

A photograph of a herd of bison in a grassy field. In the foreground, a large adult bison stands with its back to the camera, and a small calf stands next to it, facing left. The calf is looking towards the camera. In the background, several other bison are visible, some facing away and some facing towards the camera. The field is covered in tall grass and some yellow wildflowers. The text "Summer 2026 Biology" is overlaid on the left side of the image, followed by "Yr 11 to A level" and "transition" on the next lines.

Summer 2026 Biology
Yr 11 to A level
transition

You can email us for help at any time-

Head of Biology is Mrs Redmond-

sredmond@sharnbrook.academy

please take a note of this email and message with any queries



Welcome to the beginning of your A level studies.

(Pearson) Edexcel Biology A (2015 +)



There are two different Edexcel A level options so please do make sure that you are looking at

Edexcel Biology A

aka SNAB

aka Salters Nuffield.

• Launch lesson booklet...

Year 11 biology induction July 2021

Does Caffeine affect heart rate of *Daphnia*?

Name: _____

1. Hypothesis (what do you think caffeine will do to the heart rate)

2. Explain the science (how does caffeine affect the bodys nervous system?) behind your hypothesis.

3. References

4. Circle where the *Daphnia*'s heart is. It will actually look more transparent and not these colour!

5. *Daphnia* are a suitable organism to use for this experiment because of their features/ adaptations. Describe the 3 adaptations and explain why they are useful for us in this practical.

6. Write down the ethical concerns about using *Daphnia* / invertebrates in research.

7. Describe 3 ways to minimise the harm to *Daphnia*?

8. Variables

Independent variable (what you change, include range)

Dependent variable (what you measure and what you calculate after that)

Control variables (what you keep the same, and how you do this)

Uncontrolled variables (what you can't control)

9. Equipment

Light microscope
Daphnia culture
Cavity slide
Pond water
Caffeine solutions
Measuring cylinders
Syringes
Stopwatch

Cotton wool
Pipette with the end cut off to transfer *Daphnia*
Pipettes or syringes to transfer solutions
Box of tissues
Pencil
Pen
Calculator

10. Risk assessment

Hazard	What could happen i.e. risk?	How to minimise it happening	What to do if does happen
<i>Daphnia</i>			
Caffeine			
microscope	1		
	2		
	3		
glassware			

11. Method

Online induction

Watch the video [Investigating how caffeine affects the heart rate of Daphnia - YouTube](#)

count the heart beat from the screen (step 1/2)

Use the data provided (in the table)

a. Set up the microscope. Use the low power lens (the shortest one). Use the coarse focus knob to raise the stage to the highest point. b. Take cavity/slide/slide and put a tiny strand of cotton wool in the droplet. c. Collect a *Daphnia* in a pipette (make sure the end is cut off or you will squash the *Daphnia*) d. Put it onto the cotton wool with enough pond water or caffeine solution to cover it. You will use pond water as the control and a range of caffeine solutions. **You will decide which concentrations on the day!** e. Make sure you are either using 5 different concentrations or will share data to cover all of these. f. **You may need to dilute down your concentrations but more data will be given if you do.** g. Place slide on the stage. h. Switch light on i. Use the coarse focus knob to focus on the *Daphnia*'s heart. j. Count the heart beat for 15 seconds making dots in a 5 shaped curve on the blank page to find the resting heart rate. k. **Switch off the light** l. Then x4 to get beats per minute (bpm). m. Record this data in your table. n. Wait 5 minutes for *Daphnia* to acclimatise (during this 5 minutes complete sections 1 to 9 and set up the other slides possible) o. Switch microscope light on p. Count the heart beat for 15 seconds making dots in a 5 shaped curve on the blank page to find the resting heart rate. q. Then x4 to get beats per minute (bpm). r. Record the data in your table. s. Repeat with the same solution twice more. t. (you do not need to take the resting heart rate again) u. Repeat steps f to r with the other concentration(s) v. Calculate the average % heart rate increase

