

Welcome To Your A-level Biology Induction!

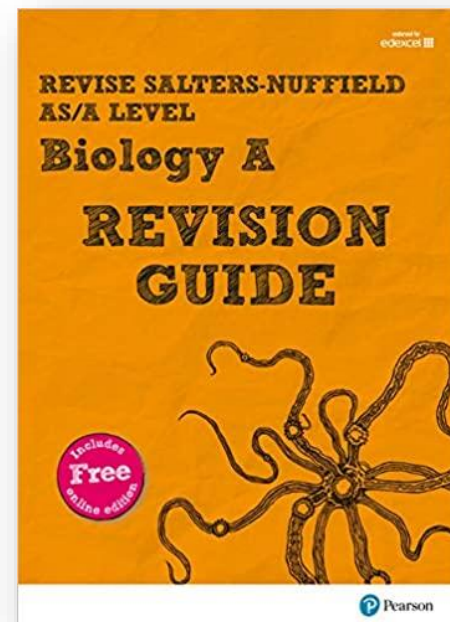
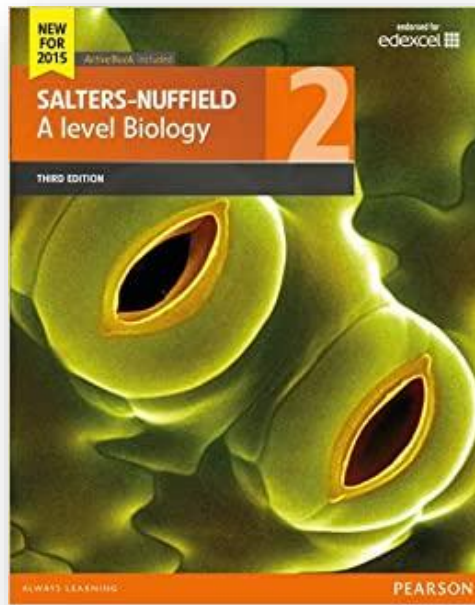
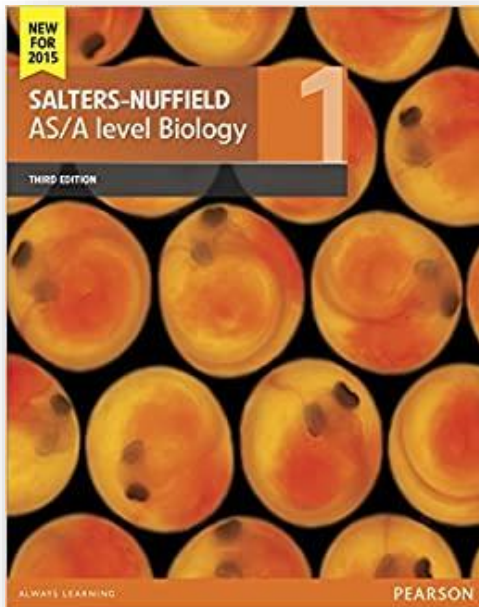


Do Now *(write your answers on a piece of paper)*

1. What made you want to study A-level Biology?
2. What do you think studying Biology involves?
3. What careers can you think of that involve Biology?

Salter's Nuffield Advanced Biology (SNAB)

- Edexcel is the Exam Board.
- Biology A specification
- <http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/biology-a-2015.html>



SNAB Topics

Year 1

- Topic 1 – Lifestyle, Health & Risk
- Topic 2 – Genes and Health
- Topic 3 – Voice of the Genome
- Topic 4 – Biodiversity and Natural Resources

Year 2

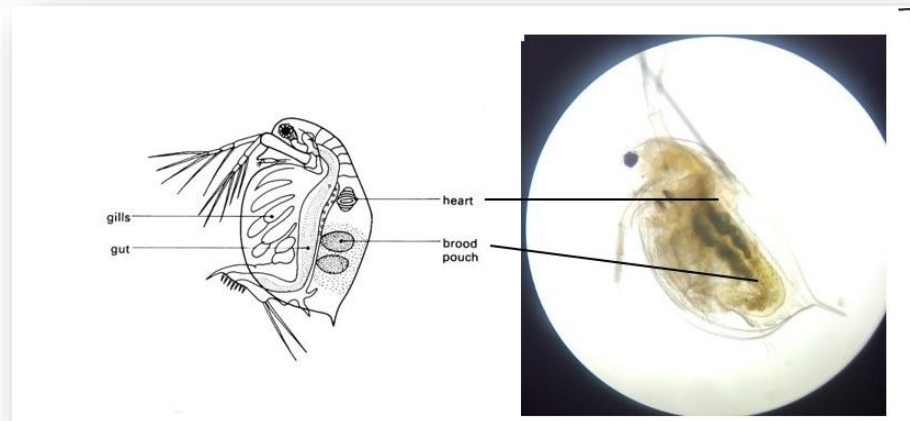
- Topic 5 – On the Wild Side
- Topic 6 – Infection, Immunity and Forensics
- Topic 7 – Run for your Life
- Topic 8 – Grey Matter

