

# **PiXL Independence:**

## **GCSE Biology – Student Booklet**

### **KS4**

**Topic: Coordination and control**

**Contents:**

- I. Level 1- Multiple Choice Quiz – 20 credits
- II. Level 2 - 5 questions, 5 sentences, 5 words – 10 credits each
- III. Level 3 - Science in The News – 100 credits
- IV. Level 4 - Scientific Poster – 100 credits
- V. Level 5 - Video summaries – 50 credits each

**PiXL Independence – Level 1**  
**Multiple Choice Questions**  
**GCSE Biology – Coordination and control**

**INSTRUCTIONS**

**Score: /20**

- Read the question carefully.
- Circle the correct letter.
- Answer all questions.

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1. Which is NOT found in the central nervous system (CNS)?
    - a. Spinal cord
    - b. Pain receptor
    - c. Relay neurone
    - d. Brain
  
  2. In bright light, the iris reduces the size of the pupils of your eyes because the...
    - a. radial muscles in the iris contract and the circular muscles relax.
    - b. radial muscles in the iris relax and the radial muscles contract.
    - c. radial muscles in the iris contract and the circular muscles contract.
    - d. radial muscles in the iris relax and the circular muscles relax.
  
  3. The type of neurone that carries an impulse from a stimulus is a...
    - a. sensory neurone.
    - b. motor neurone.
    - c. relay neurone.
    - d. intermediate neurone.
  
  4. The neurone that carries the impulse to the effector is a...
    - a. sensory neurone.
    - b. motor neurone.
    - c. relay neurone.
    - d. intermediate neurone.
  
  5. Which of the following is an example of a reflex action?
    - a. Stroking a cat.
    - b. Saving a penalty in a game of football.
    - c. Choosing a cake in the supermarket.
    - d. Your heart beating faster when you're nervous.
  
  6. A stimulus is...
    - a. a change in the environment.
    - b. an organ that detects a change.
    - c. a response to a change in the environment.
    - d. a reflex action.

7. A synapse is...
  - a. a neurotransmitter.
  - b. a chemical messenger.
  - c. an impulse.
  - d. a junction between two neurones.
  
8. Pain is detected by the ...
  - a. sensory neurone.
  - b. receptor organ.
  - c. effector organ.
  - d. motor neurone.
  
9. Which of the following describes homeostasis?
  - a. If something rises, the control systems will reduce it again.
  - b. Electrical signals that travel along a nerve fibre.
  - c. The maintenance of a constant internal environment.
  - d. If something falls, the control systems will increase it again.
  
10. A hormone is...
  - a. a protein which speeds up a chemical reaction.
  - b. a simple sugar made by the body.
  - c. a protein that is complimentary to an antigen.
  - d. a chemical messenger produced in a gland and carried by the blood.
  
11. If red blood cells were placed in a strong sugar solution, the effect on the cells would be...
  - a. lysis.
  - b. cytokinesis.
  - c. undetectable.
  - d. crenation.
  
12. If red blood cells were placed in pure water, the effect on the cells would be...
  - a. lysis.
  - b. cytokinesis.
  - c. undetectable.
  - d. crenation.
  
13. Which substance is not a hormone?
  - a. FSH
  - b. ATP
  - c. LH
  - d. Oestrogen
  
14. FSH stimulates...
  - a. the egg to mature.
  - b. the pituitary gland to release LH.
  - c. the lining of the uterus to build up.
  - d. the lining of the uterus to break down.

15. LH stimulates...
  - a. the egg to mature.
  - b. the pituitary gland to release FSH.
  - c. the lining of the uterus to build up.
  - d. the egg to be released from the ovary.
  
16. Oestrogen stimulates...
  - a. the production of FSH to stop.
  - b. the production of LH to stop.
  - c. the egg to mature.
  - d. the release of the egg.
  
17. The function of ADH is to...
  - a. prepare the body for action 'fight or flight'.
  - b. maintain the lining of the uterus.
  - c. control blood sugar levels.
  - d. regulate blood water levels by controlling the uptake of water in the kidneys.
  
18. Which hormone is secreted if the blood sugar levels become too high?
  - a. Glucose
  - b. Glycogen
  - c. Glucagon
  - d. Insulin
  
19. Which hormone is secreted if the blood sugar levels become too low?
  - a. Glucose
  - b. Glycogen
  - c. Glucagon
  - d. Insulin
  
20. Which process does NOT happen if you are trying to cool your body down?
  - a. Vasoconstriction of arterioles.
  - b. Sweating.
  - c. Hairs lie flat on the skin.
  - d. Vasodilation of arterioles.