12. Complete the results table including the units. % increase = (rest heart rate - resting heart rate) / resting heart rate

caffeine solution (%)	Resting heart rate ()	Heart rate () Trial 1	% Increase in heart rate	Heart rate () Trial 2	% Increase in heart rate	Heart rate () Trial 3	% Increase in heart rate	% increase in heart rate AVERAGE
0.0	220	220		220		224		
0.1	236	264		264		268		
0.2	260	336		320		308		
0.3	254	356		320		340		
0.4	208	344		350		376		

13. Explain why you calculate the % heart rate and not just the difference.

14. Which type of graph would be the most appropriate

15. Evaluation- Describe any problems/ tricky steps that could be faced during this practical. Suggest how you could improve or cope with these.

16. Consider errors- systematic, zero, random. What may have caused these? What might the impact be?

Studying biology at Sharnbrook Academy



You have the benefit of 4 highly experienced specialist A level teachers, with a range of biology degrees and experience behind us



We have experienced technicians who will prepare a range of practicals for you to enjoy.



You will have 9 lessons per fortnight with your teachers



You should also spend around the same time preparing for lessons, completed homework and working independently- revising, topping up your knowledge etc



Please get yourself a ring binder, pads of paper, dividers, wallets etc ready to organise all your work.

All past papers, syllabus info, etc can be found here:



<https://qualifications.pearson.com/en/qualifications/edexcel-a-levels/biology-a-2015.html>



It would be a really good idea to familiarise yourself with the layout of the website and bookmark the page for future reference



This powerpoint will go onto the website so you can access the links and information later

What topics will I study?

Year 1

1

Lifestyle, Health and Risk

2

Genes and Health

3

Voice of the Genome

4

Biodiversity and Natural Resources

Year 2

5

On the Wild Side

6

Immunity, Infection and Forensics

7

Run for your Life

8

Grey Matter

Lifestyle, Health and Risk considers the functioning of the circulatory system and how lifestyle may affect it, with reference to cardiovascular disease. Ideas about causation & correlation are also introduced.

Genes and Health introduces ideas about DNA structure, protein synthesis, genes and inheritance through the context of the inherited condition, cystic fibrosis.

Voice of the Genome looks at the structure, division and differentiation of cells, including the role of stem cells and epigenetics.

Biodiversity and Natural Resources focuses on how species adapt to and are distributed in their habitats. Plant structures and functions are covered, as are concepts of sustainability.

On the Wild Side considers photosynthesis as the key process supporting ecosystems. The biological impact of climate change also forms part of this topic.