EXAMS

Year 1	Year 2
<p data-bbox="125 601 937 701">Paper 1: Lifestyle, Transport, genes and health (topics 1 and 2) 50% of total grade</p> <p data-bbox="125 772 937 929">Paper 2: Development, plants and the environment (topics 3 and 4) 50% of total grade</p>	<p data-bbox="975 601 1748 758">Paper 1: The natural environment and species survival (topics 1,2,3,4,5 and 6) 33.33% of total grade</p> <p data-bbox="975 829 1806 986">Paper 2: Energy, exercise and co-ordination (topics 1,2,3,4,7 and 8) 33.33% of total grade</p> <p data-bbox="975 1058 1748 1215">Paper 3: General and practical applications of Biology (topics 1-8 and scientific article) 33.33% of total grade</p>

Required Practicals

- 18 core experiments completed throughout the year.
- Assessed by a lab book. At the end you will get a practical skills assessment pass or fail with your grade.



School girls expose false vitamin C claims

Fruit juice is recommended as a good source of the antioxidant vitamin C and large volumes are sold every day. In 2004, two high school students in New Zealand conducting an experiment to determine the vitamin C levels of their favourite fruit drinks found that the levels in one well-known blackcurrant juice drink were much lower than those claimed by the manufacturer. The manufacturer dismissed the concerns, saying the claim related only to the blackcurrant fruit and not the product. However, the case was taken up by a television consumer affairs show and after further testing it was found that statements about the levels of vitamin C had been misleading. Fifteen charges were brought under the Fair Trading Act. In March 2007, the manufacturer pleaded guilty to all 15 charges and was fined NZ\$217,500. The manufacturer maintains that the issue only affected juice in Australia and New Zealand.

Core practical 2: Which type of fruit juice/fruit provides the **most** vitamin C ?

CPAC Criteria focus for lesson – must be completed by candidates:

(2a) correctly uses appropriate instrumentation, apparatus and materials to carry out investigative procedures, experimental techniques and procedures with minimal assistance.

(2d) selects appropriate equipment and measurement strategies in order to ensure suitable accurate results.

(5b) Sources on information are sited demonstrating that research has taken place, supporting planning and conclusions.



Core practical: Is high C all it claims to be ?



Which type of fruit juice/fruit provides the **most** vitamin C ?

Fruit juice



Vitamin C



Antioxidant





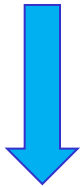
Core practical: Is high C all it claims to be ?



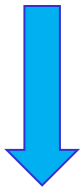
Which type of fruit juice/fruit provides the **most** vitamin C?



Fruit juice



Vitamin C



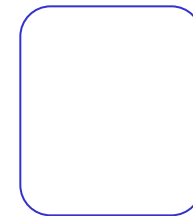
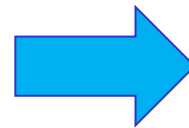
Antioxidant

The quantity of vitamin C in food and drink can be determined using a **simple colour test**.

Vitamin C **decolourises** the blue dye DCPIP

Vitamin C is an **antioxidant** and **reduces the DCPIP**.

DCPIP changes from **blue to colourless** (or slightly pink) as it becomes reduced.





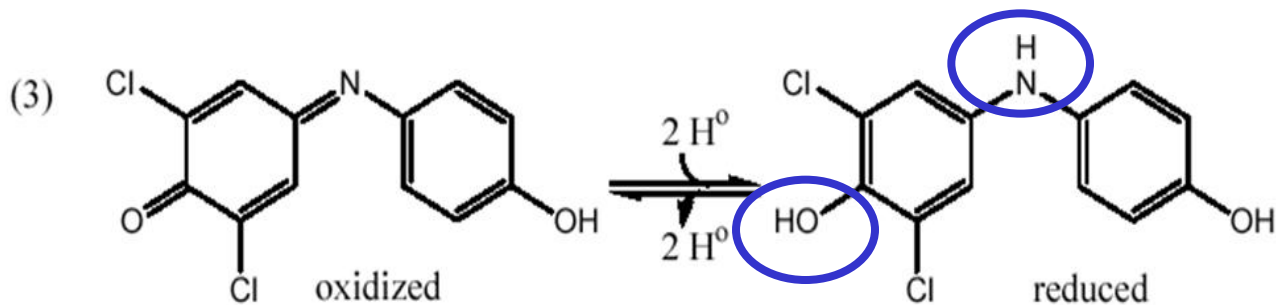
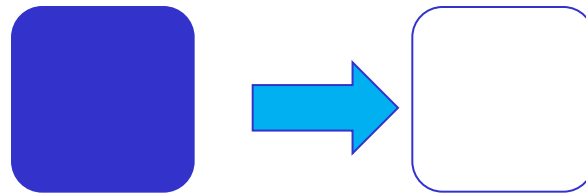
Core practical: Is high C all it claims to be ?

Which type of fruit juice/fruit provides the **most** vitamin C ?



