone production could affect the body.	
B11 L2 The Control of Blood glucose	Describe what happens when blood glucose levels become too high or too low.	Explain how glucagon interacts with insulin to control blood glucose levels. Explain why it is important to control the level of glucose in the blood	
B11 L3 Treating diabetes	Explain why Type 1 diabetes is treated with insulin injections and how Type 2 diabetes can be treated by changes to diet and exercise	Evaluate different treatments for Type 1 diabetes. Explain in detail how lifestyle choices affect the risk of developing Type 2 diabetes. Summarise how scientists are working to find a cure for diabetes.	
B11 L4 The role of Negative Feedback	a) Describe the function of adrenaline and thyroxine. b) Interpret and explain diagrams of negative feedback control.	Explain why fertility changes with age in men and women. Explain the role of each hormone in the menstrual cycle.	
B11 L5 Human Reproduction and The Menstrual Cycle	a) Explain why fertility changes with age in men and women. b) Explain the role of each hormone in the menstrual cycle.	Interpret in detail a graph showing how the levels of hormones change.	
B11 L6 Artificial control of fertility	Apply knowledge of hormones in the menstrual cycle to suggest how hormonal contraceptives work.	Evaluate different methods of contraception in detail.	
B11 L7 Fertility Treatments	Describe FSH and IVF can be used to help treat infertility.	Evaluate the advantages and disadvantages of IVF. Use different viewpoints to make an informed decision on unused IVF embryos.	
B11 L8 Plant Hormones and Responses (Triple only)	a) Explain how the production and diffusion of auxin affects the growth of shoots and roots (TRIPLE). b) Required practical: Investigate the effect of light or gravity on the growth of newly germinated seedlings (TRIPLE).	Explain in detail how the production and diffusion of auxin affects the growth of shoots and roots. Independently plan and carry out an investigation into the effect of light on plant growth. Predict the results of an investigation of tropisms, with detailed scientific reasons.	
B11 L9	Explain how plant hormones are used in agriculture and horticulture	Explain how the effects of plant hormones are useful in agriculture, horticulture, and the food industry. Evaluate the use of synthetic plant hormones.	

Using Plant Hormones (Triple only)			
B11 L10 Test			