GCSE

Science

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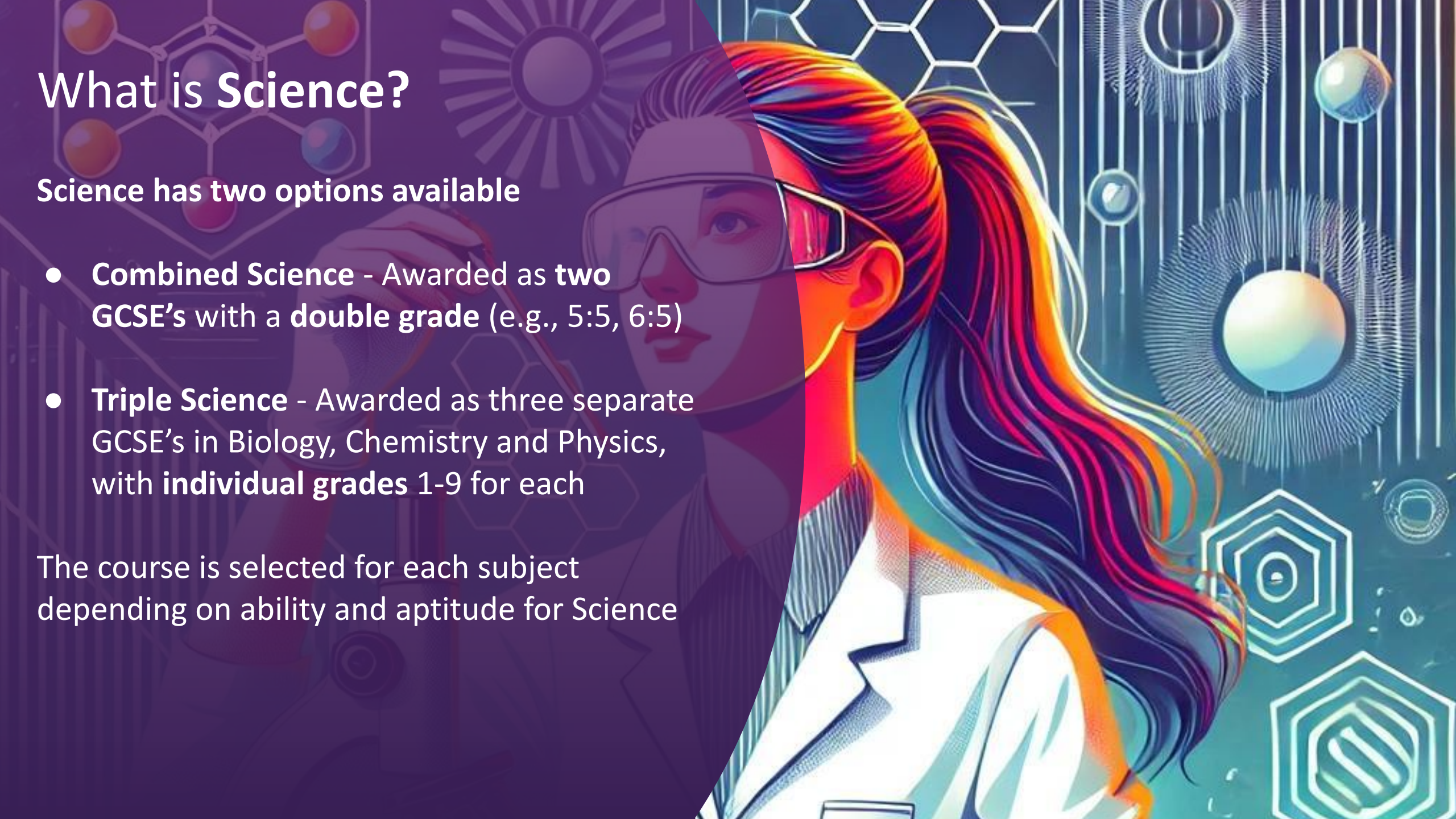
What is **Science?**

Science has two options available

- **Combined Science** - Awarded as **two GCSE's** with a **double grade** (e.g., 5:5, 6:5)

- **Triple Science** - Awarded as three separate GCSE's in Biology, Chemistry and Physics, with **individual grades** 1-9 for each

The course is selected for each subject depending on ability and aptitude for Science



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Course Overview and structure

Content Coverage:

- **Combined Science**: Covers a broad but slightly reduced version of Biology, Chemistry, and Physics
- **Triple Science**: Includes additional topics

Number of Exams:

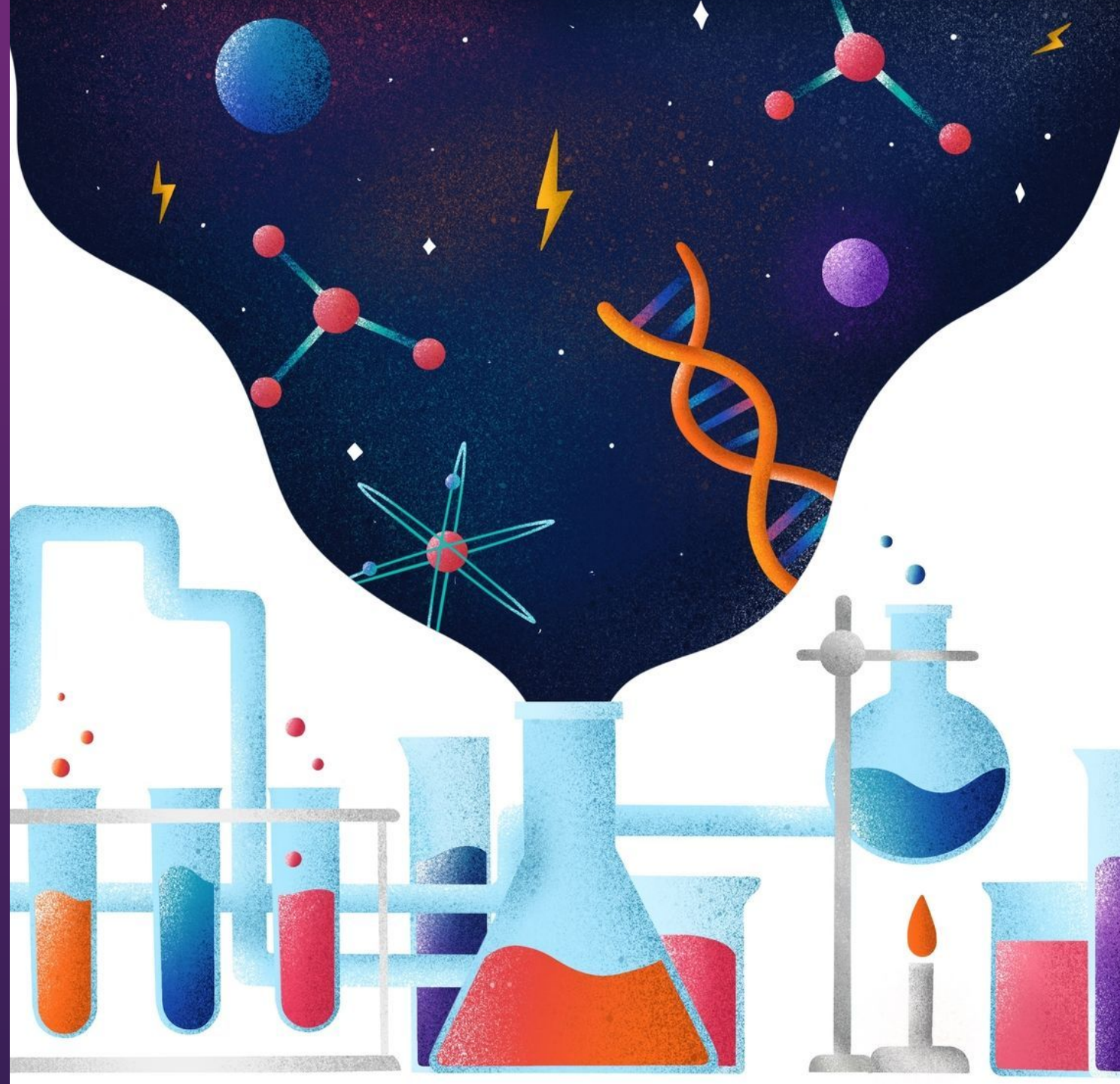
- **Combined Science: 6 papers** (2 Biology, 2 Chemistry, 2 Physics), 1hr 15 mins each
- **Triple Science: 6 papers** (2 per subject), 1hr 45 mins each as they include extra content