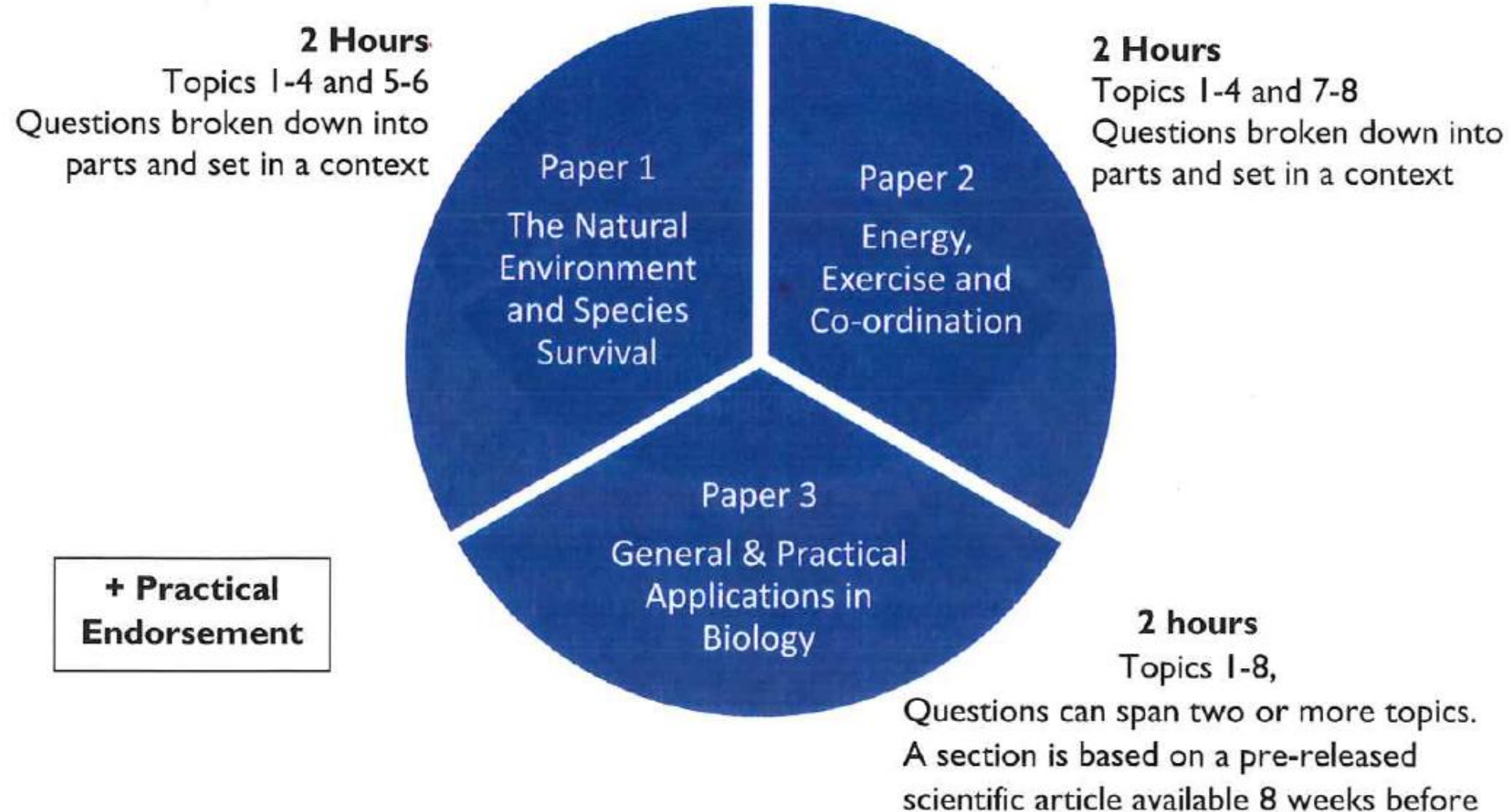
Immunity, Infection and Forensics lets students study bacteria and viruses as agents of disease and how humans combat them. The techniques used by forensic pathologists are also explored.

Run for your Life is centred on the physiological adaptations that allow animals and humans to undertake strenuous exercise. Respiration and muscle physiology are key ideas in this topic.

Grey Matter considers how the nervous system allows us to see. Brain structure and function are also explored, with reference to how we learn and to conditions such as Parkinson's disease.

Biology 'A' (Salters Nuffield) is examined, at A level, by three written exam papers.

You will also undertake a range of practical activities through the Core Practicals which leads to a separate award: the Practical Endorsement.



Practical Endorsement

This is separate to the exams and is based on your competency in completing practical work throughout the course. This can be assessed using 18 core practicals. This will include using equipment and techniques such as:



