ST. ANNE'S
CATHOLIC
HIGH SCHOOL

BURNERS & BEAKERS

THE SCIENCE DEPARTMENT NEWSLETTER

SPRING 2026

'Act justly, love tenderly, walk humbly with your God'

Introduction

Welcome to the Spring Term edition of *BURNERS AND BEAKERS*.

We have a jam-packed issue again, full of practical tips for studying, including how to get creative with Zines and Sketch-noting! There are also Interviews with two fabulous Science teachers, a spotlight on an inspirational woman in STEM, and a fun science experiment to try at home. Is that everything? No, there's even more!

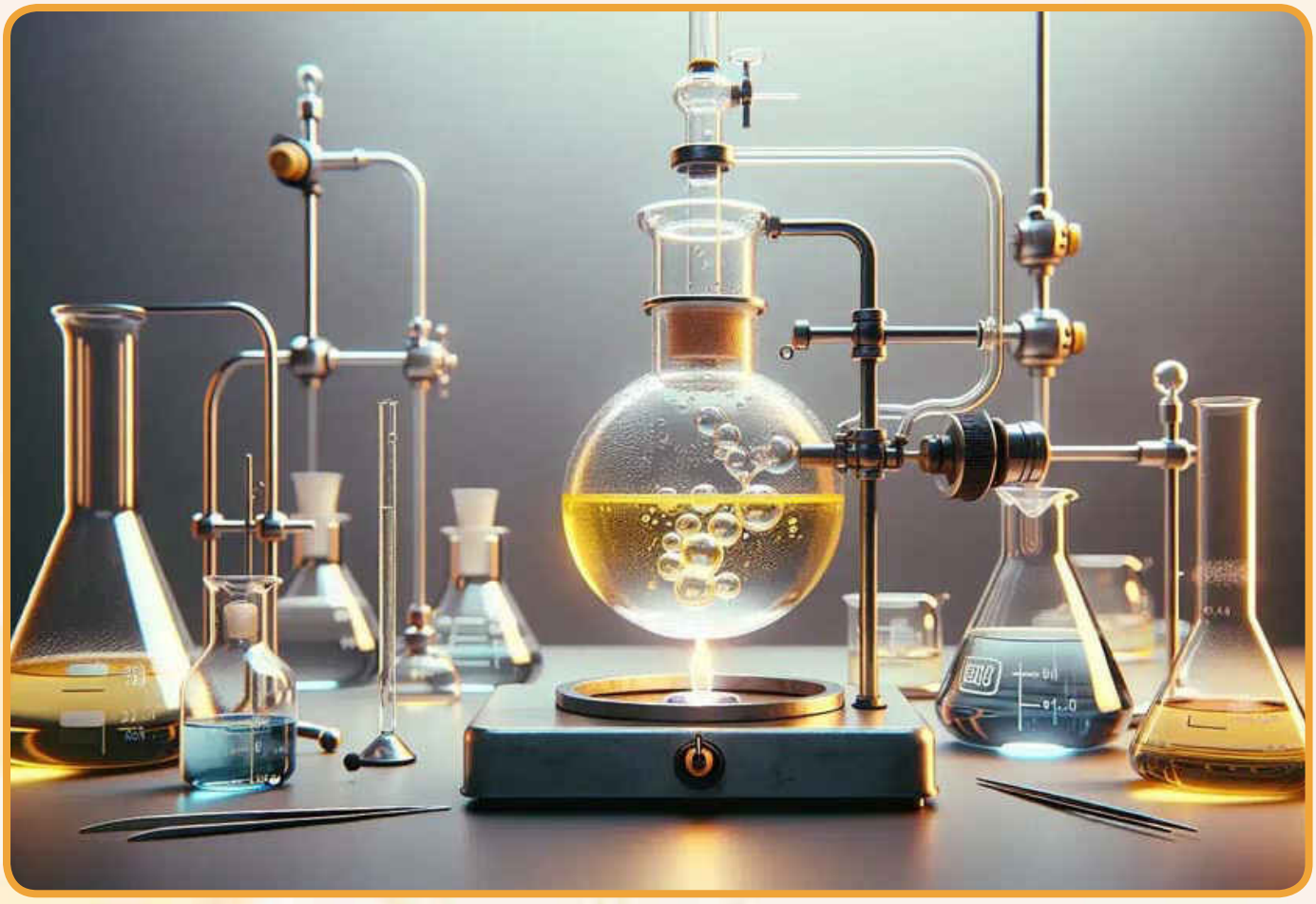
This term included Valentine's Day, International Women's Day and Mothers' Day. All gave us opportunities to highlight and celebrate all the inspirational women in Science — and beyond — who trailblaze a path for our girls, including the fantastic female Science teachers and leaders in our department.

Thank you to all the staff and students who have contributed to this term's great edition. We hope you find it educational, informative and entertaining.

Happy reading!

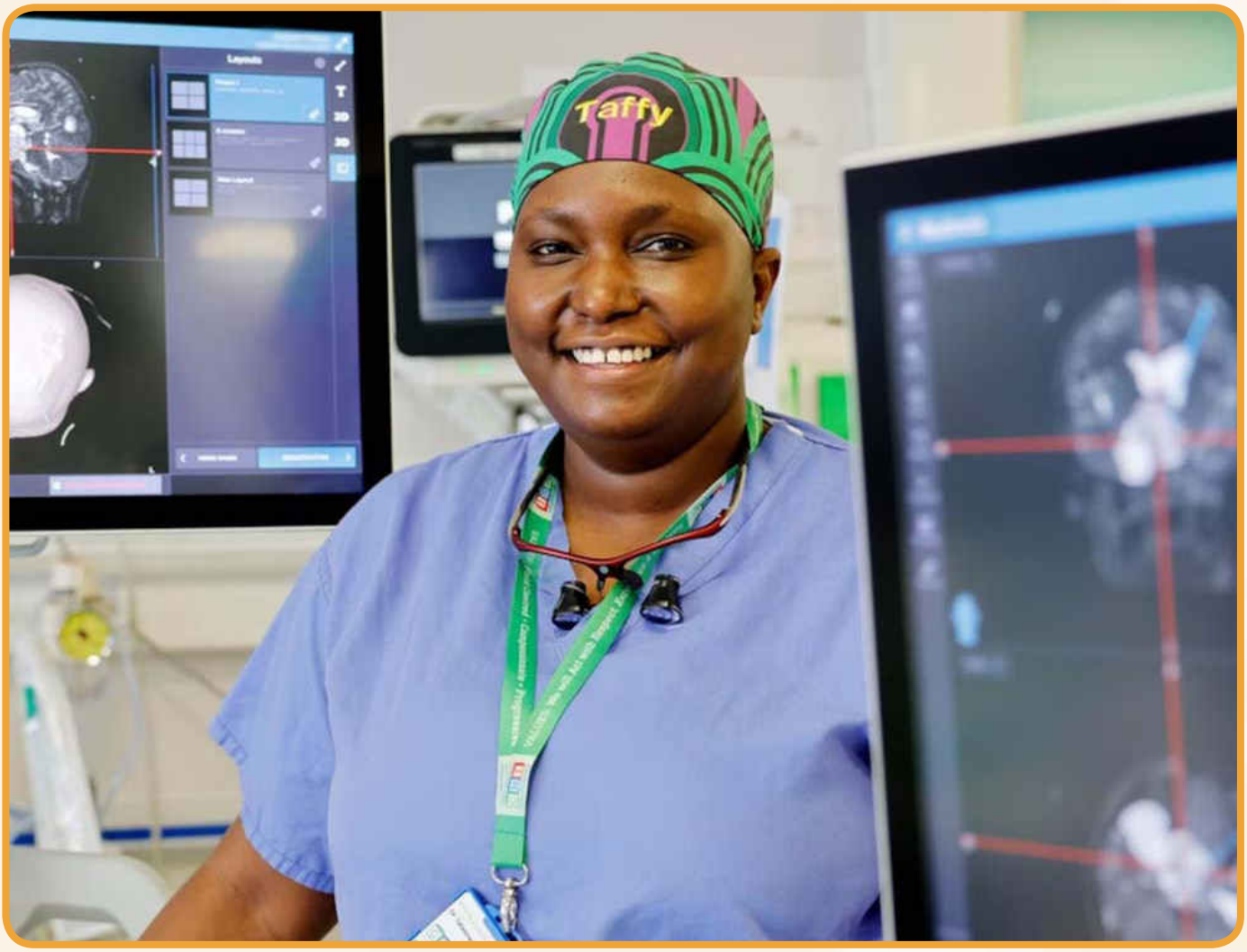
St. Anne's Science Department

P.S. If you would like to write an article for our next issue (Summer Term) or contribute in some other way, then please contact Mrs Khan or Miss Nicolaou for more information!



Spotlight on Tafadzwa Mandiwanza

Celebrating Women's Contributions to STEM



Tafadzwa Mandiwanza is a Zimbabwean-Irish paediatric neurosurgeon, recognised as Ireland's first female paediatric neurosurgeon. She specialises in spinal, brain and endoscopic neurosurgery. She has been celebrated for breaking barriers in a male-dominated field and for her empathetic approach to paediatric care.