Practical Work:

- **Combined Science**: 21 required practicals across all sciences
- **Triple Science**: 28 required practicals with additional investigations

GCSE AQA

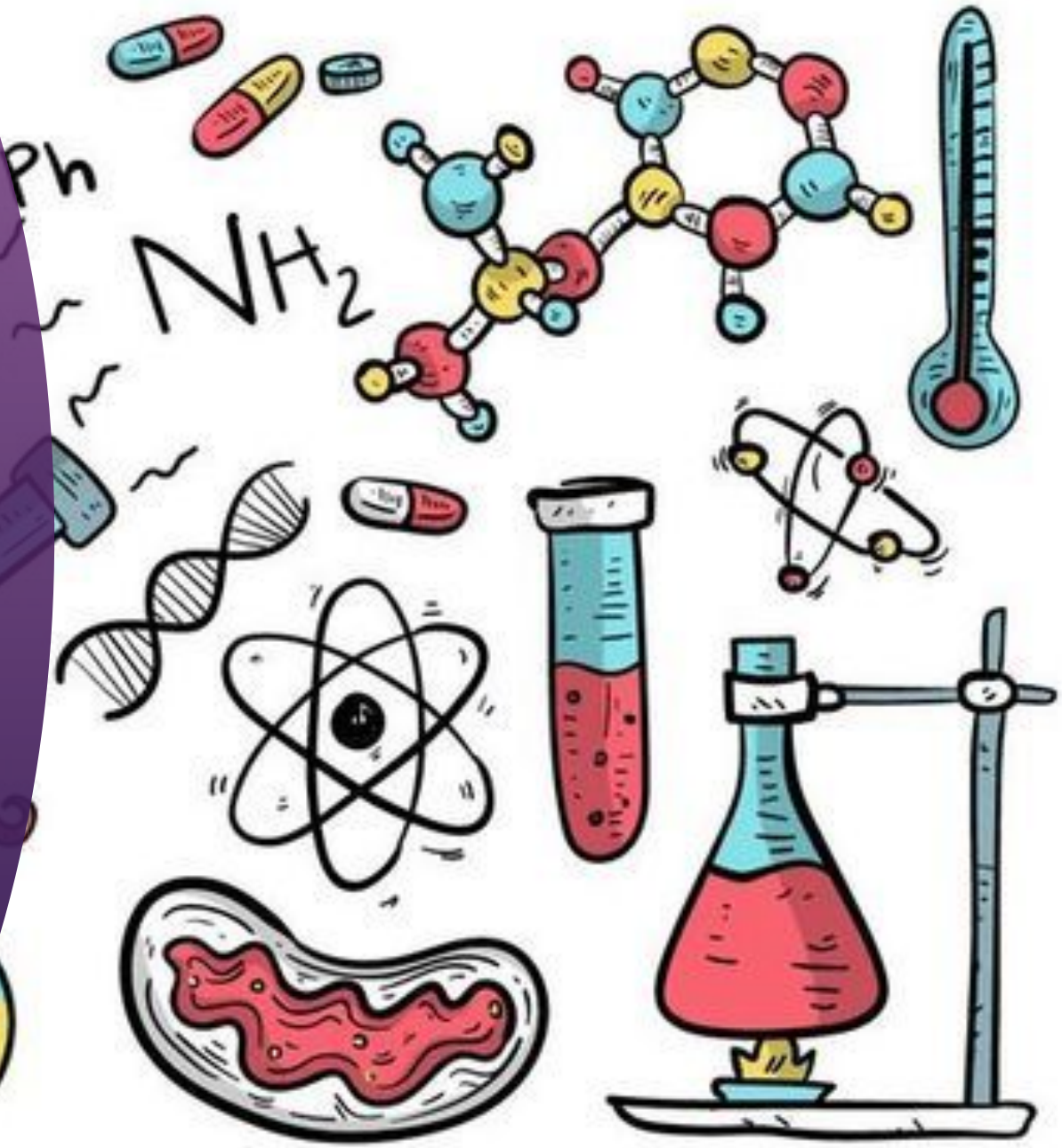
Combined Science



What is **Combined Science?**

The AQA **GCSE Combined Science** course covers **Biology, Chemistry** and **Physics**, providing a broad foundation in scientific principles, practical skills, and real-world applications while developing students' ability to think scientifically and apply mathematical skills to science.

It is assessed through a series of written exams, with questions testing knowledge, application, and practical skills across all three disciplines.



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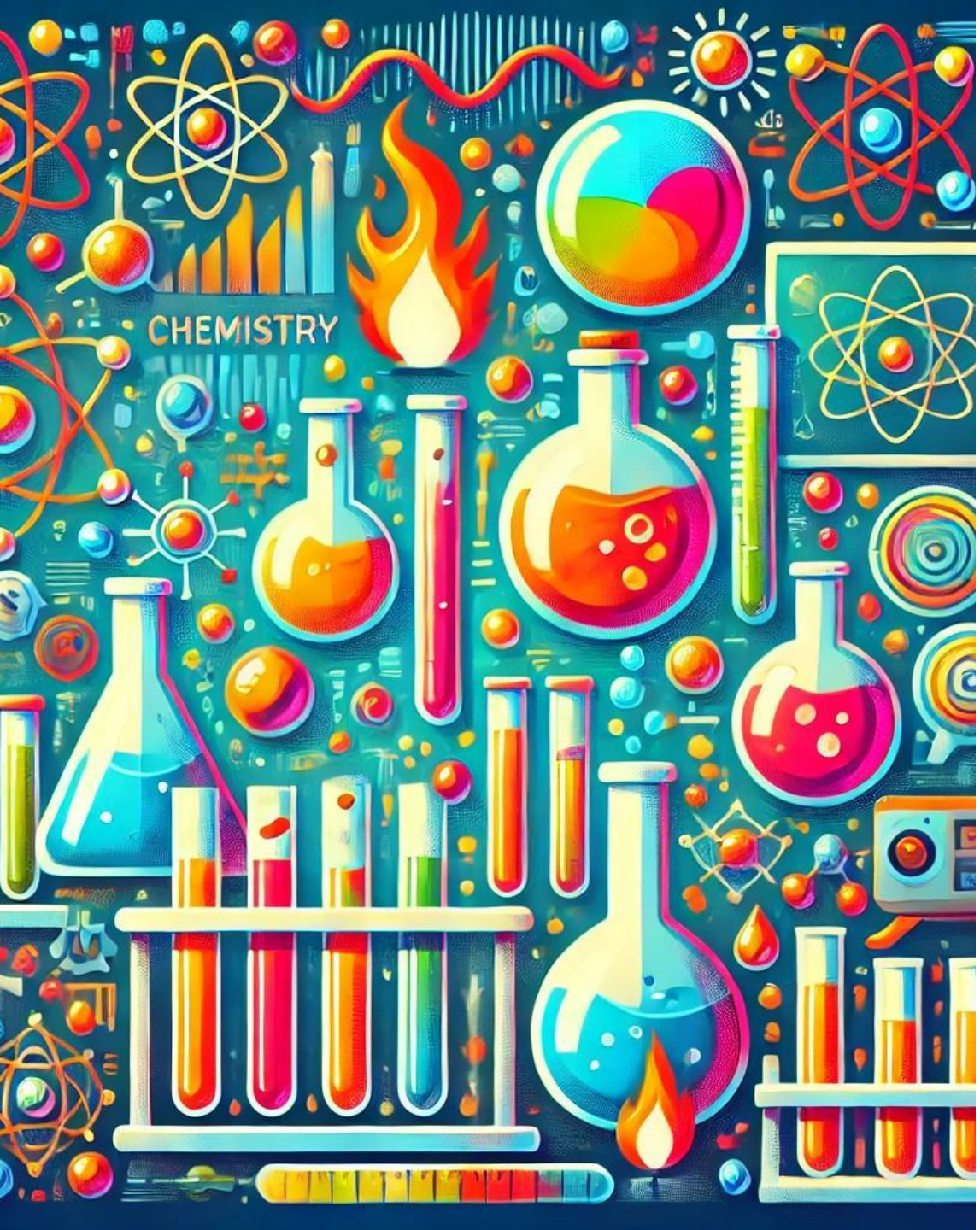
Topics explored