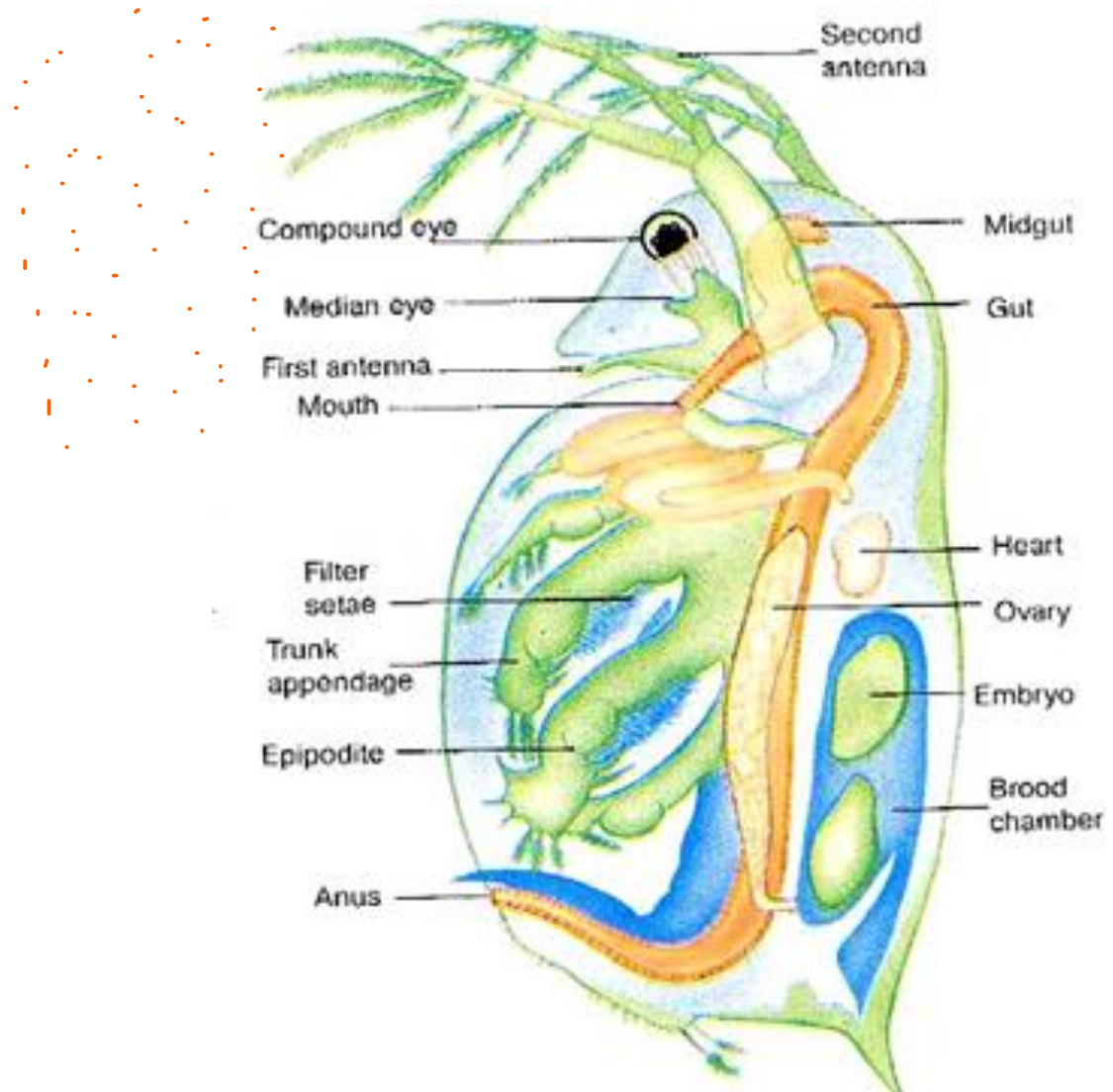
Plan for the induction sessions

- Session 1:
- Course summary
- Introduce *Daphnia* practical
- Discuss caffeine, ethics and safety, variables
- Gather the data
- Session 2:
- Finish gathering data
- Analyse the data
- Discuss the summer work

Induction
lesson
practical
activity

This is a diagram of a water flea aka *Daphnia pulex*. The colours are fake, they are pink in real life!

- We are going to look at how **caffeine solutions affect the heart rate of *Daphnia pulex***.