Mandiwanza was born in Harara, Zimbabwe, to a family that nurtured her early ambition to become a doctor. Her mother, a nurse, inspired her interest in healthcare, and her father recalled her declaring at just three years of age that she would pursue a career in medicine. She moved to Ireland in 2000 at age 19 to attend medical school at University College Cork — and graduated with an MB BCh BAO degree in 2005. She went on to earn a Fellowship of the Royal College of Surgeons in Ireland (FRCSI) in Neurosurgery in 2019 and also studied at Great Ormond Street Hospital.

Mandiwanza has spoken about the challenges of being a woman in neurosurgery, a field where only 10% of surgeons in Ireland are female! She and Catherine Moran, an adult neurosurgeon at Beaumont Hospital (and another fantastic woman in STEM), are the only two female neurosurgeons in Ireland.

Although Mandiwanza experienced a "boy's network" as a trainee, she reports feeling equal as a consultant and aims to mentor aspiring female neurosurgeons.

Science, Technology, Engineering and Maths (STEM)

Guide for parents of GCSE and A level Students

Is my daughter currently doing GCSEs or A level?

GCSE

What tier is my daughter doing for GCSE STEM?

Foundation

STEM A-level or equivalent options

Option 1
Provided she gets a 4-4 in combined science she can do Health and Social Care BTEC, or 3 grades at 9-4 incl. English for IT BTEC or for psychology A-Level: 5 grades 9-5 including English and Maths

Higher

STEM A-level or equivalent options

Option 2
Provided she gets a combined science grade of 7-6 or above and a grade 7 in maths GCSE, she can do any of the STEM A-level subjects incl. Biology, Physics, Chemistry and Maths.

A level

Based on her GCSE grades she will either be in option 1 or option 2

Option 1: BTECs or a mixture of BTECs and A level

With option 1, this is a more vocational route with lots of options available for further study, including level 5-7 (Degree level) Apprenticeships which are paid training opportunities that often lead to a full job after the apprenticeship is complete. Entry requirements vary, but as long as you have some A level or BTEC qualifications then you can apply. There are apprenticeships in nursing, engineering, construction, banking, sports therapy, lab technicians and environmental health. There are also lots of university courses she can apply for e.g. forensic science at Bournemouth University takes a combination of A level sciences but will also accept purely BTEC qualifications. Go to the **UCAS website** for more information on these and similar courses.

Option 2: purely A-levels

With option 2 she has a little more choice. Provided she gets the required grades, she can choose from most degree courses or Apprenticeships. Entry requirements for Degrees or Apprenticeships do vary, so check UCAS for more information. Medicine for example is an AAA or above in most universities. There are so many other careers within the NHS, being a 'doctor' is just one of many, and may not always be the best choice for your daughter.
Engineering and other STEM subjects do tend to have lower requirements, particularly to encourage more girls into STEM. E.g. Mechanical Engineering at Queen Mary University, a typical entry requirement is AAB including maths and physics or chemistry. However their Foundation Courses into engineering offer BBB.

Examples of 6th Form courses that past students have followed and University courses they have taken. You can see that it is possible to do a STEM course with a mixture of STEM and non-STEM subjects at 6th Form/College.

6th Form: Physics, Art and Maths

Uni/Higher Education Course: **Architecture**

6th Form : IT BTEC, French, RE

Uni/Higher Education Course: **Cyber Security and Forensic Computing**

6th Form : Art and Design BTEC, Business BTEC and IT

Uni/Higher Education Course: **Computing and Web Development**

6th Form : Health and Social Care BTEC

Uni/Higher Education Course: **Children's Nursing and Midwifery**

6th Form : Biology, Chemistry and Psychology

Uni/Higher Education Course: **Biomedical Science**

6th Form : Geography, Psychology and Sociology

Uni/Higher Education Course: **Introduction to Optometry**

6th Form : English Literature, Further maths, maths and physics

Uni/Higher Education Course: **Physics**

6th Form : Biology, English Literature and History

Uni/Higher Education Course: **Environmental Geoscience with a professional placement year**

6th Form : Biology, Chemistry and RE

Uni/Higher Education Course: **Applied Biosciences**

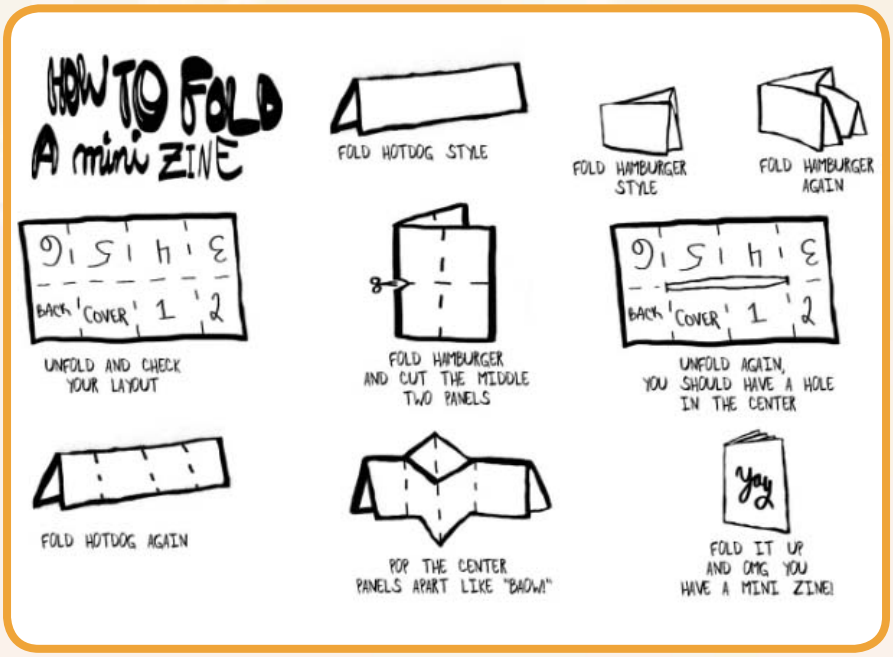
6th Form : Maths, Further Maths and Physics

Uni/Higher Education Course: **Aerospace Engineering**

AmaZINE Work!

The Science Department has embraced Zines (the tiny cute booklets that you can make and use for revision or just because!). We have asked our students to make Zines to summarise key concepts in science or for revision for end of chapter/term tests! We think you will enjoy some of the ones we present in this issue, all of which were created by our KS3, KS4 and KS5 students.

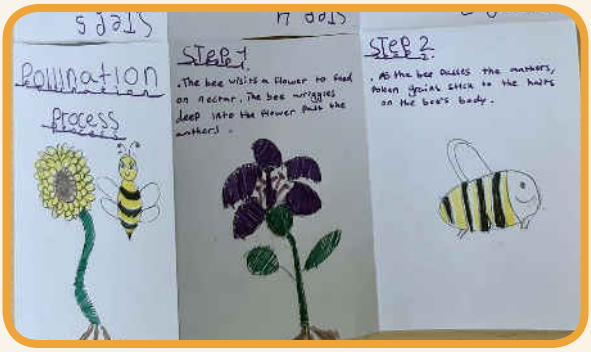
And if you fancy making one at home, here's how...



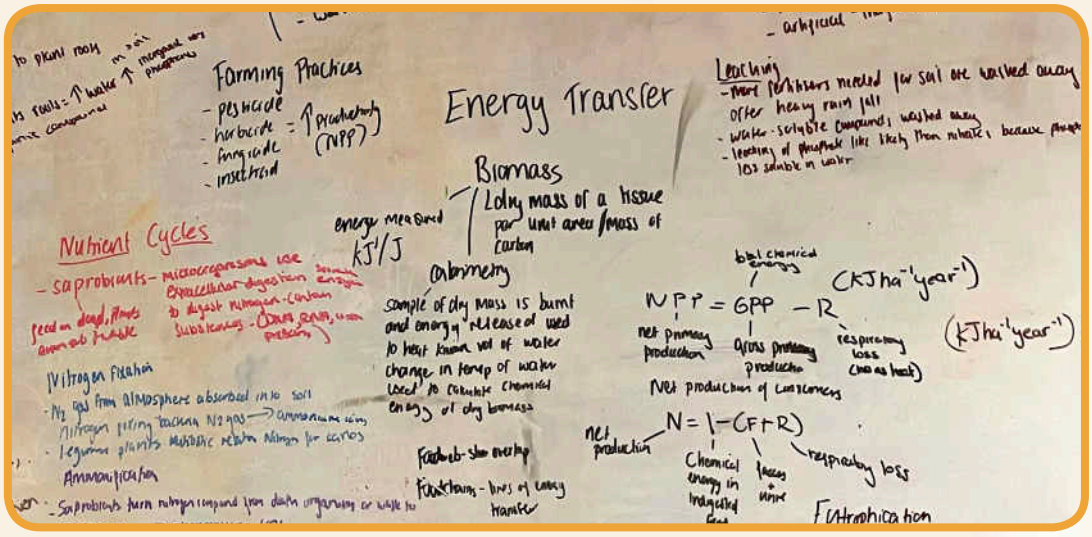
How to Use Them...