Biology Topics:

- **Cell biology** – Structure of cells, cell division, and transport.
- **Organisation** – Digestive, circulatory systems, and plant transport.
- **Infection and response** – Pathogens, immune response, and antibiotics.
- **Bioenergetics** – Photosynthesis and respiration.
- **Homeostasis and response** – Nervous and hormonal control.
- **Inheritance, variation, and evolution** – Genetics and natural selection.
- **Ecology** – Ecosystems, biodiversity, and human impact.



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Topics explored

Chemistry Topics:

- **Atomic structure and periodic table** – Atoms, elements, and trends.
- **Bonding, structure, and properties** – Ionic, covalent, and metallic bonding.
- **Quantitative chemistry** – Moles, formulas, and yield calculations.
- **Chemical changes** – Acids, alkalis, and electrolysis.
- **Energy changes** – Exothermic and endothermic reactions.
- **Rate and extent of chemical change** – Factors affecting reactions.
- **Organic chemistry** – Basic hydrocarbons and their reactions.
- **Chemical analysis** – Identifying substances.
- **Chemistry of the atmosphere** – Gases and climate change.
- **Using resources** – Sustainable development and recycling.

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Topics explored

Physics Topics:

- **Energy** – Energy stores, transfers, and efficiency.
- **Electricity** – Circuits, resistance, and domestic electricity.
- **Particle model of matter** – States of matter and density.
- **Atomic structure** – Nuclear physics and radiation.
- **Forces** – Newton's laws, momentum, and motion.
- **Waves** – Properties, electromagnetic spectrum, and sound.
- **Magnetism and electromagnetism** – Magnetic fields and motors.

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Assessment

The **AQA GCSE Combined Science** course is assessed through **six exam papers**, with two papers each for **Biology, Chemistry, and Physics**. There is **no coursework**, but **required practicals** are assessed within the written exams.

Biology

- **Paper 1:** Cell Biology, Organisation, Infection & Response, Bioenergetics
- **Paper 2:** Homeostasis & Response, Inheritance, Variation & Evolution, Ecology

Chemistry

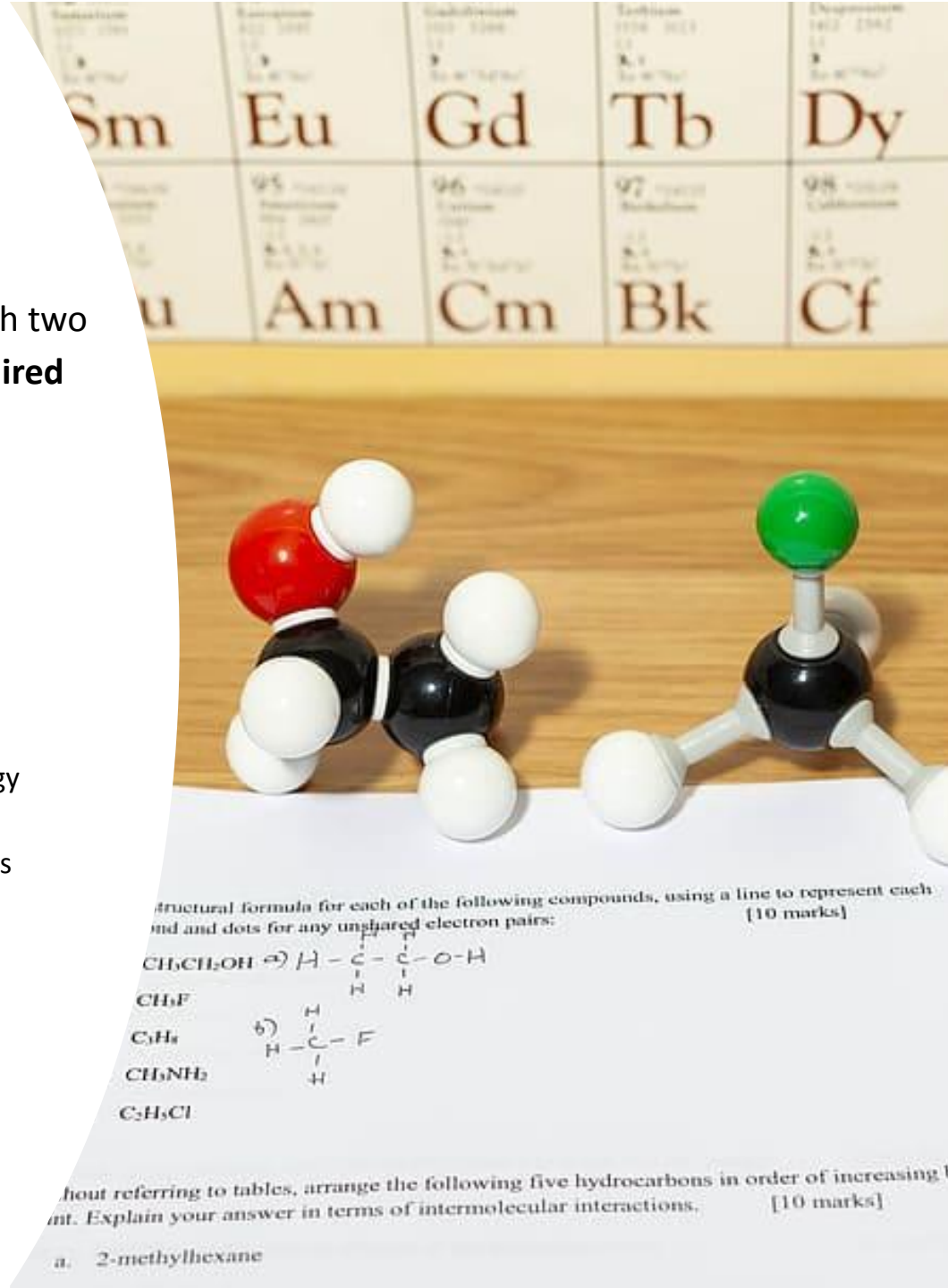
- **Paper 1:** Atomic Structure & Periodic Table, Bonding, Quantitative Chemistry, Chemical & Energy Changes
- **Paper 2:** Rates of Reaction, Organic Chemistry, Chemical Analysis, Atmosphere, Using Resources

Physics

- **Paper 1:** Energy, Electricity, Particle Model, Atomic Structure
- **Paper 2:** Forces, Waves, Magnetism & Electromagnetism

Required Practicals

- Students complete **21 practicals** (7 per subject)
- Practical skills are tested in the written exams



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Required Practical Activities (Combined Science)

Students complete **21 practicals** (7 per subject)

Practical skills are tested in the written exams

Some of the practicals include:

- **Microscopy**
- **Food tests (for starch, sugars, proteins, and lipids)**
- **Making soluble salts**
- **Chromatography**
- **Measuring acceleration**
- **Calculating density**

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Key Career Skills

- Analytical and Critical Thinking
- Evaluating evidence.
- Research and Investigation Skills
- Problem-Solving Abilities
- Practical and Technical Skills
- Mathematical and Data
- Communication and Teamwork

Future career opportunities (Combined Science)

Studying **GCSE Combined Science can lead to a career in a wide range of areas, including:**

- **Healthcare (nursing, paramedic, radiography, biomedical science)**
- **Engineering (mechanical, electrical, aerospace, robotics)**
- **Environmental science (conservation, renewable energy, meteorology)**.