Questions to consider-
you should make notes
in the downloaded
practical booklet or on
paper, to use later.

What would it do to the
Daphnia's heart rate?

Why are *Daphnia* perfect for
this practical?

Refresh your memory about
variables! IV/DV/CV/UV

Hypothesis (what do you think caffeine will do to the heart rate)		
Explain the science (how does caffeine affect the bodies nervous system?) behind your hypothesis.	Caffeine is a It nervous impulses in your body. This means that ...	
	Daphnia are a suitable organism to use for this experiment because of their features/ adaptations. Describe the 3 adaptations and explain why they are useful for us in this practical.	

Write down the ethical concerns about using Daphnia / invertebrates in research.	For	Against
Describe 3 ways to minimise the harm to Daphnia?	test quickly, limit the use of the daphnia under the microscope and in the caffeine solution; minimise harm, try not to squash them, pipette that has had the tip cut	

Practical time!!

Lesson 2

- Did you pool your data at the end of the first session, if not- we can do so now!

caffeine solution (%)	Resting heart rate ()	Heart rate () Trial 1	% Increase in heart rate	Heart rate () Trial 2	% Increase in heart rate	Heart rate () Trial 3	% Increase in heart rate	AVERAGE % increase in heart rate
0.0								
0.1								
0.2								
0.3								
0.4								

You need to calculate the difference between the trial heart rate and the resting heart rate and then divide by the resting heart rate to get the % increase for each trial, then calculate the average % increase for each concentration

caffeine solution (%)	Resting heart rate ()	Heart rate () Trial 1	% Increase in heart rate	Heart rate () Trial 2	% Increase in heart rate	Heart rate () Trial 3	% Increase in heart rate	AVERAGE % increase in heart rate
0.0	220	220	(220-220)/220 =	225		224		
0.1	236	264		284		288		
0.2	260	336		320		308		
0.3	254	356		320		340		
0.4	208	344		360		376		

You need to calculate the difference between the trial heart rate and the resting heart rate and then divide by the resting heart rate to get the % increase for each trial, then calculate the average % increase for each concentration

caffeine solution (%)	Resting heart rate ()	Heart rate () Trial 1	% increase in heart rate	Heart rate () Trial 2	% increase in heart rate	Heart rate () Trial 3	% Increase in heart rate	AVERAGE % increase in heart rate
0.0	220	220	0	225	0.0227	224	0.0181	2.05
0.1	236	264	0.119	284	0.203	288	0.220	18.1
0.2	260	336	0.292	320	0.231	308	0.185	23.6
0.3	254	356	0.402	320	0.260	340	0.339	33.4
0.4	208	344	0.654	360	0.731	376	0.808	73.1

Hopefully your answers should be similar to these!
This data can be used by anyone who missed the induction sessions and still wants to complete the activities

Explain why you calculate the % heart rate and not just the difference.

Which type of graph would be the most appropriate.

**Evaluation- Describe any problems/
tricky steps that could be faced during
this practical.**

**Suggest how you could improve or
cope with these.**

**Consider errors- systematic, zero,
random**

**What may have caused these? What
might the impact be?**

Next steps

Before the first lesson of term, you will need to have completed:

tasks 1 (survey) to 5.