## PiXL Independence – Level 2

### 5 questions, 5 sentences, 5 words

### GCSE Biology – Coordination and control

#### INSTRUCTIONS

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- For each statement, use either the suggested website or your own text book to write a 5-point summary. In examinations, answers frequently require more than 1 key word for the mark, so aim to include a few key words.
- It is important to stick to 5 sentences. It is the process of selecting the most relevant information and summarizing it, that will help you remember it.
- Write concisely and do not elaborate unnecessarily, it is harder to remember and revise facts from a big long paragraph.
- Finally, identify 5 key words that you may have difficulty remembering and include a brief definition. You might like to include a clip art style picture to help you remember it.

#### Example:

<b>QUESTION:</b>	Explain how the structure of the nervous system is adapted to suit its functions			
<b>Sources:</b>	<b>Website</b> – <a href="https://www.bbc.co.uk/education/guides/zkdnb9g/revision">https://www.bbc.co.uk/education/guides/zkdnb9g/revision</a> <b>Interactive</b> - <a href="https://www.youtube.com/watch?v=hS13j4ERYhY">https://www.youtube.com/watch?v=hS13j4ERYhY</a>			
<ol style="list-style-type: none"> <li>1. The nervous system enables humans to react to their surroundings and to coordinate their behaviour.</li> <li>2. Information from receptors passes along neurones as electrical impulses to the central nervous system (CNS).</li> <li>3. The CNS contains the brain and spinal cord.</li> <li>4. The CNS coordinates the response of effectors. Examples of effectors include: muscles contracting or glands secreting hormones.</li> <li>5. The nervous system is very fast to allow responses to be rapid.</li> </ol>				
Stimulus	Sensory neurone	Receptor	Motor neurone	Effector

<b>QUESTION 1:</b>	Explain how the parts of a reflex arc relate to their function.
<b>Sources:</b>	<b>Website</b> – <a href="http://www.frankswebpace.org.uk/ScienceAndMaths/biology/reflex-actions.htm">http://www.frankswebpace.org.uk/ScienceAndMaths/biology/reflex-actions.htm</a> <b>Interactive</b> - <a href="https://www.youtube.com/watch?v=Nn2RHLWST-k">https://www.youtube.com/watch?v=Nn2RHLWST-k</a>

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**QUESTION 2:**

Explain how insulin controls blood glucose levels in the body

**Sources:****Website** – <http://www.s-cool.co.uk/gcse/biology/nerves-and-hormones/revise-it/the-pancreas-controlling-glucose>**Interactive** - [https://www.youtube.com/watch?v=Pp\\_5wvKtVU0](https://www.youtube.com/watch?v=Pp_5wvKtVU0)

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**QUESTION 3:**

Describe the function of kidneys in maintaining the water balance of the body.

**Sources:****Website** – <https://www.niddk.nih.gov/health-information/kidney-disease/kidneys-how-they-work>**Interactive** - <https://www.youtube.com/watch?v=FN3MFhYPWWo>

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<b>QUESTION 4:</b>	Describe the roles of hormones in human reproduction, including the menstrual cycle.			
<b>Sources:</b>	<b>Website</b> – <a href="http://ib.bioninja.com.au/standard-level/topic-6-human-physiology/66-hormones-homeostasis-and/menstrual-cycle.html">http://ib.bioninja.com.au/standard-level/topic-6-human-physiology/66-hormones-homeostasis-and/menstrual-cycle.html</a> <b>Interactive</b> - <a href="https://www.youtube.com/watch?v=CyT6IJb6Wbk">https://www.youtube.com/watch?v=CyT6IJb6Wbk</a>			

<b>QUESTION 5:</b>	Describe the principles of hormonal coordination and control by the human endocrine system.
<b>Sources:</b>	<b>Website</b> – <a href="http://www.s-cool.co.uk/gcse/pe/how-the-body-is-controlled/revise-it/the-endocrine-system">http://www.s-cool.co.uk/gcse/pe/how-the-body-is-controlled/revise-it/the-endocrine-system</a> <b>Interactive</b> - <a href="https://www.youtube.com/watch?v=z-GXGR7AFpQ">https://www.youtube.com/watch?v=z-GXGR7AFpQ</a>