It also supports **apprenticeships** in **laboratory work, pharmacy, veterinary nursing, and forensics**, while developing **problem-solving and analytical skills** useful in **law (patent law, environmental law), finance (data analysis, actuarial science), business, education, and science communication (journalism, technical writing, media production)**.

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Future study opportunities (Combined Science)

Studying **Combined Science** can lead to further study in;

- Any relevant subject at Level 3 (A level), for example at NSG we offer:
  - **A-level Biology**
  - **A-level Chemistry**
  - **A-level Geography**
  - **A-level Psychology**

- Other areas of study that would be relevant.
  - **A-level Maths**
  - **A-level Physics**

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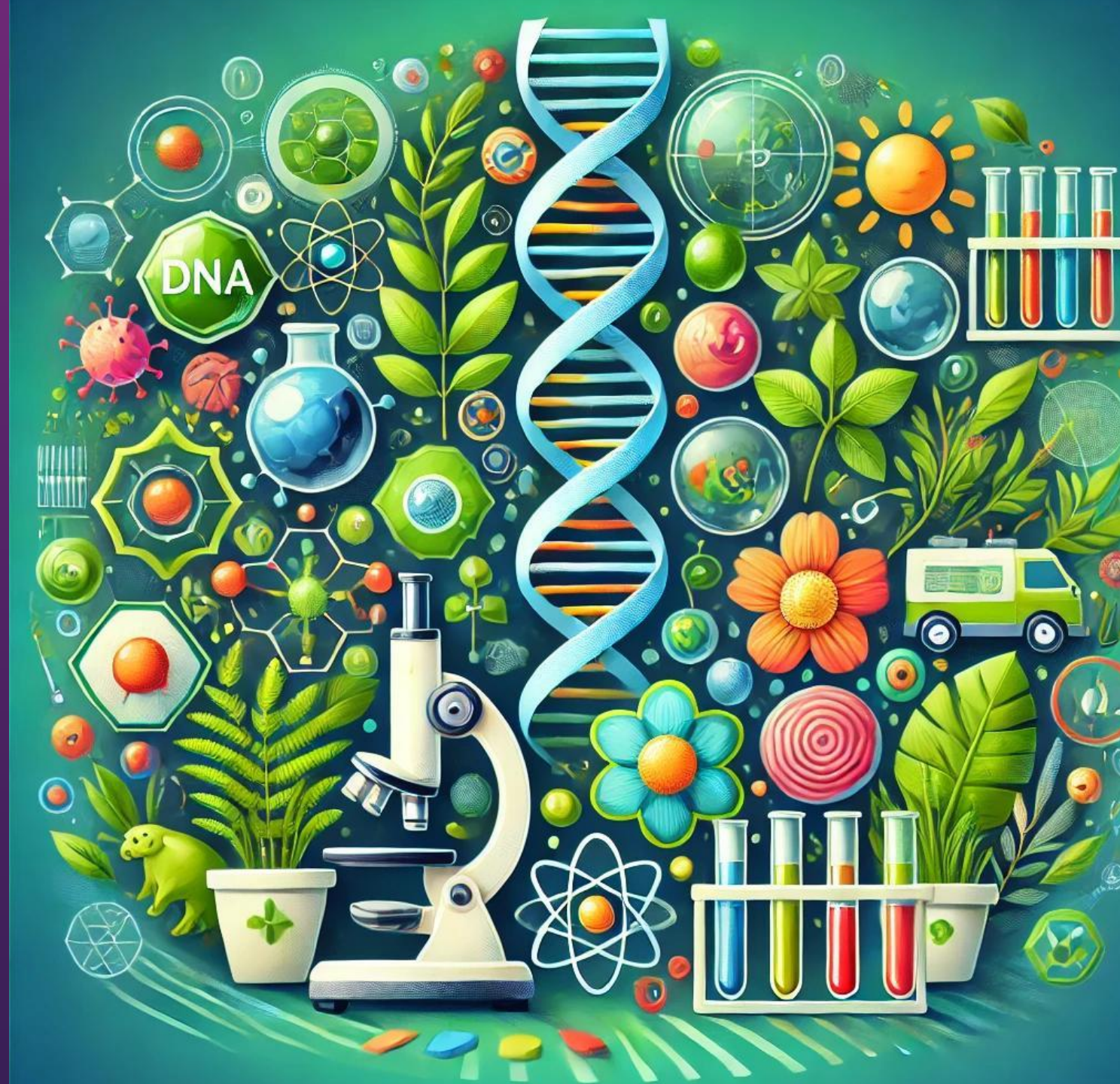
GCSE AQA

Biology



What is **Biology**

- **GCSE Biology** (AQA) is a course designed to give students a solid foundation in **biological principles**, preparing them for further study or careers in science.
- It covers key areas of biology, including **cell biology, human biology, ecology,** and **genetics, emphasizing scientific understanding** and **practical skills.**

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Course Overview and structure (Biology)

Structure:

The course is divided into several key topics:

- **Cell Biology** – Structure and function of cells, microscopy, cell division (mitosis), transport in and out of cells.
- **Organisation** – The structure and function of the human digestive, circulatory, and respiratory systems, as well as plant transport systems.
- **Infection & Response** – Pathogens, the immune system, vaccination, antibiotics, and drug development.
- **Bioenergetics** – Photosynthesis, respiration, and the energy requirements of living organisms.
- **Homeostasis & Response** – The nervous system, hormones, reproduction, and maintaining internal conditions like temperature and blood sugar levels.
- **Inheritance, Variation & Evolution** – DNA, genetic inheritance, natural selection, and speciation.
- **Ecology** – Ecosystems, food chains, biodiversity, and the impact of human activities on the environment.