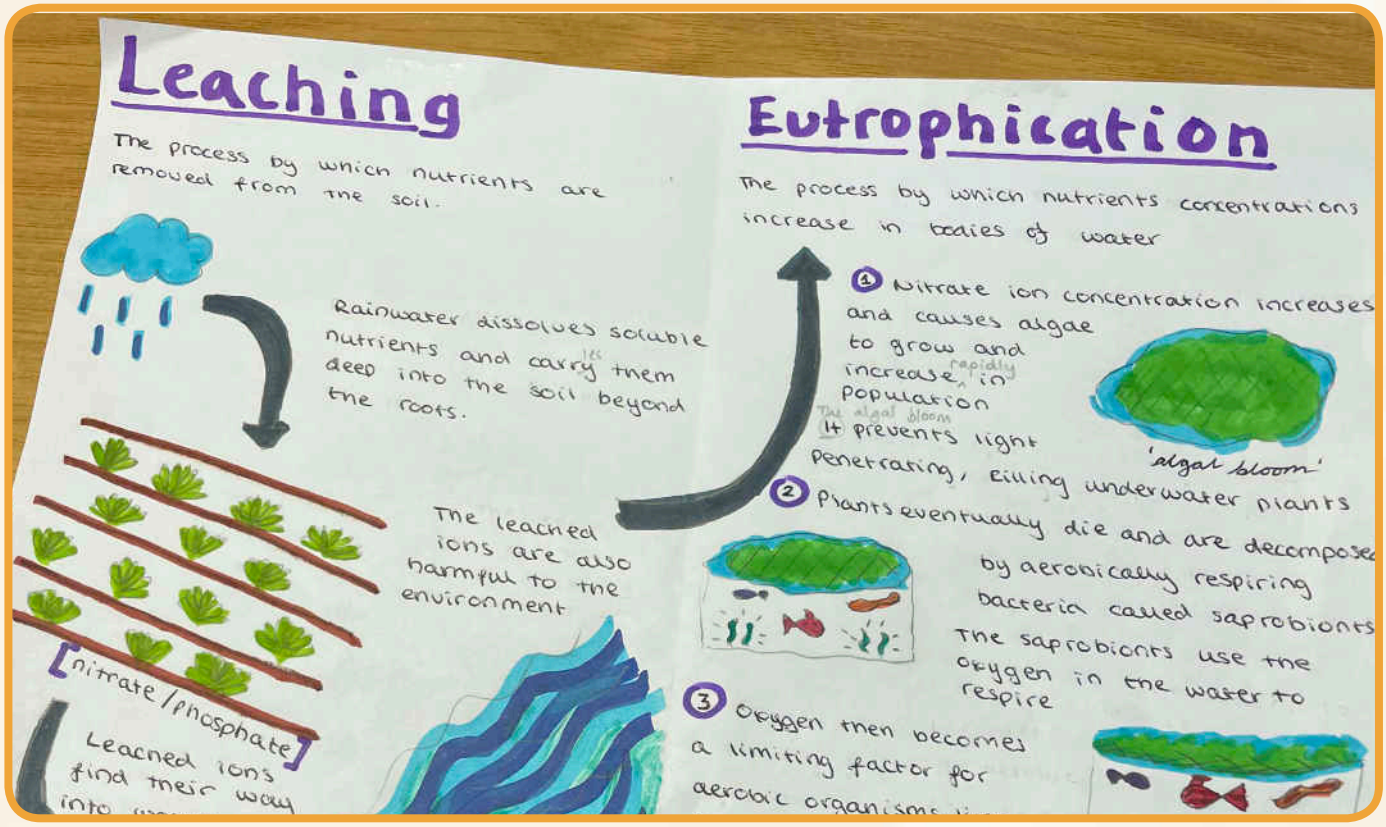
- To summarise a process e.g. a method for a practical activity in science, with each page representing a step...
- To revise a topic, with a page for each part of the topic.
- As alternatives to flashcards (no more losing half the cards!).
- You can use drawings, words, colours... Just have fun with it! Summarising concepts doesn't have to be dull or boring!

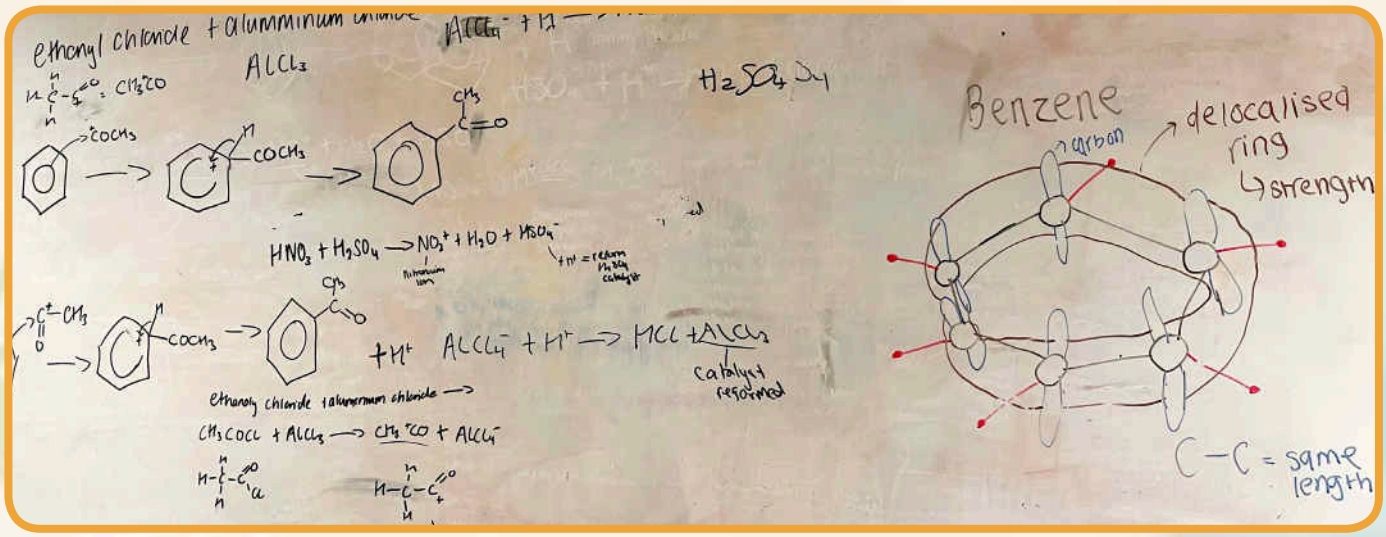
Here are some examples produced by Year 7 students in Ms O'Dea's class.



Here are some great examples of how Mrs Hyland and her Sixth Form class have used the whiteboards in the common room for revision and essay planning — plus posters and zines on eutrophication! A fantastic effort from our students.