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**PiXL Independence – Level 3**  
**Science in the News**  
**GCSE Biology – Coordination and control**

**INSTRUCTIONS**

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**Fake news**

Sensationalised news stories have been around for some time, but with the mass growth of social media, the problem seems to have grown in recent years. At the very least, the US Presidential election has certainly highlighted the impact that misleading information can have. [www.tiny.cc/fakenews2](http://www.tiny.cc/fakenews2)

At home, the Brexit vote also suffered from the circulation of misleading news stories [www.tiny.cc/fakenews3](http://www.tiny.cc/fakenews3)

Therefore, the ability to identify real information, track it back to the source article and make your own judgement is a very important skill. This activity will help you develop that skill.

**What is diabetes and how is it treated?**

News article: <http://www.dailymail.co.uk/sciencetech/article-4587850/Colour-changing-tattoo-ink-help-people-diabetes.html>

NHS article: <http://www.nhs.uk/Conditions/Diabetes/Pages/Diabetes.aspx>

Discussion article: <http://www.bbc.co.uk/news/health-40123846>

Real article: <https://www.webmd.com/diabetes/guide/understanding-diabetes-detection-treatment#1>

**Task 1:**

You need to produce a 1-page essay discussing how a disease can be eradicated when the methods of its development or transmission are understood.

<b>Essay section</b>	<b>Activity</b>
<b>Introduction</b>	Describe what diabetes is and the differences between type I and type II.
<b>Describe</b>	Describe the current treatments for diabetes.
<b>Explore</b>	Discuss the new treatments for diabetes.
<b>Evaluate</b>	How can a change in lifestyle help in the regulation and control of blood sugar?

## Ice bucket challenge- the scientific impact!

News article: <http://www.bbc.co.uk/news/health-36901867>

NHS: <http://www.nhs.uk/conditions/Motor-neurone-disease/Pages/Introduction.aspx>

Real article: <http://www.wingsforlife.com/en/latest/how-does-a-neuron-work-562/>

### Task 2:

You need to produce a 1-page essay discussing the steps involved in the creation of a new drug.

<b>Essay section</b>	<b>Activity</b>
<b>Introduction</b>	What was the ice bucket challenge? What was this raising awareness of?
<b>Describe</b>	Describe motor neurone disease (MND).
<b>Explore</b>	Explain how neurons work and link this to MND.
<b>Evaluate</b>	Evaluate the impact of social media in raising awareness of this disease.

# PiXL Independence – Level 4

## Scientific Posters

### GCSE Biology – Coordination and control

#### INSTRUCTIONS

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##### Scientific Posters

Scientists communicate research findings in three main ways. Primarily, they write journal articles much like an experiment write up. These are very concise, appraise the current literature on the problem and present findings. Scientists then share findings at conferences through talks and scientific posters. During a science degree, you would practice all three of these skills.

Scientific posters are a fine balance between being graphically interesting and attracting attention and sharing just the right amount of text to convey a detailed scientific message. They are more detailed than a talk and less detailed than a paper.

Use this information to help structure your poster – [www.tiny.cc/posterskills](http://www.tiny.cc/posterskills) (that's Poster Skills not Posters Kill!) More detailed guidance is available at: [www.tiny.cc/posterskills2](http://www.tiny.cc/posterskills2)

##### Creating your poster

It is easiest to create a poster in PowerPoint; however, you need to add custom text boxes rather than using the standard templates.



Posters need to be eye catching, but readable from a distance. If you use PowerPoint, start with a 4:3 slide (for easier printing, it can then be printed on A3) and use a 14-16 pt font. The first box could be larger to draw people in. You can use a background image, but pick a simple one that is of high quality. Select text box fill and select change the transparency to maintain the contrast and partially show the picture.

You can experiment with different layouts and you should include images. Avoid a chaotic layout, posters are read from top left column downwards.

Remember to include the authors and references.

Finally, look at the examples given on the University of Texas website which also offers an evaluation of each [www.tinyurl.com/postereg](http://www.tinyurl.com/postereg)

## Transport systems

### Background

The nervous system allows the body to respond to changes in the environment in a process usually coordinated by the brain. Reflex actions are extra-rapid responses to stimuli; this process also involves the nervous system but bypasses the brain.