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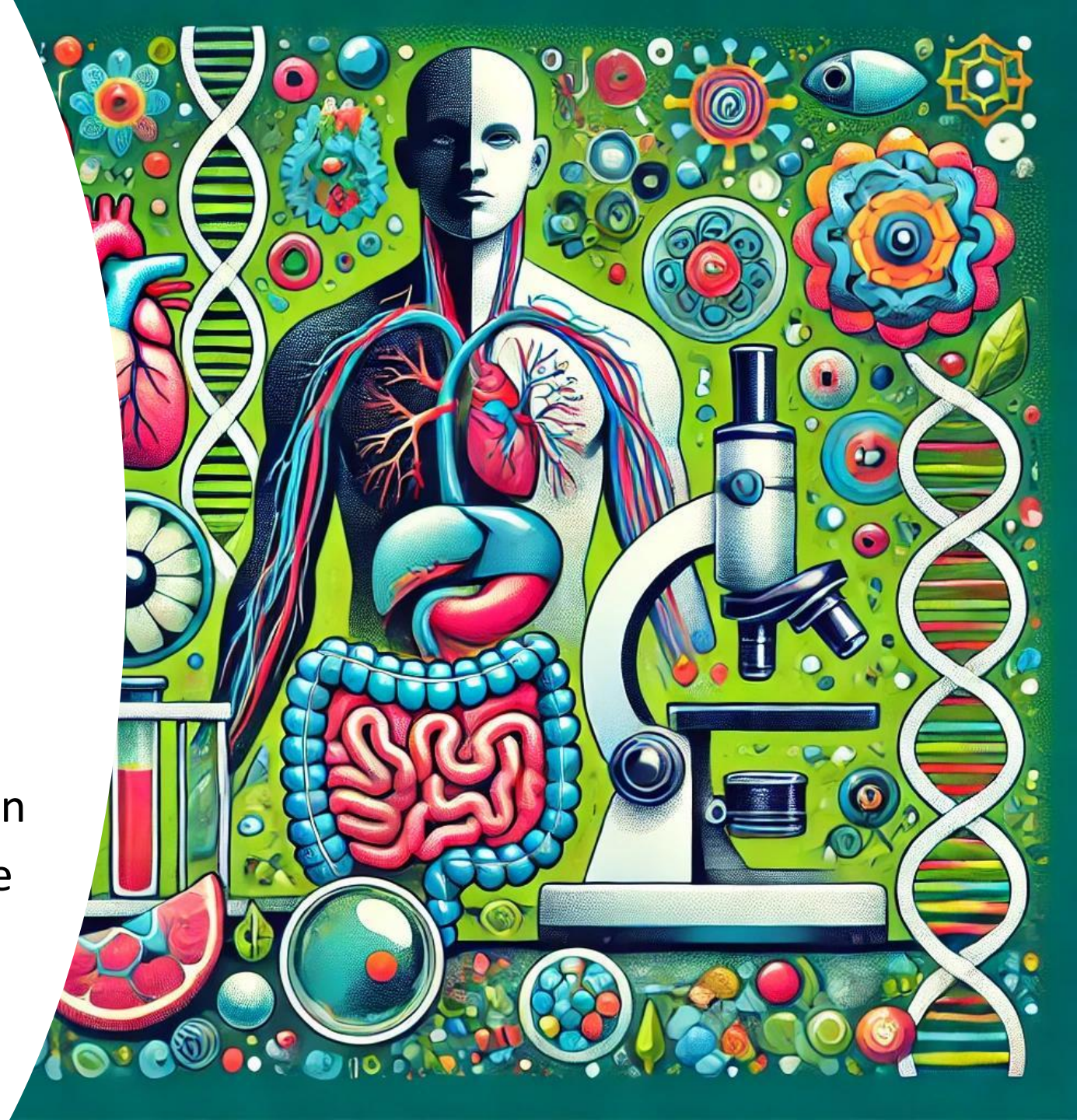
Assessment (Biology)

Students will sit **two exam papers**, each covering different topics:

Paper 1: (Topics 1–4)
Paper 2: (Topics 5–7)

Each paper includes multiple-choice, structured, closed short answer, and open response questions. There is also a focus on practical skills, requiring knowledge of core experiments



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Required Practical Activities (Biology)

Throughout the course, students must complete a series of practicals that will be assessed in their exams. These include:

- **Microscopy**
- **Food tests (for starch, sugars, proteins,** and **lipids)**
- **Photosynthesis investigations**
- **Enzyme activity experiments**
- **Investigating osmosis in potatoes**

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Key Career Skills

- Analytical and Critical Thinking
- Evaluating evidence.
- Research and Investigation Skills
- Problem-Solving Abilities
- Practical and Technical Skills
- Mathematical and Data
- Communication and Teamwork

Future career opportunities (Biology)

Studying **GCSE Biology** opens doors to many exciting career paths, especially in science, healthcare, and the environment. Here are some careers you can pursue with further study:

- **Healthcare & Medicine**
  - **Doctor** – Requires further study in medicine (A-levels & medical degree)
  - **Nurse** – Vital role in patient care, requires a nursing degree.
  - **Dentist** – Specializes in oral health and dentistry
  - **Optometrist** – Focuses on eye health and vision care.

- **Science & Research**
  - **Biotechnologist** – Uses biology to develop medicines, food, and new technology
  - **Biomedical Scientist** – Researches diseases and develops treatments
  - **Epidemiologist** – Investigates how diseases spread
  - **Forensic Scientist** – Uses biology in crime investigations

- **Animal & Environmental Careers**
  - **Zoologist** – Studies and protects animals in the wild.
  - **Environmental Scientist** – Works to protect the planet.
  - **Veterinarian** – Treats sick and injured animals.
  - **Marine Biologist** – Studies ocean life and conservation.

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Future study opportunities (Biology)

Studying **Biology** can lead to further study in;

- Any relevant subject at Level 3 (A level), for example at NSG we offer:
  - **A-level Biology**
  - **A-level Chemistry**
  - **A-level Geography**
  - **A-level Psychology**

- Other areas of study that would be relevant.
  - **A-level Maths**
  - **A-level Physics**