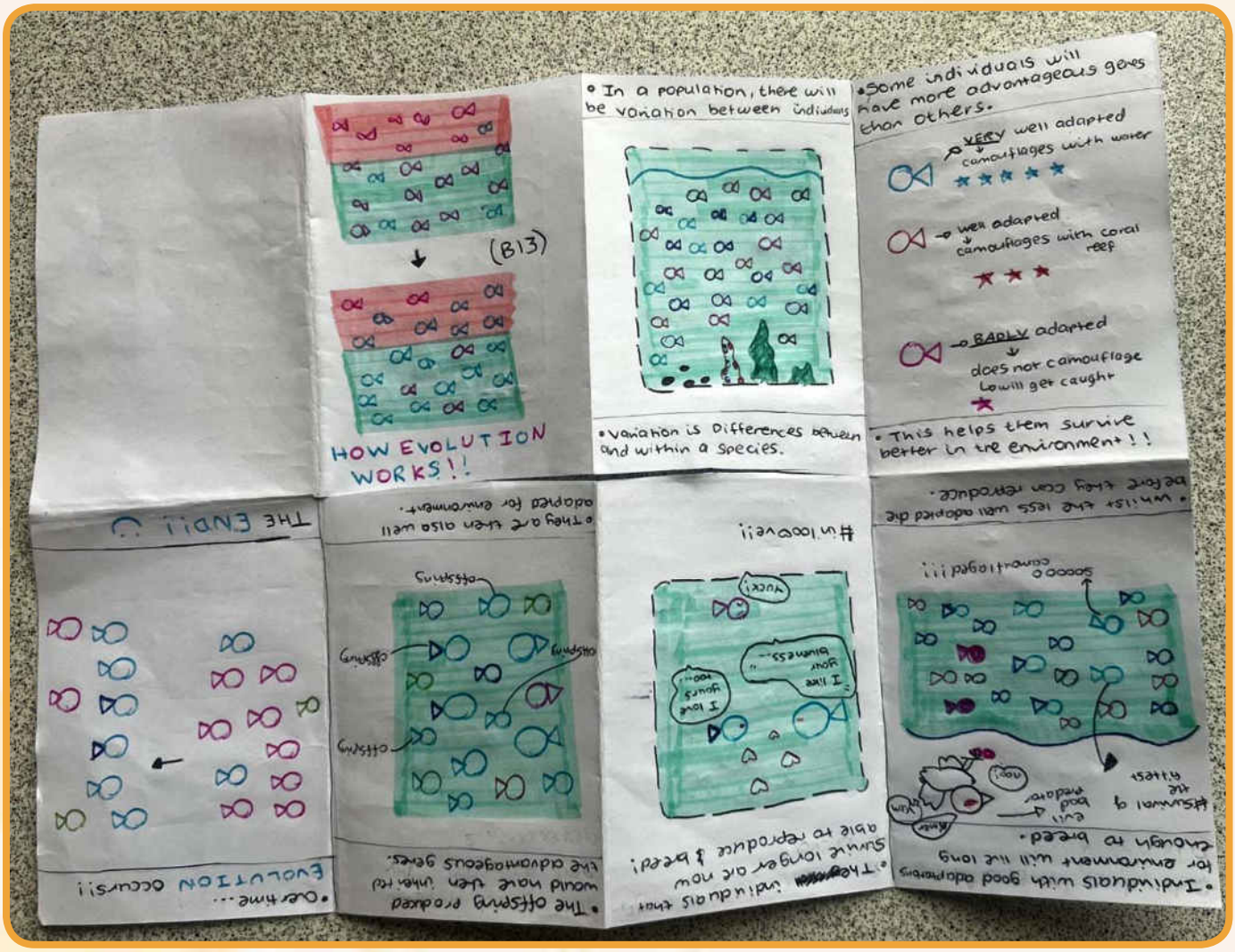






Ms Nicolaou's Year 11 Science students got their creative juices flowing while creating colourful summaries of Evolution and Natural Variation, ensuring their work met the AQA marking criteria.

It was great to see both creativity and scientific understanding on display.



Science Q & A

Mr Ataoglu

Q1. Where did you grow up as a child?
I was born in Trabzon, a northern city of Turkey. I spent my high school years and later life in Istanbul. I grew up during the transition from street games to computer games, so I belong to the first generation that grew up with computers.

Q2. How did your childhood draw you to science?
During secondary school, channels like National Geographic and Discovery Channel attracted me more than most other programs. I was curious about how things worked and enjoyed researching the reasons behind them — and sharing what I learned with my friends.

Q3. What is your science specialism?
My specialism is physics.

Q4. Where did you study? And what subject did you do at university/college?
I studied physics in Turkey and also completed a master's degree in Psychology of Education. During my university years, I wrote a thesis on superconductors and electricity. After five years of teaching physics in Turkey, I completed a postgraduate program for QTS at London Metropolitan University in London.

Q5. If you had to give your students one piece of advice for exam success, what would it be?
Focus on truly understanding the concepts rather than memorising answers, and always have a clear plan for your revision — good or bad, having a plan is better than having none.

Q6. What do you like to do in your spare time (e.g. are you into walking, travelling, comics, yoga)?
I enjoy exploring new natural places, such as rivers and mountain trails. Basketball used to be my favourite sport in Turkey, but in London it has been replaced by volleyball — I try to play at least one day each weekend in the park. Being surrounded by green landscapes and the blue of the sea makes me happy. I also love salsa dancing and bachata.

Q7. What famous scientist, dead or alive, do you admire and why?
I admire Nikola Tesla for his brilliant theoretical mind and his countless inventions that shaped modern technology.

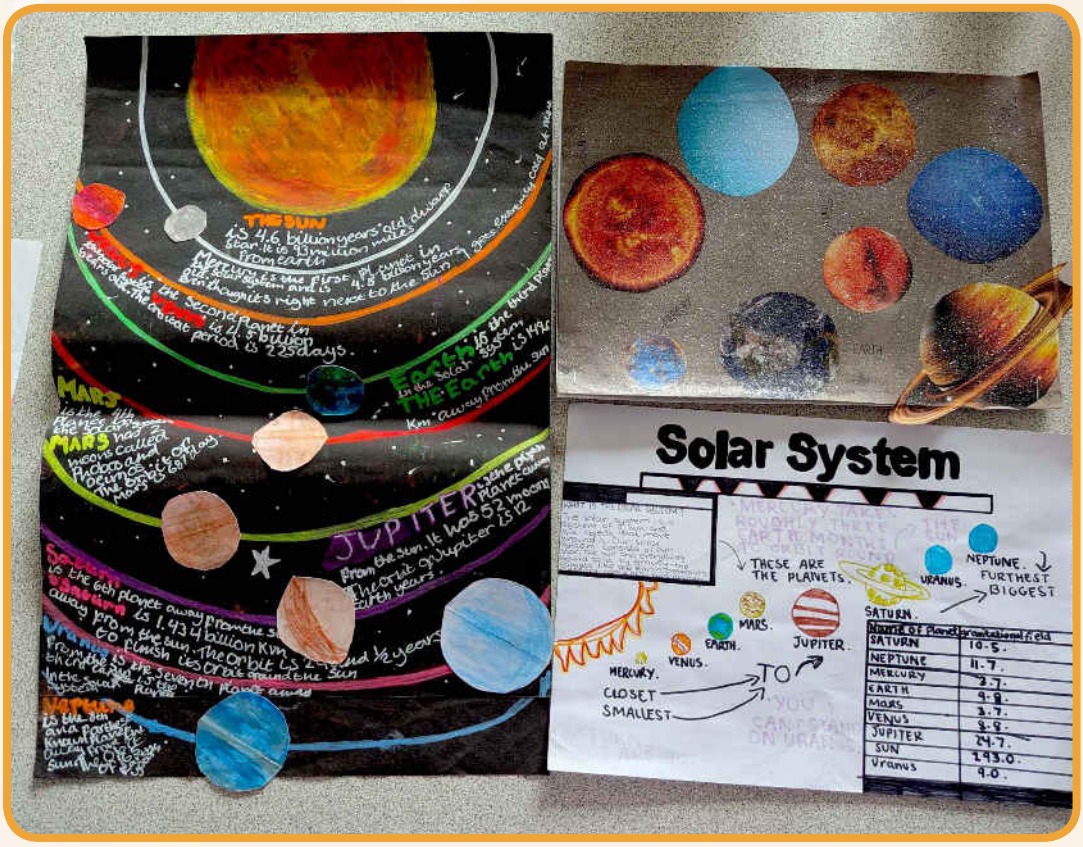
Q8. What's your favourite 'sciency' place to visit in London and why?
My favourite 'sciency' place in London is the Science Museum. I love how it combines hands-on exhibits with the history of scientific discovery — it's inspiring and makes complex ideas accessible.

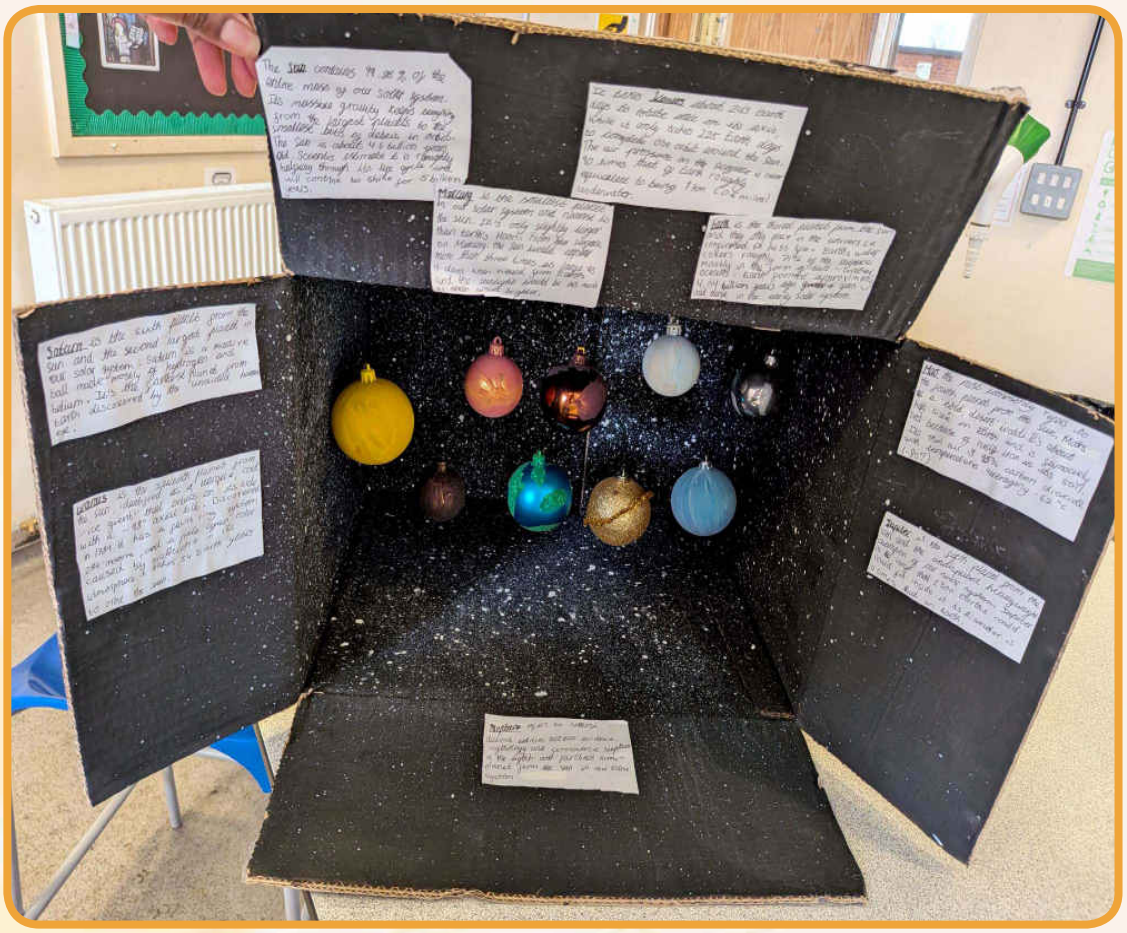
Q9. Have you had any other jobs apart from being a teacher?
When I first came to London, I trained as an electrician and earned my certification, thanks to my physics background. Later, I returned to my true passion: teaching science and mathematics.