Vitamin C is a reducing agent.

DCPIP is reduced.





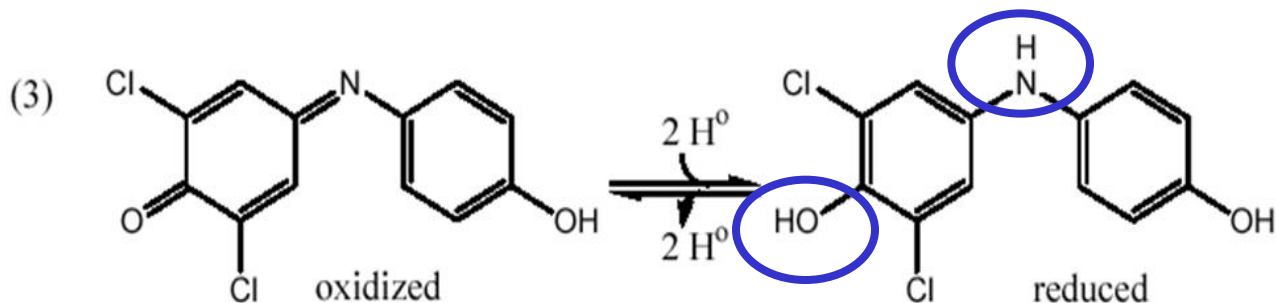
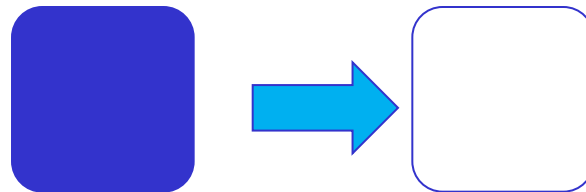
Core practical: Is high C all it claims to be?

Which type of fruit juice/fruit provides the **most** vitamin C ?



You will be determining which fruit juice contains the most vitamin C (and therefore which is the best antioxidant) using this colour change.

How ?



Equipment

You need

- 1% DCPIP solution
- 1% vitamin C solution
- A range of fruit juices
- Test tubes
- Pipette to accurately measure 1 cm³
- Pipette or burette.

Video – Finding vitamin C content of food



Think Pair Share

For this experiment what is/are the:

- a) Independent variable **The type of juice**
- b) Dependent variable **The volume of juice required to decolourise the DCPIP**
- c) Controls

The age of juice, the volume of DCPIP, concentration of DCPIP

Task: come up with a results table to collect your results in

It needs to include:

- your independent variable (juices of)
- 3 repeats and an average
- units

RESULTS TABLE

Juice tested	Volume of Juice required to decolourise 1cm ³ of 0.15 DCPIP solution (cm ³)			Average volume of juice required (cm ³)
	1	2	3	
Control	1	2	2	1.7
Orange	2	2	2	2
Apple	10	14	16	13.3
Blackcurrant	4.5	4	4.5	4.3
Pineapple	13	13	14	13.3

Demo of procedure for 1% vitamin C

1. Pipette 1 cm³ of 1% DCPIP solution into a test tube.
2. Record the start volume of 1% vitamin C solution in a pipette or burette.
3. Add 1% vitamin C solution drop by drop to the DCPIP solution. After adding each drop, shake the tube gently. Continue to add drops of the vitamin C solution until the blue colour of the DCPIP has just disappeared.
4. Record the end volume.
5. Calculate the exact volume of 1% vitamin C solution needed to decolourise the DCPIP by subtracting the start volume from the end volume. Repeat the procedure and average the result.

Task: now start collecting results for your assigned juice

Method

1. Pipette 1 cm³ of 1% DCPIP solution into a test tube.
2. Record the start volume of 1% vitamin C solution in a pipette or burette. Add 1% vitamin C solution drop by drop to the DCPIP solution. After adding each drop, shake the tube gently. Continue to add drops of the vitamin C solution until the blue colour of the DCPIP has just disappeared. Record the end volume. Calculate the exact volume of 1% vitamin C solution needed to decolourise the DCPIP by subtracting the start volume from the end volume. Repeat the procedure and average the result.
3. Repeat this procedure with the fruit juices provided. If only one or two drops of the fruit juice decolourises the DCPIP, dilute the juice and repeat the test.

Method

Challenge

- The 1% vitamin C solution contains 10 mg of vitamin C in 1.0 cm³. Calculate the mass of vitamin C that is required to decolourise 1 cm³ of the DCPIP solution. Use this value to work out how much vitamin C each of the fruit juices contain, in mg cm⁻³.
- Mass of vitamin C in fruit juice sample = mass of vitamin C to decolourise 1cm³ of DCPIP × volume of sample required to decolourise 1cm³ of DCPIP

Task: collect results from the other groups for the other juices

- Present your results as a graph

Exit Ticket

1. Which juice had the highest vitamin C content?
2. How did you know the above?
3. How **repeatable** were your results?
4. To what **precision** were your results?
5. If you were to do this experiment again, how would you improve it to make it more **valid** or **precise**?