CAMBRIDGE NATIONAL APPLIED SCIENCE

Studying Cambridge National Applied Science is highly valuable because it gives you a practical, hands-on understanding of scientific concepts that are directly relevant to real-world situations and careers.
Unlike purely theoretical courses, it develops both your knowledge and your skills, such as carrying out experiments, analysing data, and applying scientific thinking to solve problems. This course is particularly useful if you are considering careers in areas like healthcare, laboratory work, environmental science, or engineering, as it helps you build confidence in using scientific equipment and understanding how science is used in industry. It also supports the development of important transferable skills, including teamwork, communication, and organisation, which are essential for further education and employment.

Complete the following tasks to ensure your knowledge is current and that you are fully prepared to begin studying effectively. These tasks are designed to refresh key concepts, identify any gaps in understanding, and help you start your learning with confidence and clarity.

APPLIED SCIENCE

RESEARCH TASK:

InAs part of your course you will complete a practical assessment. This will require you to carry out a series of practical activities as well as planning how to do them, analysing the results and evaluating the methods. This will require you to: Using appropriate apparatus to record a range of measurements (such as acceleration, rate of reaction, mass, volume and concentration), the use of an eyepiece graticule and stage micrometer to investigate various samples with a microscope, the use of a haemocytometer and Coulter counter to investigate cells, the use of quadrats, the use of titration apparatus to investigate acid-base reactions, the use of a potentiometer to investigate potential divider circuits, the use of light gates to investigate the acceleration due to gravity. Using techniques such as scientific drawing, estimation of plant cover, continuous monitoring methods.

TASK:

Research the following investigative terms – what are they and how are they used?:

Haemocytometer
Potentiometer
Eyepiece graticule
Coulter counter
Quadrat
Titration

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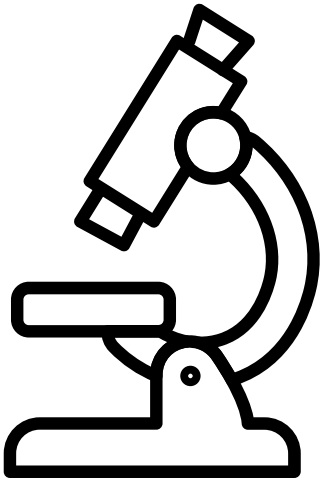

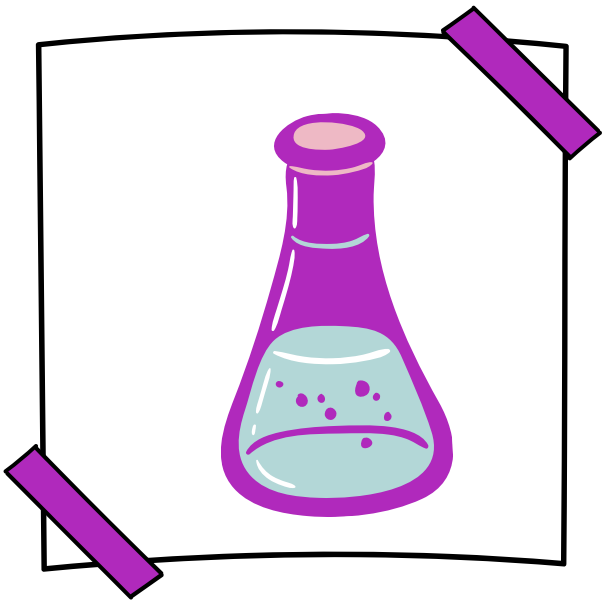

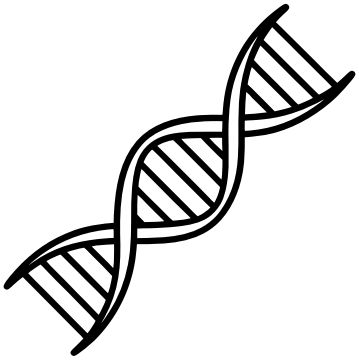

APPLIED SCIENCE

As you move from Year 11 into Year 12, developing strong research skills becomes essential for success in your studies, as you will be expected to work more independently and engage with more complex ideas. Good research allows you to find accurate, relevant information, evaluate its reliability, and use it effectively to support your arguments. Reliable sources include academic textbooks, peer-reviewed journals, and trusted educational websites such as university pages or organisations like the BBC Bitesize or NHS for science topics. You should be cautious when using sources like Wikipedia or random blogs; while they can be useful as a starting point, they are not always reliable enough to reference in your work. Learning how to compare sources, check authorship, and identify bias will help you build well-informed, credible assignments and prepare you for further education.

Carry out some research to answer the following questions:

·How does vitamin content vary in foods?
·What substances affect the growth of microbes?
·How are scientific biological drawings made?
·What factors affect enzyme action?
·What factors affect the rate of reaction?
·What affects the rate of reaction between calcium carbonate and hydrochloric acid?
·How do different types of circuit components affect output potential difference in a potential divider circuit?
·What methods can be used to find the value of the acceleration due to gravity?
·What factors affect the rebound height of a dropped ball?
·How does mass affect acceleration down a slope?

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APPLIED SCIENCE

IN THE BIOLOGY UNITS, YOU'LL LEARN ABOUT HOW LIVING THINGS WORK AND INTERACT WITH THE WORLD AROUND THEM. THIS INCLUDES STUDYING CELLS, WHICH ARE THE BASIC BUILDING BLOCKS OF LIFE, AND UNDERSTANDING HOW SPECIALISED CELLS DO DIFFERENT JOBS IN ORGANISMS.