Year 7 Solar System Project

7–2 were given a research task about the Solar System to complete over the half-term break.

Some of the work produced was truly out of this world!





Congratulations to Miruna on her fantastic Solar System model, which was very cleverly made using what we *hope* were spare Christmas tree baubles!

Mr Hussain

Q1. Where did you grow up as a child?
I was born and raised in Hackney.

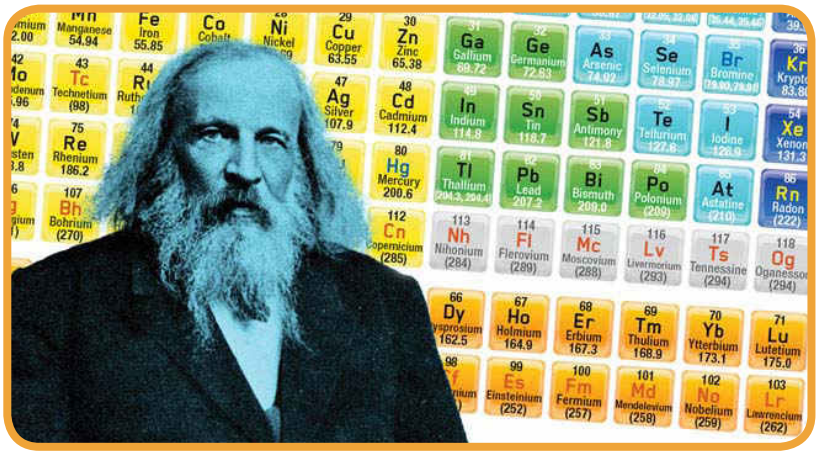
Q2. What is your science specialism?
Chemistry.

Q3. Where did you study? And what subject did you do at university/college?
Biology Chemistry and Maths for A level, and then later, Chemical engineering at Queen Mary University of London.

Q4. If you had to give your students one piece of advice for exam success, what would it be?
It would be that sometimes the mark scheme can help you even more than its question paper. Learn its language!

Q5. What do you like to do in your spare time (e.g. are you into walking, travelling, comics, yoga)?
I spend my spare time engaging in a lot of sports. I play football, basketball, tennis and snooker on a weekly basis.

Q6. What famous scientist, dead or alive, do you admire and why?
Dmitri Mendeleev (1834-1907), a Russian chemist known for formulating the periodic law and creating a version of the periodic table of elements. He was bold enough to leave gaps in the periodic table despite all of society at his time disapproving it, only to win a Nobel prize for those very gaps when elements matching Mendeleev's predictions were discovered after his death.



Q7. Have you had any other jobs apart from being a teacher?
I've spent the last four to five years running security at live music events and met some very famous artists along the way.

I also started a few businesses of my own in the past couple of years, including Airbnb property management, my own small-time security firm, a van removal service and I'm now working on a beard oil product.

KS4 Information for Students and Parents

Another busy term has taken place at the Palmers Green Campus. Year 10 students have fully settled in, and Year 11 are working diligently towards their GCSE assessments. The second round of PPEs (Pre-Public Examinations, aka mock exams) has been a success, with students demonstrating a high level of maturity and dedication to their studies. We are very proud of their efforts — keep up the hard work! The topics we have covered this term are:

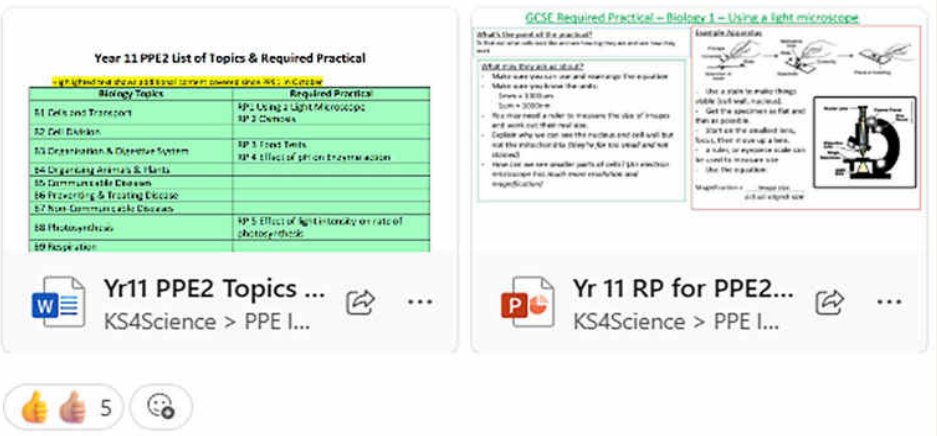
Year 10

Biology	Chemistry	Physics
B3 Organisation & Digestion	C4 Chemical Calculations	P6 Molecules and Matter
	C5 Chemical Changes	P8 Forces in Balance

Year 11

Biology	Chemistry	Physics
B12 Reproduction	C8 Rates & Equilibrium	P4 Electric Circuits
Pre-Public Exams	Pre-Public Exams	Pre-Public Exams

Don't forget the support materials available on Teams. We update them regularly to provide students the resources they need to succeed:



Year 11 PPE2 - start of Feb

Hi KS4 Science, This post is aimed at year 11.

- You will each sit 1 paper for each science subject, a total of 3 papers: biology, chemistry & physics
- You will not sit a second paper (paper 2) but paper 2 content will be included
- **Trilogy (core) science exams will be 75 minutes long, approx. 70 marks**
- **Triple papers will be 105 minutes long, approx. 100 marks - please ask your teachers for a topic list**

The word document attached shows all the topics and required practical's (RPs) that could be assessed.
Topics highlighted in yellow are the additional topics covered since PPE1.
YouTube playlists for each RP are at the bottom of this document and you can use this ppt for a summary: Yr 11 RP for PPE2 Oct 25.pptx
Also please refer to page 14 of the science newsletter for more useful revision sites

Good luck with your revision

Yr11 PPE2 Topics & Links to Required practicals.docx

You can also find great support videos on YouTube, just make sure they are aimed for the AQA examinations:

- **Cognito: www.youtube.com/@Cognitoedu**
- **Free Science Lessons: www.youtube.com/@Freesciencelessons**
- **Science Shorts: www.youtube.com/@ScienceShorts**
- **Fuse School: www.youtube.com/@fuseschool**

Also I would highly recommend practising past papers, again these links can be found in the science team page or in your child's class team as what we call "ExamPro Links".

You could also try the following sites:

- **AQA Website: www.aqa.org.uk/find-past-papers-and-mark-schemes**
  Past papers, mark schemes and examiner reports in PDF format. Filter by your subject and tier.
- **Physics & Maths Tutor (PMT): www.physicsandmathstutor.com/past-papers/**
  AQA GCSE science revision organised by topic — notes, revision questions and past papers.
- **MME Revise: https://mmerevise.co.uk/gcse-science-revision/**
  Past papers and exam questions, plus free worksheets and paid predicted papers.
- **Save My Exams: www.savemyexams.com/gcse/**
  AQA GCSE Biology, Chemistry, Physics and Combined Science exam questions and answers.

Other Tips for Using Exam Questions

- **Know Your Specification:** Ensure questions match your specific course code and tier.
- **Review Mark Schemes:** Vital for understanding how to structure answers and gain top marks.
- **Practice Under Timed Conditions:** Practice time management and build confidence by using full past papers. Employ the **3 Pen Method** we promote in class.