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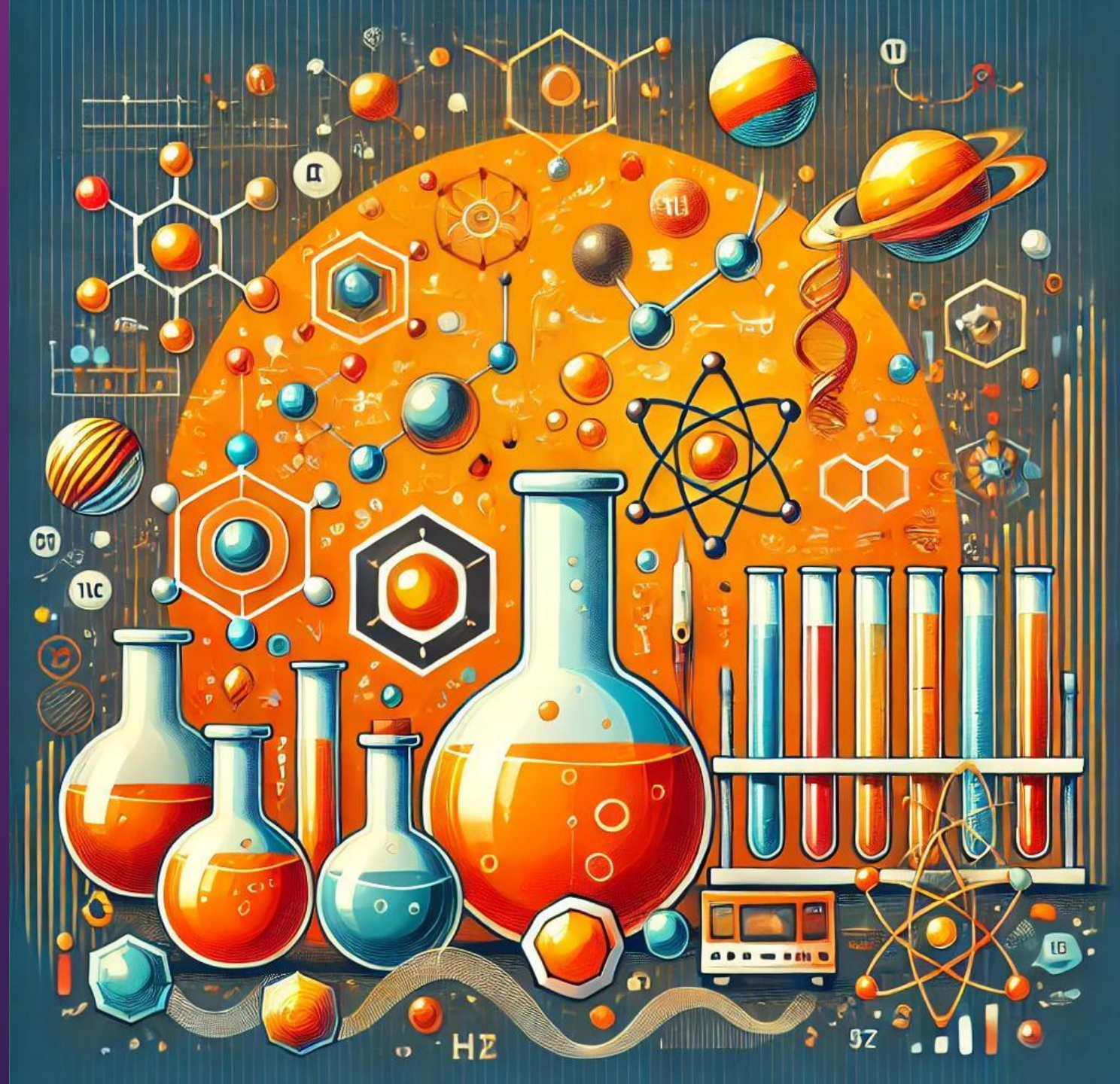
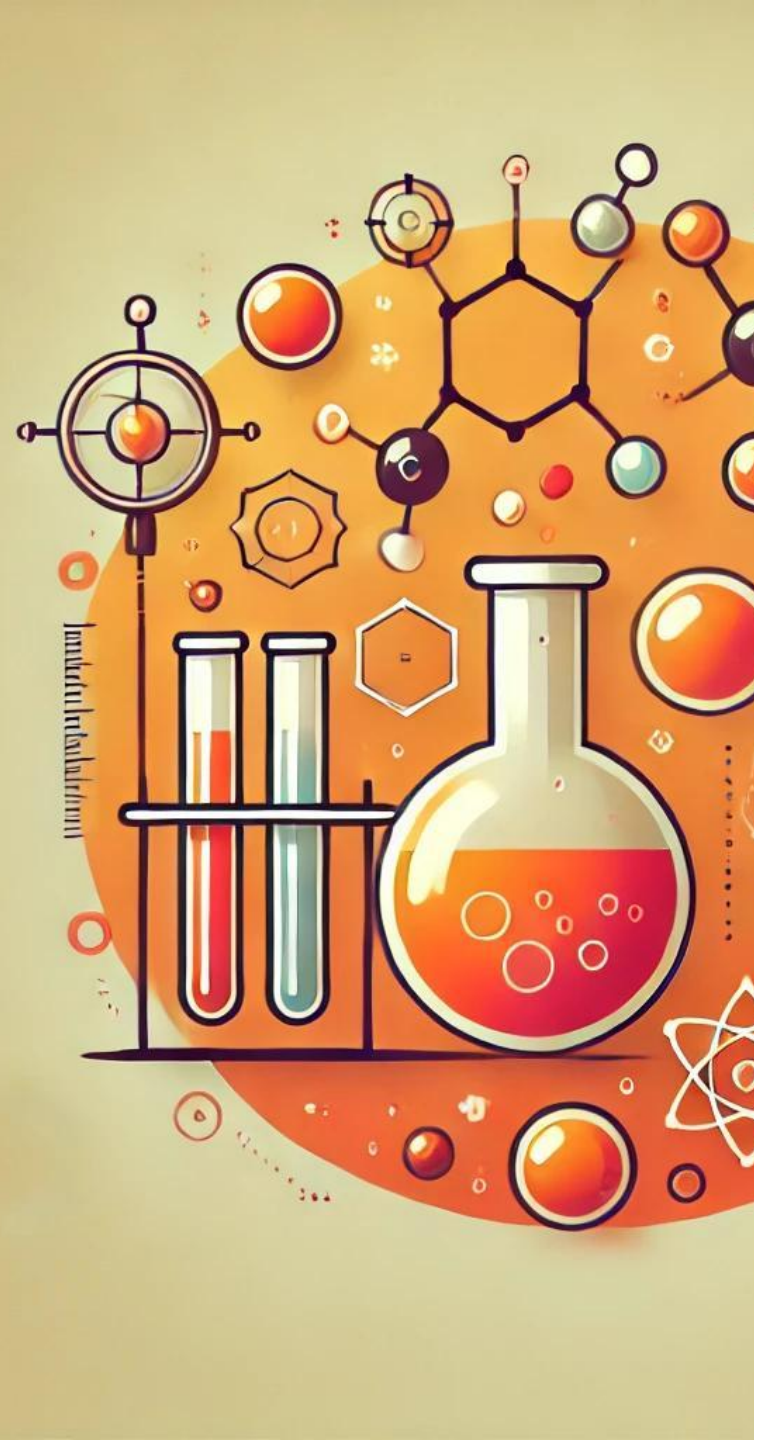
GCSE AQA

Chemistry



What is **Chemistry**

- **GCSE Chemistry** covers the **fundamental principles of chemistry**, including **atomic structure, bonding, chemical reactions, quantitative chemistry,** and the **periodic table,** while also exploring real-world applications like **organic chemistry, environmental chemistry,** and **industrial processes.**
- It emphasizes **scientific skills, practical experiments,** and **mathematical techniques, ensuring students can analyze data**, **evaluate evidence,** and **understand the impact of chemistry** on **society** and the **environment**



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Course Overview and structure (Chemistry)

Structure:

The course is divided into several key topics:

- **Atomic Structure and the Periodic Table** – Understanding atoms, elements, compounds, and trends in the periodic table.
- **Bonding, Structure, and the Properties of Matter** – Different types of bonding (ionic, covalent, metallic) and their effects on material properties.
- **Quantitative Chemistry** – Calculations involving moles, concentrations, and chemical equations.
- **Chemical Changes** – Reactions of acids, electrolysis, and reactivity of metals.
- **Energy Changes** – Exothermic and endothermic reactions, bond energies, and fuel cells.
- **The Rate and Extent of Chemical Change** – Factors affecting reaction rates and equilibrium.
- **Organic Chemistry** – Hydrocarbons, alcohols, carboxylic acids, and polymers.
- **Chemical Analysis** – Purity, formulations, chromatography, and identification of substances.
- **Chemistry of the Atmosphere** – Evolution of the atmosphere, greenhouse gases, and climate change.
- **Using Resources** – Sustainable development, water purification, and life cycle assessments.

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Assessment (Chemistry)

Assessment

Two written exams (each 1 hour 45 minutes).

Each exam is worth **50% of the GCSE**.

Paper 1: Covers topics 1–5.

Paper 2: Covers topics 6–10.

Questions include multiple choice, structured, short-answer, and open-response types.