### Source articles

<http://www.bbc.co.uk/schools/gcsebitesize/science/aqa/nervesandhormones/thenervoussystemrev2.shtml>

<http://www.bbc.co.uk/schools/gcsebitesize/science/aqa/nervesandhormones/thenervoussystemrev3.shtml>

<http://outreach.mcb.harvard.edu/teachers/Summer05/JerryHalpern/Reflexes.pdf>

<https://backyardbrains.com/experiments/reactiontime>

**Use other sources as necessary.**

### Task:

Produce a scientific poster on the nervous system and how different responses are brought about.

<b>Recall</b>	Recall the structure and function of the human nervous system.
<b>Describe</b>	Describe how information received from stimuli results in a response. Give an example to show your understanding.
<b>Compare</b>	Describe and explain the different parts of a reflex arc. Compare how a reflex is different to a conscious response.
<b>Evaluate</b>	Evaluate data linked to reaction times and explain how this links to the structure of the nervous system.

# PiXL Independence – Level 5

## Video summaries

### GCSE Biology – Coordination and control

#### Cornell Notes

At A level and University, you will make large amounts of notes, but those notes are only of use if you record them in a sensible way. One system for recording notes is known as the Cornell notes system. This method encourages you to select relevant information, rather than trying to write a transcript of everything said. More importantly, it forces you to spend a few minutes reviewing what you have written, which has been scientifically proven to aid learning and memory retention.

The ideal is to write everything on one page, but some students may prefer to type and others will to handwrite their notes. Whichever option you use, remember the aim is to summarise and condense the content with a focus on the objectives that you are trying to learn and understand.

#### There are three main sections to the Cornell notes

- 1 **Cue/ Objectives** – This can be done before or after the lecture. You may have been provided with the objectives or you may need to decide what they were (in a less well-structured lecture) or you may want to make the link to your learning if this is an additional task or lecture you are viewing, such as this video.
- 2 **Notes** – In this space you record concisely, simply the things you really will not remember. The NEW knowledge.
- 3 **Summary** – the most important step that is carried out after the lecture. This helps to reinforce learning.

#### Background

The following short videos present two topics that link to your learning. The first video looks at the nervous system and how it coordinates and controls body functions. The second video concentrates on the system of glands which produce and secrete different types of hormones directly into the bloodstream regulating the body's growth, metabolism, and sexual development and function.

#### Source article:

##### Video 1 – The nervous system

Crash course biology: <https://www.youtube.com/watch?v=x4PPZCLnVkA>

##### Video 2 – The endocrine system

Crash course biology: <https://www.youtube.com/watch?v=WVrIHH14q3o>

**Task:**

**You need to produce a set of Cornell notes for the video given above.  
Use the following objective to guide your note taking, this links to your learning.**

- 1 Discuss the nervous system and how it coordinates and controls systems.
- 2 Discuss the endocrine system and how it coordinates and controls systems.

**Objectives**  
What are the main learning outcomes that have been shared with you?  
This will help guide you to taking the RIGHT notes during the video.

Title  
Date

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Sketch down note and key words  
Do not write in full sentences whilst you listen, put quick sketches, single words, mind maps, short hand etc.  
To help train you for university, try not to pause the video because you could not pause a live lecture (However, a lecture may give more natural pauses for you to catch up).

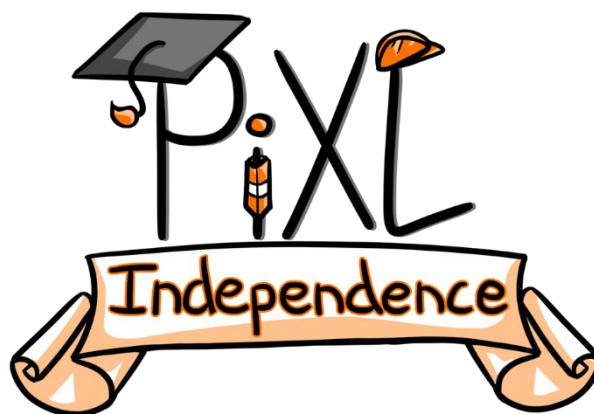
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**Summary (after the video)**  
What are your main points of learning from this video.  
This is your chance to make sense of your notes.  
Make clear connections to the things you need to know



<b>Objectives:</b>	<b>Title:</b>
	<b>Date:</b>
<b>Summary:</b>	

<b>Objectives:</b>	<b>Title:</b>
	<b>Date:</b>
<b>Summary:</b>	



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