Summer Term Topics will be:

Year 10

Biology	Chemistry	Physics
B4 Organisation of Animals and Plants	C9 Crude oil	P8 Forces in balance
B8 Photosynthesis	C10 Chemical analysis	P9 Motion
B9 Respiration	C11 Earth's Atmosphere	P9 Forces and Motion

Year 11

Biology	Chemistry	Physics
B13 Variation and Evolution	C9 Crude oil	P5 Electricity in the Home
B14 Genetics and Evolution	C10 Chemical analysis	P7 Radioactivity
B15 Adaptations. Interdependence & competition	C11 Earth's Atmosphere	P13 Electromagnetism

GCSE DATES	Biology	Chemistry	Physics
Paper 1	12th May	18th May	2nd June
Paper 2	8th June	12th June	15th June

KS3 & KS4 Independent Study Skills

Building Good Habits to Last a Lifetime

Being able to organise yourself to revise, is SO important! Often young people don't know what to do, or how to revise/study. Modern lives are busy, and full of challenges, namely social media and mobile phones! Here are some practical hints and tips to help you organise yourself and actually revise/study effectively.

How much time should you be spending on Independent Study a week for Science? We recommend the following:

- **Year 7:** 30—40 minutes
- **Year 8:** 40—50 minutes
- **Year 9:** 50—60 minutes
- **KS4:** about 60 minutes for each science, so in total about 3 hours a week additional revision. This is especially imperative nearing GCSEs in Year 11

The recommendations above can include time to do homework. If no homework is set, you should still set aside that amount of time to consolidate your learning during the week.

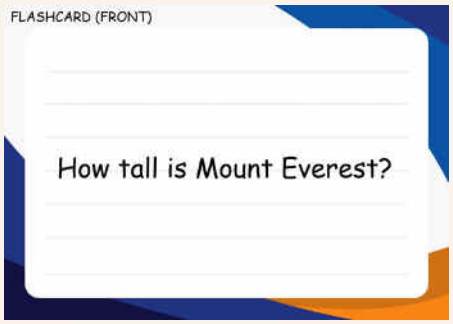
Revision Activities

If you want to revise for an end of term assessment or your upcoming exams, you can do one or more of the following activities:

1. **Summary Mind Maps.** See this video of how to produce a three-colour mind map. You will need plain paper, 3 different coloured pens and a text book/internet.

2. **Flashcards.** You can make flashcards in various ways and levels to suit you. Use these levels to up your flashcard game!

   - Level 1 — **Key Words and Meanings**
   - Level 2 — **Key Processes** e.g. longer answer flow charts
   - Level 3 — **Synoptic Revision**
   - Level 4 — **Exam-style Questions**



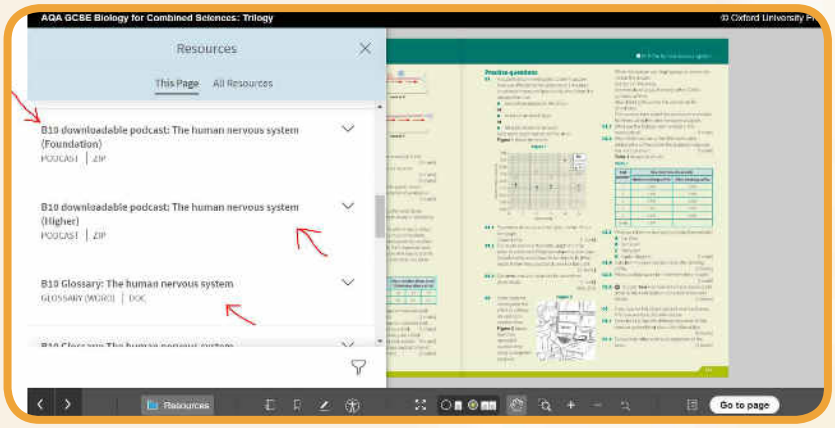
Remember to keep flashcards in two piles:

One for questions you answer correctly and don't need to revisit too often, and another pile of flashcard questions you need to look over again.

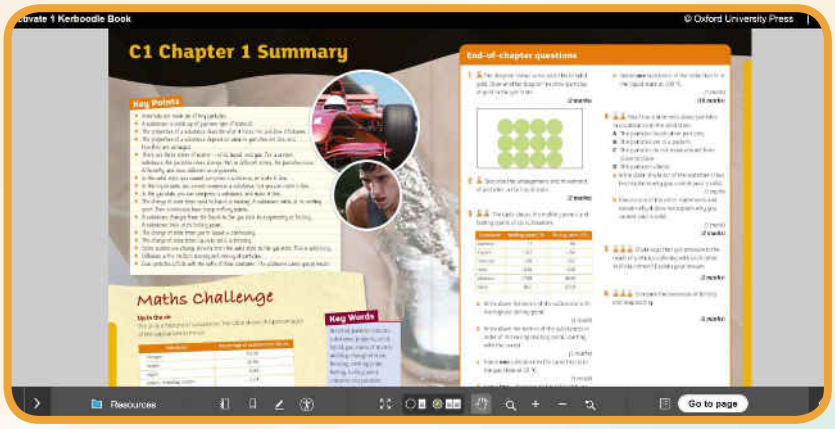
And keep using them — repetition is key!

Stephania in 7-2 created a set of lovely flashcards to support her revision for the Cells and Microscopes assessment. Her use of colour helps reinforce different concepts — well done, Stephania! Good luck in the test.

3. **Using Kerboodle.com** to find podcasts, keyword lists, knowledge organisers and checklists to help you with your revision for each topic. For hints and tips on how to use Kerboodle, see the Powerpoint on Teams.



4. **Exam Qs.** When you have finished your topic and want to revise, exam style Qs are great. Look at the end of each chapter in the textbooks to find some exam style questions. In the **Activate** books they are called **End of Chapter Qs**.



In the **GCSE** books they are called **Practice Questions**. You can then find the mark schemes to all your chapters on Teams so you can self-assess them.

Doing exam questions as part of your revision is essential to improving your grades. There is so much available for you to help you revise, please be responsible and do them!

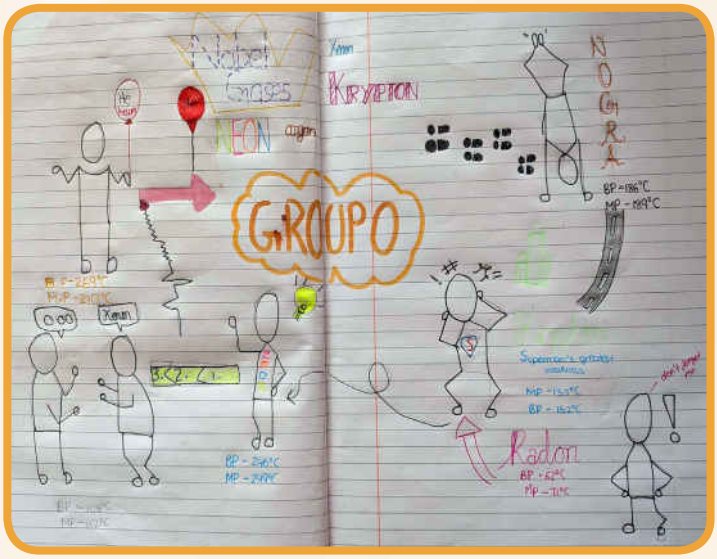
Visual Notetaking

As part of our revision for KS3 Spring Term Assessments with Year 8 we adopted yet another revision hack — Visual Notetaking!

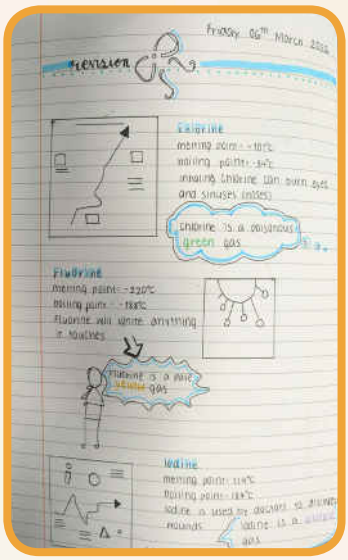
This technique, also known as sketch-noting or graphic recording, is the practice of capturing information by combining words with illustrations, symbols like arrows and layouts, rather than using linear text alone. It transforms spoken or written content into a visual, memorable and easily digestible format in real-time.

It allows students to really pinpoint the important information they need and display it in a fun and memorable way. It also forces students to read the information and not just copy word for word. Have a look at some of the fantastic visual note takers in 8Y2 and 8X2, who made notes on Noble Gases and Group 7 Halogens.

We hope it inspires you to give it a go!