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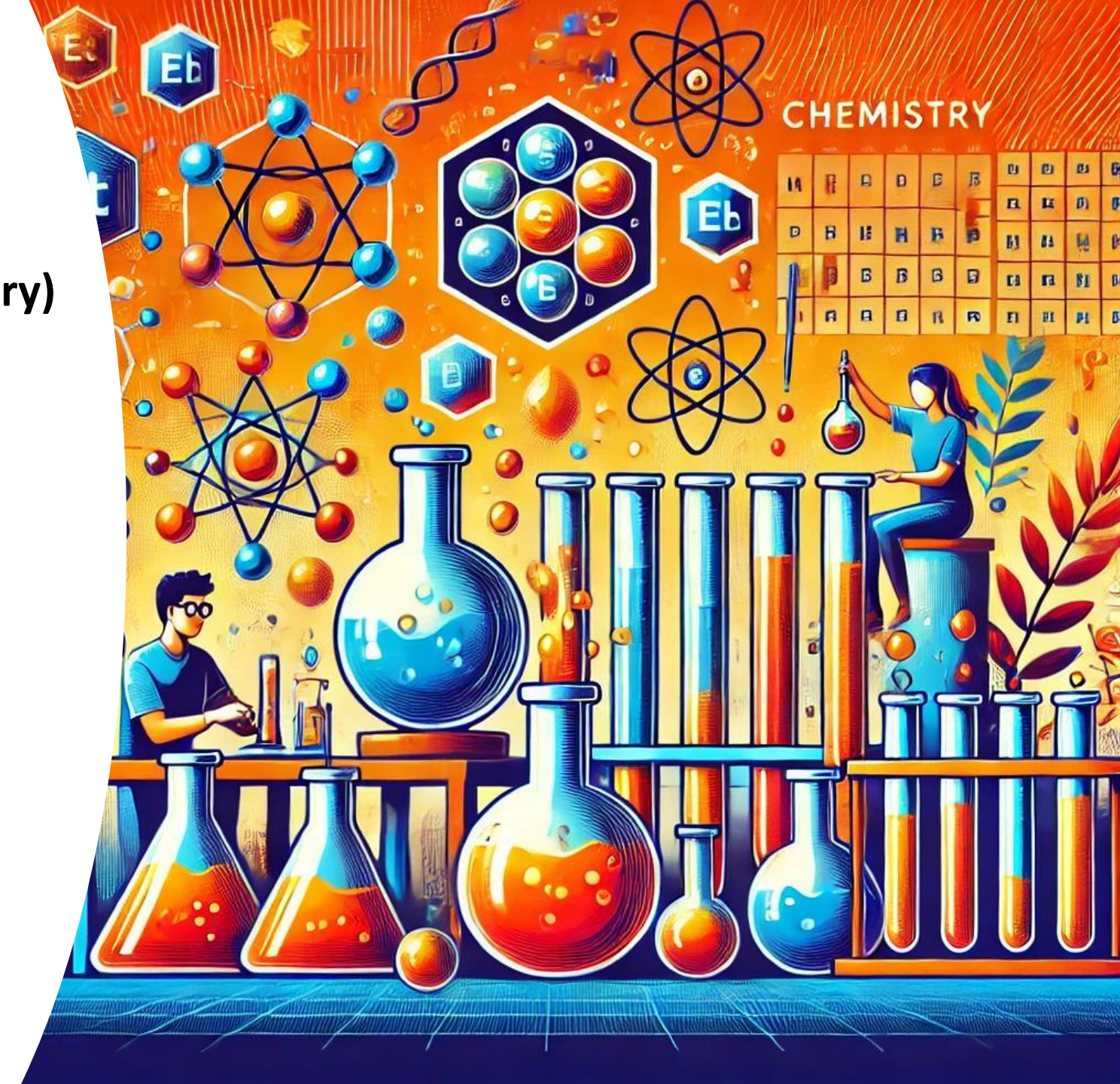
Required Practical Activities (Chemistry)

Throughout the course, students must complete a series of practicals that will be assessed in their exams. These include:

- **Making Salts**
- **Electrolysis**
- **Temperature Changes in Reactions**
- **Rates of Reaction**
- **Chromatography**
- **Identifying Ions (Chemical Analysis)**
- **Water Purification**



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Key Career Skills (Chemistry)

- Analytical and Critical Thinking
- Evaluating evidence.
- Research and Investigation Skills
- Problem-Solving Abilities
- Practical and Technical Skills
- Mathematical and Data
- Communication and Teamwork

Future career opportunities (Chemistry)

GCSE Chemistry can lead to many exciting careers, both in **science-based** fields and beyond. Here are some career options:

- **Forensic Scientist** – Analyze evidence for criminal investigations.
- **Biomedical Scientist** – Research diseases and medical treatments.
- **Toxicologist** – Study the effects of chemicals on humans and the environment.
- **Chemical Engineer** – Design and improve chemical manufacturing processes.
- **Materials Scientist** – Develop new materials for industries like aerospace or electronics.
- **Environmental Engineer** – Work on pollution control and sustainability.
- **Environmental Scientist** – Study climate change and pollution.
- **Renewable Energy Scientist** – Develop cleaner energy sources.
- **Hydrologist** – Study water quality and resources.
- **Doctor/Surgeon** – A strong foundation for medical careers.
- **Nurse or Paramedic** – Chemistry helps in understanding medicines and treatments.
- **Veterinarian** – Animal healthcare relies on chemistry knowledge.
- **Food Scientist** – Improve food safety and nutrition.
- **Cosmetic Scientist** – Develop beauty and skincare products.
- **Science Teacher** – Educate future scientists!
- **Patent Lawyer** – Protect inventions in science and technology.
- **Brewer/Winemaker** – Chemistry plays a big role in fermentation!

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Future study opportunities (Chemistry)

Studying **Chemistry** can lead to further study in;

- Any relevant subject at Level 3 (A level), for example at **NSG** we offer:
  - **A-level Biology**
  - **A-level Chemistry**
  - **A-level Geography**
  - **A-level Psychology**

- Other areas of study that would be relevant.
  - **A-level Maths**
  - **A-level Physics**

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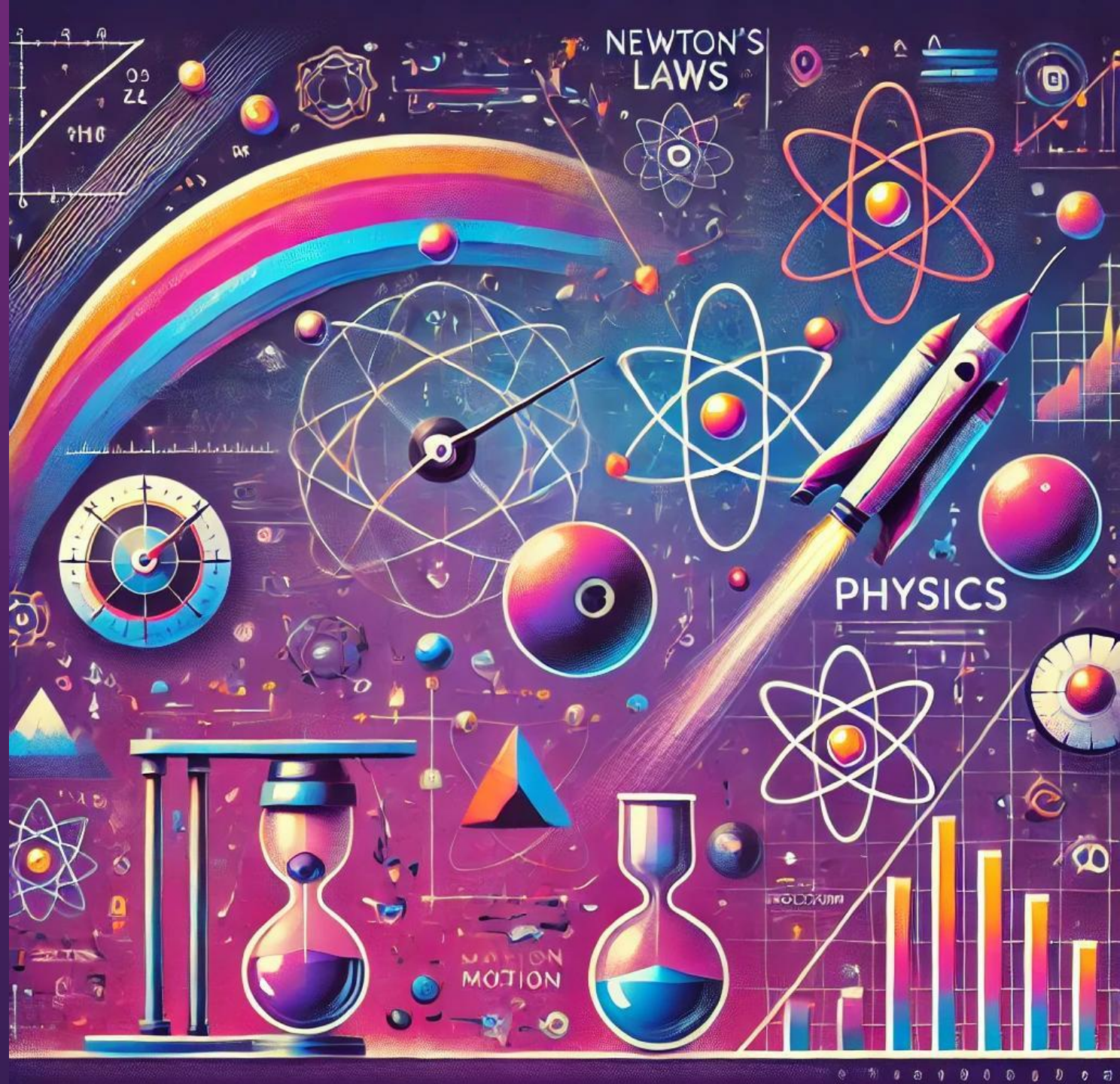
GCSE AQA