YOU'LL ALSO EXPLORE BODY SYSTEMS, SUCH AS THE DIGESTIVE, RESPIRATORY, AND CIRCULATORY SYSTEMS, LEARNING HOW THEY WORK TOGETHER TO KEEP US ALIVE. ANOTHER KEY TOPIC IS HEALTH AND DISEASE, WHERE YOU LOOK AT HOW ILLNESSES AFFECT THE BODY, HOW THEY SPREAD, AND HOW THEY CAN BE TREATED OR PREVENTED.

YOU'LL ALSO INVESTIGATE THE ENVIRONMENT AND ECOSYSTEMS, INCLUDING HOW ORGANISMS DEPEND ON EACH OTHER AND HOW HUMAN ACTIVITY CAN IMPACT THE PLANET. THROUGHOUT THE COURSE, YOU'LL OFTEN APPLY THIS KNOWLEDGE IN PRACTICAL SITUATIONS, SUCH AS CARRYING OUT EXPERIMENTS OR ANALYSING REAL-LIFE CASE STUDIES, WHICH HELPS YOU SEE HOW BIOLOGY IS USED OUTSIDE THE CLASSROOM.

QUESTIONS:

1. WHAT IS THE DIFFERENCE BETWEEN THE 'OBJECT' BEING VIEWED AND THE 'IMAGE' SEEN THROUGH A MICROSCOPE?

2. WHAT IS MAGNIFICATION, AND WHAT FORMULA IS USED TO CALCULATE IT?

3. WHAT DOES RESOLUTION MEAN IN MICROSCOPY, AND WHY IS IT IMPORTANT?

4. HOW DOES A LIGHT MICROSCOPE WORK TO PRODUCE AN IMAGE OF A SPECIMEN?

5. WHY MIGHT INCREASING MAGNIFICATION ALONE NOT ALWAYS IMPROVE THE QUALITY OF AN IMAGE?

APPLIED SCIENCE

In the chemistry part of the course, you'll learn about what substances are made of and how they interact with each other. This includes understanding atoms, elements, and compounds, and how they join together through chemical bonding. You'll also explore chemical reactions, looking at how and why reactions happen, how to write equations, and how energy changes are involved. Another key area is materials and their properties, where you investigate why different substances behave the way they do and how they are used in everyday life. You'll also learn about rates of reaction and factors that affect them, such as temperature and concentration. Throughout the course, you'll carry out practical experiments, helping you build confidence in using equipment, making observations, and applying your knowledge to real-life scientific situations.

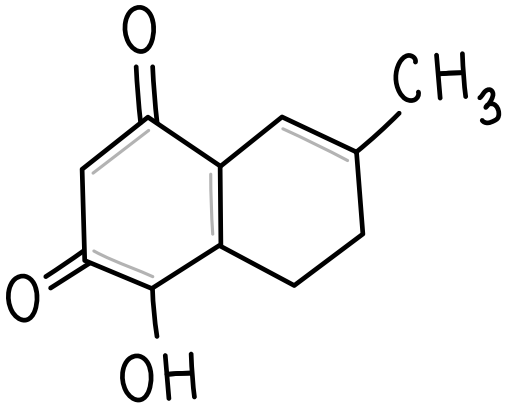
1. What does collision theory state about how chemical reactions occur?

2. What two conditions must be met for a collision between particles to result in a reaction?

3. How does increasing temperature affect the rate of a chemical reaction according to collision theory?

4. What effect does increasing concentration (or pressure for gases) have on the rate of reaction, and why?

5. How does adding a catalyst increase the rate of reaction, in terms of activation energy?



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In the physics part of the course, you'll explore how the world around you works, focusing on forces, energy, and how objects move. You'll learn about energy types and transfers, including how energy is stored and used in everyday situations. You'll also study forces and motion, understanding how things speed up, slow down, and change direction. Another important area is electricity, where you'll look at how circuits work, how current flows, and how electrical devices are used safely. You'll also explore waves, such as light and sound, and how they behave. Throughout the course, you'll carry out practical investigations to help you apply these ideas, build problem-solving skills, and see how physics is used in real-life applications like transport, technology, and energy production.
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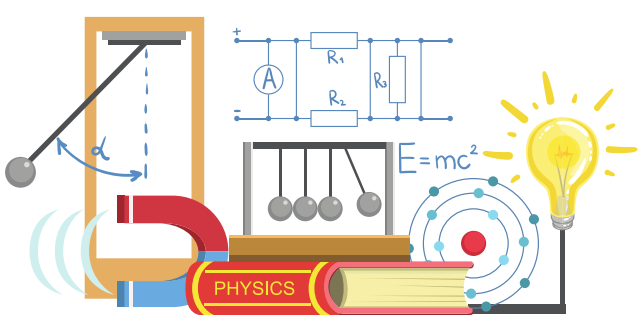
estions:
1. What is meant by radioactive decay, and why are some isotopes considered unstable?
2. What is 'activity' in radioactive decay, and what unit is used to measure it?
3. What are the two equivalent definitions of half-life mentioned in the video?
4. How can you use a decay (activity-time) graph to determine the half-life of a radioactive substance?
5. Why is radioactive decay described as a random process, and what does this mean for predicting when a single nucleus will decay?



APPLIED SCIENCE

Get out of you comfort zone and do something different. Watch or listen to something that you haven't before.

BBC Inside science -

Zoe science and nutrition -

TED Talk on science

TASK:

Think about what you have seen or listened to. Was it interesting? Would you watch/listen to another episode?

If you could research and present your own science podcast what would you do? What do you think is a global problem that needs to be solved? Or what is important to you?