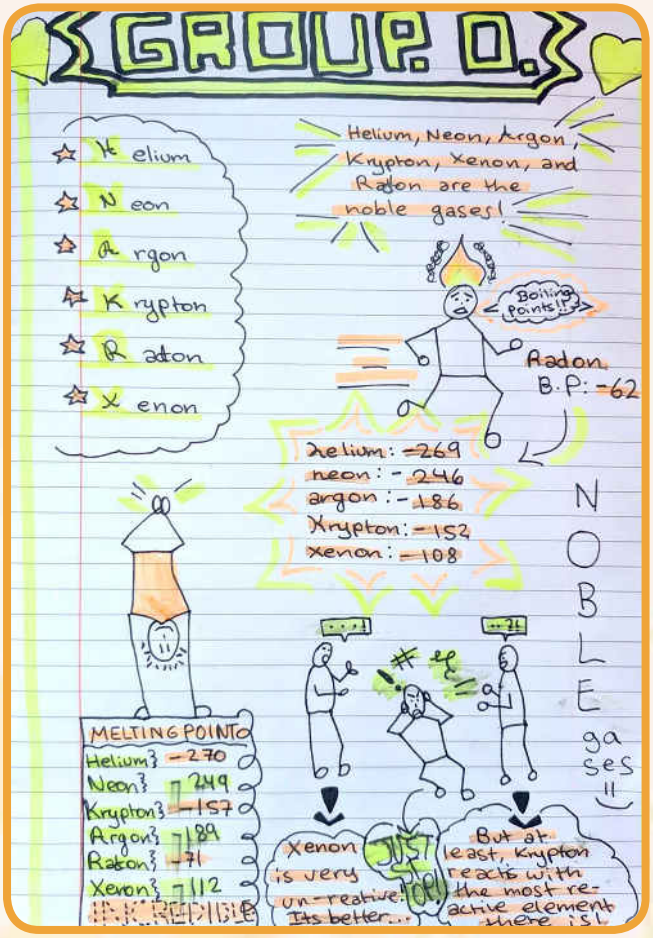


Hailey 8Y2



Courtney 8X2

Sheza 8Y2

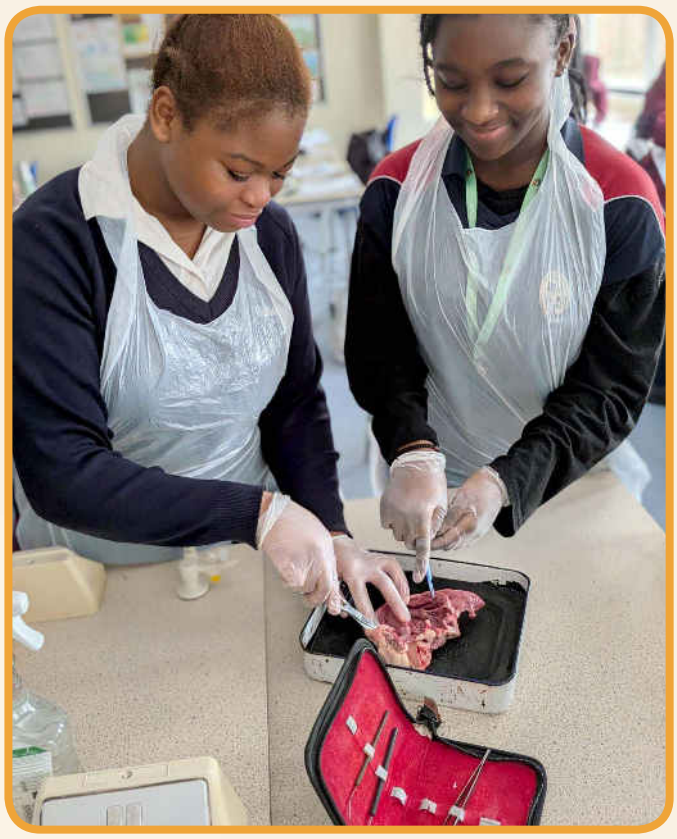


Guilia 8Y2

Ansia 8X2

Practicals, Practicals, Practicals!

Investigating the Heart



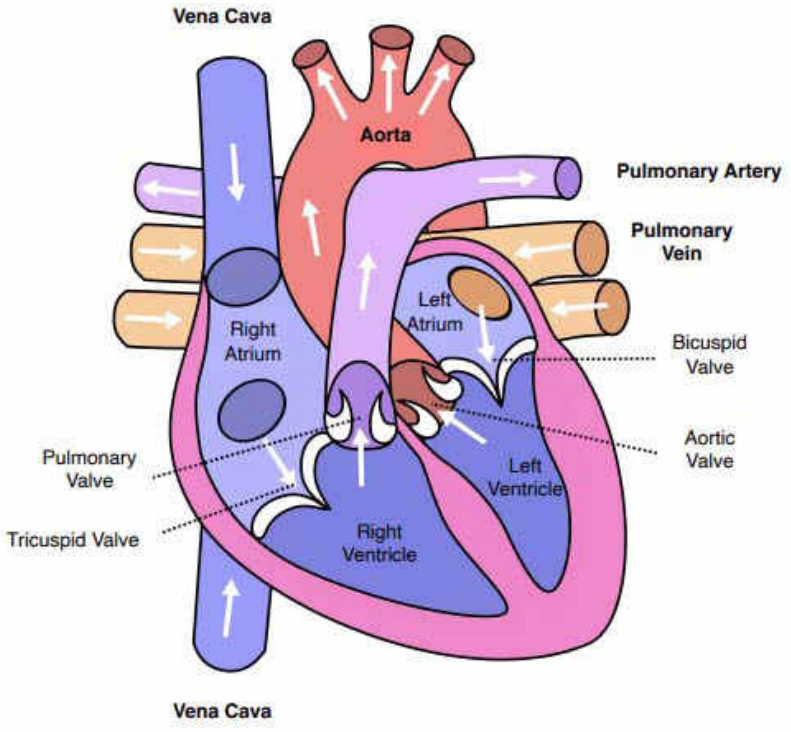
As always we have been busy with practicals in KS3, 4 and 5!

First up, as this term saw Valentine's Day, what better way to represent love, than a good old-fashioned heart dissection?

Year 10 are currently learning about the heart and its problems. In this lesson we learnt about the structure of the heart, consisting of the ventricles and atria with the vessels vena cava, aorta, pulmonary artery and pulmonary vein.

We saw that the left hand side of the heart's ventricle wall is thicker, due to more muscle pumping blood at higher pressures around the body. We were able to link structure to function.

Do you know your Heart Anatomy?



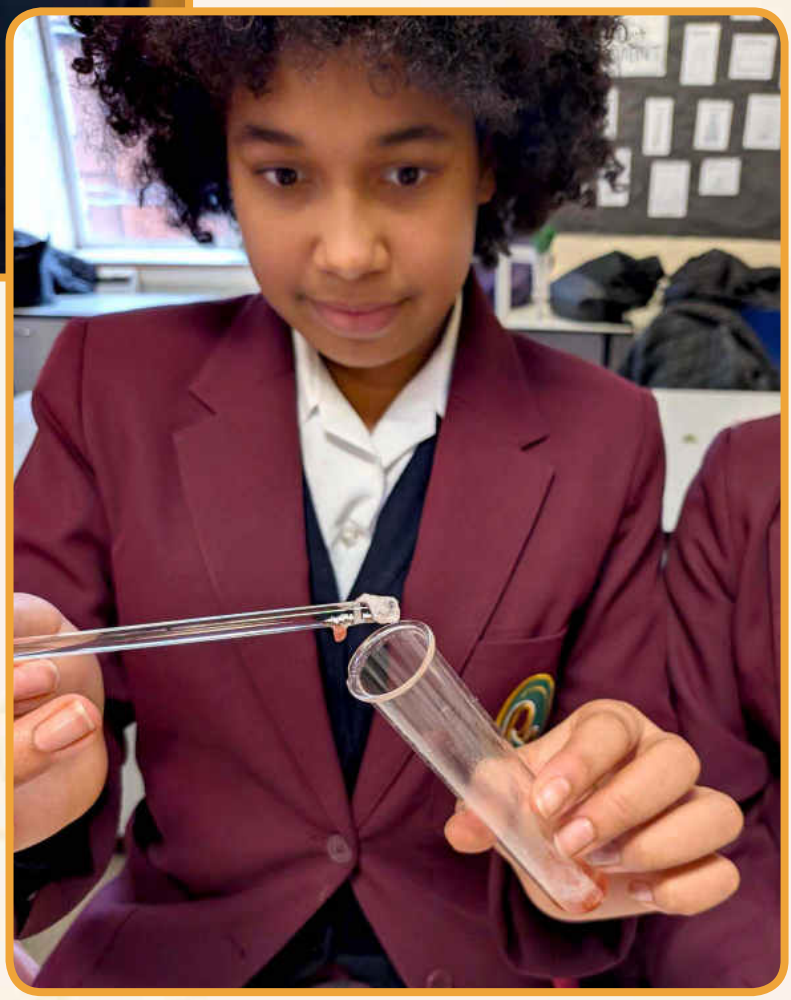
DNA Extraction!

