Year 10
Subject: Biology
Topic/Unit: Topic 5: Homeostasis and Response
When: Spring Term.

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Overview: Why this? Why now?
Cells can only survive within narrow physical and chemical limits. This unit explores how the body maintains a constant internal environment, known as **homeostasis**, to ensure optimum conditions for enzyme action and cell function. Having previously studied basic cell biology and digestion, students now explore the complex coordination between the **nervous system** (fast, electrical responses) and the **endocrine system** (slower, chemical responses).

Building on...building to: This unit builds on Year 7 knowledge of reproduction and Year 9 concepts regarding specialised cells like neurones. It develops advanced physiological understanding required for further study, specifically focusing on complex feedback loops and the evaluation of medical interventions such as **IVF**, **dialysis**, and **organ transplants**.

Sequence summary:
1. **Homeostasis and the Nervous System:** Definitions and the structure of the human nervous system, including the stimulus-response pathway.
2. **Reflexes and Reaction Time:** The mechanics of **reflex arcs** and **synapses**. Students complete **Required Practical 7** to investigate factors affecting reaction time.
3. **The Brain and Eye (Biology Only):** Identifying structures and functions of the brain (cerebral cortex, cerebellum, medulla) and the eye. Focus on **accommodation** and vision defects like **myopia**.
4. **The Endocrine System:** Introduction to glands and hormones. Detailed study of **blood glucose control** (insulin and glucagon) and diabetes management.
5. **Water Balance and Thermoregulation (Biology Only):** The role of the **kidneys** in filtration and **selective reabsorption**, and the control of body temperature by the thermoregulatory centre.
6. **Hormones in Reproduction:** The roles of **FSH, LH, oestrogen, and progesterone** in the menstrual cycle. Evaluating methods of **contraception** and infertility treatments.
7. **Negative Feedback (Higher Tier):** Explaining the roles of **thyroxine** and **adrenaline**.
8. **Plant Hormones (Biology Only):** Investigating **tropisms** through **Required Practical 8** and exploring the industrial uses of **auxins, ethene, and gibberellins**.

Key Vocabulary: Homeostasis, Neurone, Synapse, Effector, Endocrine, Insulin, Glucagon, ADH, Ovulation, Auxin, and Phototropism.

Assessments:
- **Required Practicals:** Written methods and data analysis for Reaction Time (RP7) and Plant Growth (RP8).
- **Past Exam Questions (PEQs):** Focusing on the eye, IVF, and blood glucose control.
- **Summative:** End-of-unit test (40 marks).
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Able and interested: Higher Tier students will explore the complexity of mapping brain functions using **MRI** and the principles of **negative feedback** in thyroxine release. Students can evaluate cutting-edge research, such as using the **Zika virus** to treat brain cancer.
Inclusion, Personal Development and Wider Skills: Lessons incorporate ethical debates regarding contraception and IVF success rates. Health education is addressed through the study of **obesity** as a risk factor for **Type 2 diabetes**. We celebrate diversity by studying scientists like **Percy Lavon Julian**.

Homework and Independent Learning:
Students will complete a task set on the SPARX online platform. The task is based on the current topic but also includes consolidation on previous topics. It will automatically adjust the level of challenge as the student complete the activities. Teachers may also set consolidation and revision activities.