Task 1

Please complete this survey in the next day or two

Biology Induction 2026



Task 2

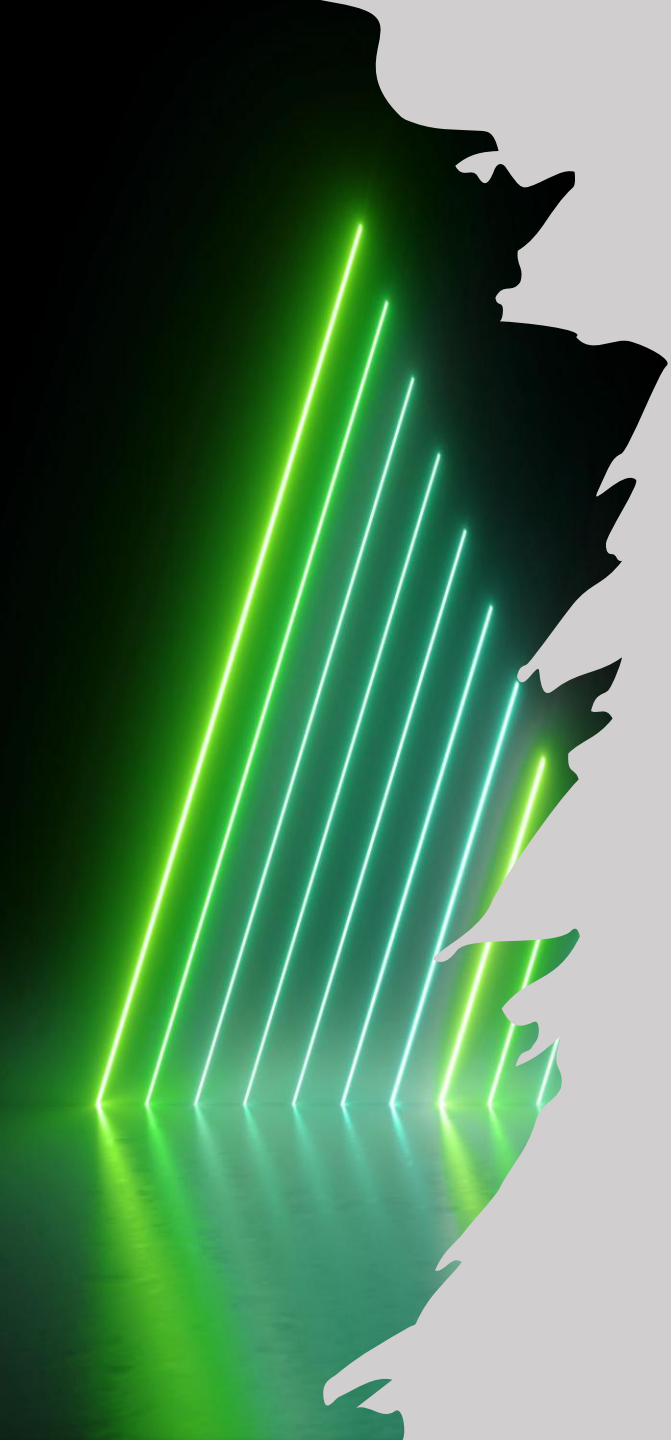
- Go to the edexcel website

<https://qualifications.pearson.com/en/qualifications/edexcel-a-levels/biology-a-2015.html>

- Find the command words in Appendix 7 of the A level specification.
- Save the command words and definitions to a new word document.
- Create a resource to help you learn the definition of each command word.
(flash cards, mix and match etc)
- You will need to refer back to this again and again during your studies so keep it safe.
- BRING IN TO FIRST LESSON IN SEPTEMBER

Task 3

- Finish the *Daphnia* booklet pages
- Complete sections 2 and 3 in the pack- the worksheets and homework sheets





Task 4 vaccine research and report

We would like you to produce a piece of work that is:

Researched and word processed

Max 1000 words

Min 5 images/diagrams/ tables/graphs etc

Using clear, helpful side headings

Show where you have used references

These references can go in a number appendix at the end and are not included in the word count. Simply put the number of the reference where you have used that information in your write up.

NB Not referencing your work is considered to be plagiarism.

You should also **evaluate your sources** (for example, if I own company GLOVES R US and I publish a study that says everyone wears gloves, can you believe my conclusion? If GLOVEWATCHERS, an independent self funded glove survey company, says 20% of people wear gloves, which conclusion is more likely to be unbiased?)