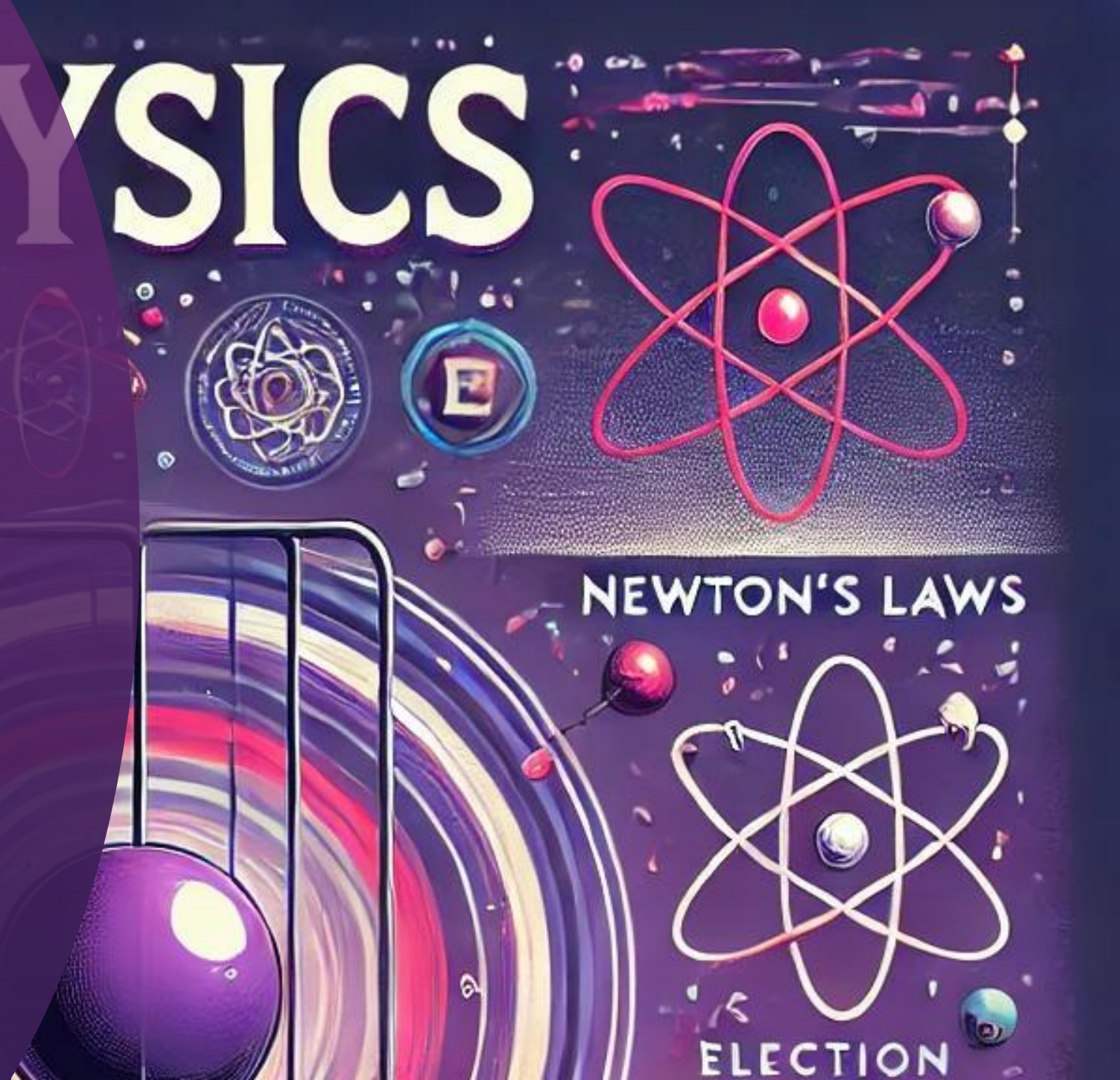
Physics



What is **Physics?**

Physics is the study of **matter, energy,** and the **fundamental forces of nature**. It seeks to understand how the universe works, from the tiniest subatomic particles to the vastness of spice.

The subject involves **mathematical modelling, experimentation,** and **logical reasoning** to **explain natural phenomena.**



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Course Overview and structure (Physics)

Structure:

The course is divided into several key topics:

Paper 1 Topics:

- Energy
- Electricity
- Particle Model of Matter
- Atomic Structure

Paper 2 Topics:

- Forces
- Waves
- Magnetism & Electromagnetism
- Space Physics (Physics only, not in Combined Science)

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Assessment (Physics)

Physics involves 2 GCSE exams, resulting in a single grade **1-9.**

There are **practical investigations** you are required to know about and carry out the exam which will test your knowledge of these.

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Required Practical Activities (Physics)

Throughout the course, students must complete a series of practicals that will be assessed in their exams. These include:

- **Specific heat capacity**
- **Thermal insulation**
- **Resistance of a wire**
- **IV characteristics**
- **Density of solids and liquids**
- **Acceleration**
- **Waves**
- **Reflection and refraction of light**
- **Radiation and absorption**
- **Hookes Law**
- **Motion and mass on a spring**
- **Lenses and image formation**

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Key Career Skills (Physics)

- Analytical and Critical Thinking
- Evaluating evidence.
- Research and Investigation Skills
- Problem-Solving Abilities
- Practical and Technical Skills
- Mathematical and Data
- Communication and Teamwork

Future career opportunities (Physics)

Studying **GCSE Physics** opens doors to many exciting career paths, especially in science, healthcare, and the environment. Here are some careers you can pursue with further study:

- **Mechanical Engineer – Designing machines, vehicles, and tools.**
- **Electrical Engineer – Working with power systems, circuits, and renewable energy.**
- **Civil Engineer – Designing and building infrastructure like bridges and buildings.**
- **Aerospace Engineer – Designing aircraft, spacecraft, and satellites.**
- **Robotics Engineer – Creating and programming automated systems and robots.**
- **Astrophysicist – Studying space, stars, and planetary systems.**
- **Aerospace Engineer – Working in space exploration and satellite technology.**
- **Medical Physicist – Using physics in cancer treatments, MRI, and X-ray imaging.**
- **Radiographer – Operating medical imaging technology.**
- **Renewable Energy Engineer – Developing solar, wind, and hydroelectric power.**
- **Environmental Scientist – Studying climate change and pollution control.**
- **Software Developer – Writing code and developing computer programs.**
- **Data Scientist – Analyzing big data for insights and predictions.**
- **AI and Machine Learning Engineer – Developing smart algorithms and robotics.**
- **Forensic Scientist – Using physics in crime scene investigation.**
- **Aviation Specialist – Designing aircraft and improving flight safety.**
- **Quantum Physicist – Exploring quantum mechanics and futuristic technologies.**
- **Particle Physicist – Working at institutions like CERN.**
- **Material Scientist – Developing new materials for industries like tech and fashion.**
- **Investment Analyst – Using data to predict financial trends.**

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Future study opportunities (Physics)

Studying **Physics** can lead to further study in;

- Any relevant subject at Level 3 (A level), for example at NSG we offer:
  - **A-level Physics**
  - **A-level Maths**
  - **A-level Further Maths**
  - **A-level Computer Science**

- Other areas of study that would be relevant.
  - **A-level Maths**
  - **A-level Further Maths**
  - **A-level Statistics**

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