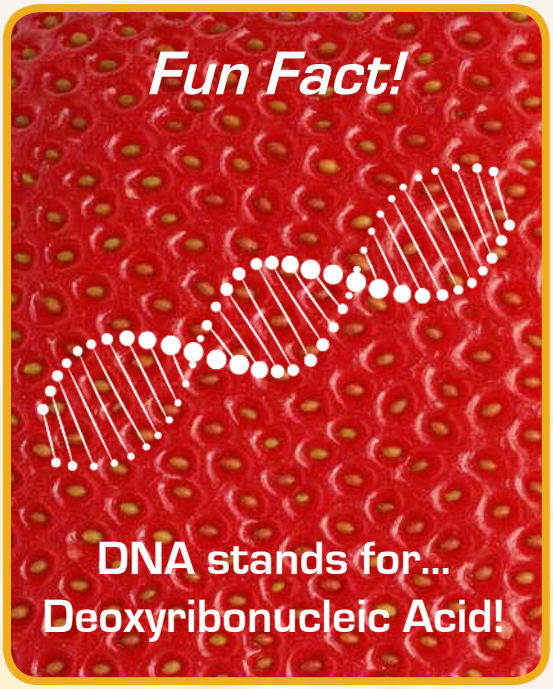
In Year 8 we also extracted some ACTUAL DNA from a strawberry!

The girls were amazed to see and touch the DNA, which looked like white, gooey mucus — so fascinating!

Every cell of living organisms — except mature red blood cells — has a nucleus with DNA containing the genetic instructions for the development, functioning, growth and reproduction of the organism that carries it, often acting as a blueprint). The shape of DNA is a double helix; imagine a ladder and twist it like fusilli pasta — that's what it looks like!

The double-helix structure of DNA was discovered at Cambridge University in 1953 by Francis Crick and James Watson, based on x-ray evidence provided by Rosalind Franklin.



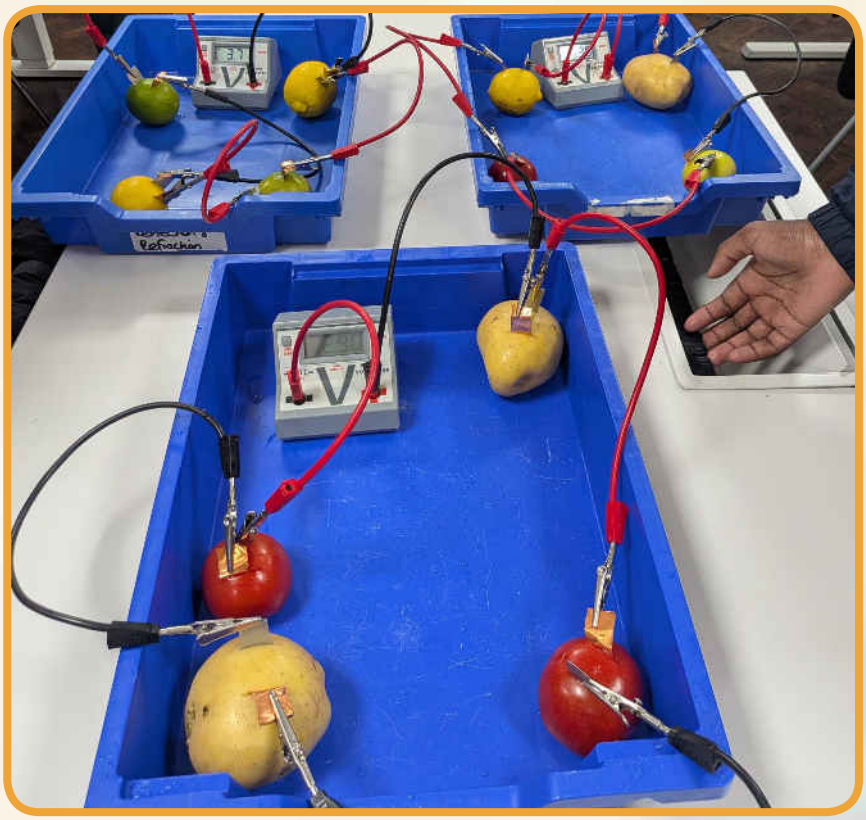


Making Fruit Batteries

8y4 made fruit batteries with Mrs Adeleke, showing that current (the flow of charge) could be generated from other sources than power stations!

A fruit battery generates electricity through an electrochemical reaction between two different metal electrodes (usually zinc and copper) connected by the acidic juice of the fruit, which acts as an electrolyte. The acid breaks down the metals, releasing electrons that travel through a circuit to create a small current. So the more acidic the fruit, the higher the current!

8y4 saw that limes and lemons produced higher voltages than potatoes and tomatoes!



surfing scientist

Teacher Demonstration

Elephant's Toothpaste

This classic chemistry demonstration is a huge hit with kids of all ages. The title becomes obvious as the reaction converts 125ml of 6% hydrogen peroxide to several litres of harmless, frothy foam which can be safely washed down the sink. It looks just like a giant tube of toothpaste being squished. Please be prepared for very excited students who will want to see the demonstration more than once!

Materials:

- 125ml 6% Hydrogen Peroxide (also labelled 20Vol)
- 1 Sachet Dry Yeast (powder) + 4 tablespoons of warm water
- Detergent
- Food colours – optional (not cochineal)
- Empty bottle
- Funnel
- Plastic tray or tub
- Dishwashing gloves
- Safety goggles

** 6% Hydrogen peroxide (20Vol) is available in 400ml bottles from most retail chemists and cosmetics suppliers and some supermarkets.*

Instructions

1 Gather all the materials and set them up on a desk with the students gathered around.

2 Empty a full sachet of dry yeast into a cup.

3. Add four table spoons of warm water and stir until well mixed.

4. The foam produced is safe to touch and can be poured down the sink but you (and student helpers) should wear dishwashing gloves and safety goggles as a precaution and as standard practice when handling chemicals. Use a funnel to pour 125 ml (roughly half a cup) of 6% hydrogen peroxide into the empty soft drink bottle.

5. Add a large squirt of dishwashing liquid. Swirl the bottle to mix the detergent into the hydrogen peroxide.

6. Optional – add ten or fifteen drops of food colouring Swirl the bottle to mix the food colouring into the solution. If you are planning to repeat the demonstration, add food colouring the second time.

   Note: don't use cochineal as it won't colour the foam effectively

7. All the ingredients are now ready. Use the funnel to pour all of the yeast solution into the bottle.

8. The solution will begin to rapidly produce foam with a much greater volume than the original ingredients. The tiny bubbles are filled with oxygen gas (not air – see teacher notes).

9. As the foam expands, the bottle quickly fills to the brim. When the bottle is full, the excess foam begins to pour out of the bottle. The result resembles a tube of toothpaste being squeezed far too much.

10. 125ml of hydrogen peroxide produces approximately two litres of foam. The foam will be warm to touch because the underlying chemical reaction is exothermic (releases heat). Rinse all the materials and the plastic tray after the demonstration.

Explanatory Notes

What is hydrogen peroxide?

Hydrogen peroxide (in a much stronger 30% concentration) is a chemical well known to hairdressers as a bleaching agent. It is also used to bleach paper and many other industrial chemical processes. In hair dressing bleach, the liquid is incorporated into a thick gel which clings to hair preventing contact with the scalp.

The chemical symbol H_2O_2 for hydrogen peroxide is very similar to water's H_2O. The H_2 represents two hydrogen atoms while the O_2 represents two oxygen atoms (water molecules contain only one oxygen atom).

Hydrogen peroxide molecules are very unstable and naturally decompose into water and oxygen gas. The chemical equation for this decomposition is:

$$2\ H_2O_2 \rightarrow 2\ H_2O + 0_2$$

The equation above represents two hydrogen peroxide molecules decomposing into two water molecules and one oxygen molecule (note that all oxygen gas molecules are comprised of two oxygen atoms – ozone, by contrast, is comprised of three oxygen molecules and has the chemical symbol O_3). The decomposition of hydrogen peroxide also releases a small amount of heat so the reaction is exothermic.

Hydrogen peroxide is stored in opaque plastic or brown glass bottles to minimise exposure to light which accelerates the natural decomposition of hydrogen peroxide.

Why does yeast accelerate hydrogen peroxide decomposition?

Hydrogen peroxide is a natural by-product of metabolism. All known animals which metabolise oxygen produce a natural enzyme called catalase which catalyses the decomposition of hydrogen peroxide into harmless water and oxygen gas. Catalase is found in every organ in the body and in particularly high concentrations in the liver. Hydrogen peroxide is harmful to living things because it is a strong oxidiser which can cause damage to living cells at the molecular level.

Yeast is a fungi which also produces the catalase enzyme. Adding yeast to hydrogen peroxide then, rapidly increases (catalyses) the decomposition of hydrogen peroxide into water, oxygen gas and heat (you will notice that the foam produced feels warm).

In potatoes, catalase is present in sufficient quantities to produce visible bubbles of oxygen when a freshly cut piece is coated with 3% hydrogen peroxide.

Many other chemicals catalyse the decomposition of hydrogen peroxide into water and oxygen gas. Some catalysts such as potassium iodide are particularly efficient catalysts for the decomposition but almost any super fine powder will cause the decomposition to accelerate.

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