You should include the following topics:

Vaccine trial protocols or procedures

How vaccines work

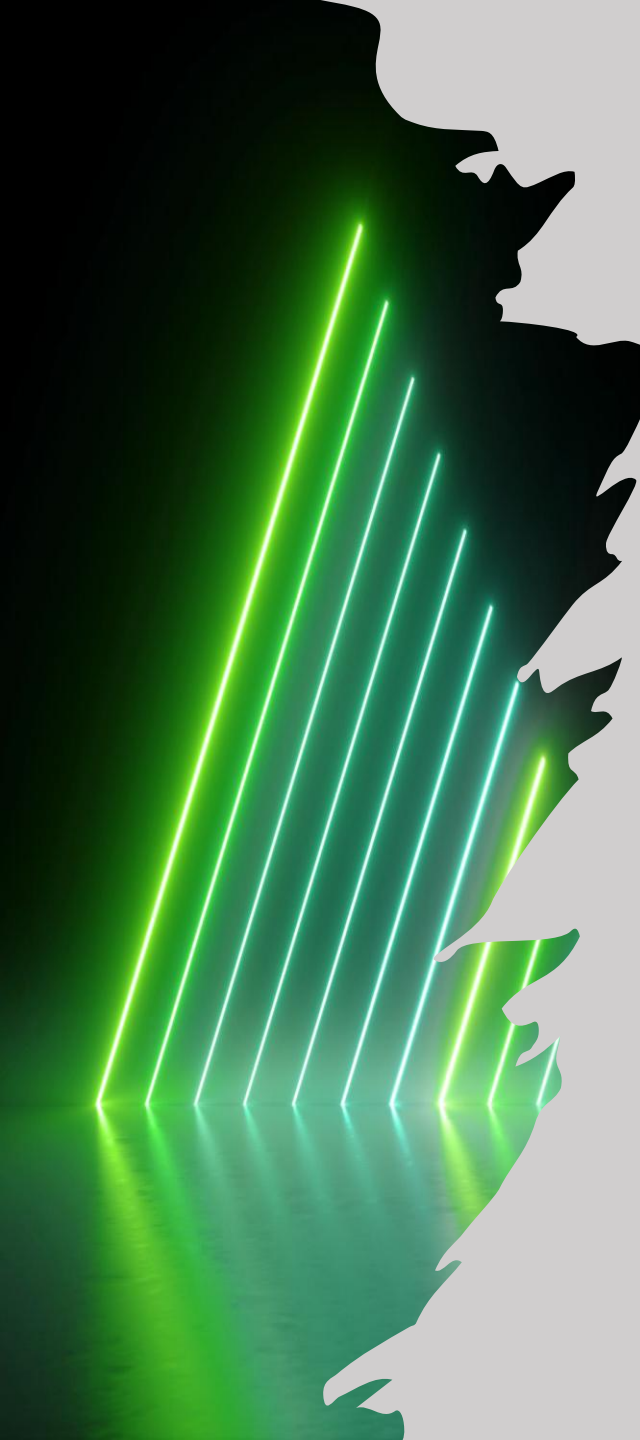
The limitations of vaccines (think about the annual flu vaccine)

How vaccines are manufactured

Any other relevant information you think should be in your report

NB vaccine trials are not the same as standard drug trials so be careful!

Task 4 checklist



Typed and printed or emailed to sredmond@sharnbrook.academy
5(+) images
Side headings used well
Refences cited in text
References listed correctly
References evaluated well
vaccine trial protocol outlined
Vaccine mode of action
Vaccine limitations
Vaccine manufacturing
Other relevant information included
Conclusion

Task 5

You will have an induction test during your first fortnight in year 12.

Info sheets are in the pack and the questions will be based upon these.

Complete the question sheets in your pack- handwritten answers are fine.



Please make sure you have the following resources to help prepare:



Time- little and often- don't leave everything to the last minute- it'll just be a disaster



2025 induction pack- contains the information sheets



Calculator



Retrieval tactics- go to [the learning scientists video](#) for tactics advice



Equipment to make notes



Folder to keep everything organised