

# Our Lady Queen of Peace

Catholic High School

## Curriculum Overview

### YEAR 9 SCIENCE

#### Careers

##### Local Market Information

Local science becomes diagnosis and high-value technology. Biology links to NHS biomedical work: cells, microscopy, disease and diagnostics, like the work carried out at the Liverpool School of Tropical Medicine. Chemistry links to Pilkington/NSG and wider advanced materials employers, where atomic structure, reactions and material properties matter. Physics links to ultrasound in healthcare, light/optics in glass, and waves/radio astronomy at Jodrell Bank.

##### Skills

**Problem Solving**  
**Reliability**  
**Organisational Skills**

##### Jobs

Biomedical scientist; sonographer; audiology assistant; optical technician; glass/materials technician

#### Knowledge & Understanding

#### Subject Specific Literacy Development

#### Cultural Capital / Enrichment Opportunities

##### Topics (Bigger Picture)

##### Knowledge (Key Concepts)

##### Recall & Retrieval Practice Focus

##### Key Vocabulary

##### Half Term 1

B5a: Inheritance, Variation & DNA

Understanding how genetic information is passed on, how variation occurs within species.

Know that offspring are similar to parents and individuals vary within a species  
Recall that genetic information is passed via genes (DNA on chromosomes) causing variation

Gene  
DNA  
Chromosome  
Biodiversity  
Variation  
heredity  
Continuous  
Discrete

Opportunity to discuss relevant news.  
Highlighting the relevance and transferability of science for daily and future lives.  
Challenging popular stereotypes.

|             | Knowledge & Understanding                    |                                                                                                                                                                                        |                                                                                                                                                                     | Subject Specific Literacy Development                                                          | Cultural Capital / Enrichment Opportunities                                                                                                                                                |
|-------------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | Topics (Bigger Picture)                      | Knowledge (Key Concepts)                                                                                                                                                               | Recall & Retrieval Practice Focus                                                                                                                                   | Key Vocabulary                                                                                 |                                                                                                                                                                                            |
|             | B5b: Natural Selection, Evolution & Fossils  | Understanding how natural selection leads to evolution, adaptation, and sometimes extinction, supported by fossil evidence and influenced by both natural processes and human actions. | Know that organisms compete and environments affect survival.<br>Recall that natural selection leads to evolution, adaptation, and extinction, supported by fossils | Natural selection<br>Evolution<br>Extinction<br>Fossilisation                                  | Science in the news.                                                                                                                                                                       |
|             | P5a: Forces, Pressure & Moments              | Understand how pressure acts in solids and fluids, how it changes with depth, and how it is applied in systems like hydraulics, levers, and balanced moments.                          | Know that forces can push, pull, and act on objects.<br>Recall how pressure, levers, and moments affect movement and balance                                        | Pressure<br>Upthrust<br>Hydraulic<br>Moment                                                    | Career spotlights for each topic.                                                                                                                                                          |
|             | P5b: Speed, Motion Graphs & Acceleration     | Understand how to calculate and measure speed, represent motion using distance–time graphs, and explain how speed changes over time due to acceleration.                               | Know that objects move and speed describes how fast they travel.<br>Recall how to calculate speed, interpret motion graphs, and describe acceleration.              | Speed<br>Accuracy                                                                              | Creating opportunities for students to explore STEM activities through practical and encouragement of STEM club.<br><br>Careers drop in 1 “Did You Know”: “Unexpected Careers in Science.” |
| Half Term 2 | P5b: Speed, Motion Graphs & Acceleration     | Understand how to calculate and measure speed, represent motion using distance–time graphs, and explain how speed changes over time due to acceleration.                               | Know that objects move and speed describes how fast they travel.<br>Recall how to calculate speed, interpret motion graphs, and describe acceleration.              | Gradient<br>Acceleration                                                                       | Careers drop in 2 “Did You Know”: “Science Behind Sport, Gaming and Entertainment”<br><br>STEM careers lesson 1 “Science in Everyday Life/Green Careers”                                   |
|             | B6a: Feeding Relationships & Interdependence | Understand how organisms are linked through food chains and webs, how these relationships affect populations, and how energy transfer is shown using pyramids of numbers and biomass.  | Know that animals depend on others for food.<br>Recall food chains/webs, energy transfer, and how populations are linked.                                           | Food web<br>Producer<br>Consumer<br>Population<br>Predator<br>Prey<br>Trophic level<br>Biomass | Career links in reading for meaning tasks                                                                                                                                                  |

|             | Knowledge & Understanding                   |                                                                                                                                                                                                          |                                                                                                                                    | Subject Specific Literacy Development                                                                                                | Cultural Capital / Enrichment Opportunities                                                                                                                                                                                                                                                                                                                                                                |
|-------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | Topics (Bigger Picture)                     | Knowledge (Key Concepts)                                                                                                                                                                                 | Recall & Retrieval Practice Focus                                                                                                  | Key Vocabulary                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                            |
|             | B6b: Human Impacts & Biodiversity           | Understand how organisms interact within ecosystems, the importance of pollinators and biodiversity, and how human activity and toxins can impact food chains and food security.                         | Know that humans affect the environment.<br>Recall how ecosystems are affected, the importance of biodiversity, and food security. | Ecosystem<br>Pollination<br>Food security<br>Bioaccumulation<br>Biodiversity                                                         |                                                                                                                                                                                                                                                                                                                                                                                                            |
|             | P6a: Sound Waves, Hearing & Ultrasound      | Understand how waves transfer energy, how sound is produced and detected, and how sound waves are used in applications such as echoes and ultrasound.                                                    | Know that sound is heard and comes from vibrations.<br>Recall sound as a wave, how it travels, and how it is used.                 | Wave<br>Transverse<br>Longitudinal<br>Frequency<br>Pitch<br>Ultrasound<br>Echo                                                       |                                                                                                                                                                                                                                                                                                                                                                                                            |
| Half Term 3 | P6b: Light, Reflection, Refraction & Colour | Understand how light travels, forms images, and behaves through reflection, refraction, and colour.                                                                                                      | Know that light allows us to see objects.<br>Recall how light travels, reflects, refracts, and produces colour.                    | Reflection<br>Incidence<br>Refraction<br>Medium<br>Wavelength                                                                        | Science in the news.<br>Career spotlights for each topic.<br><br>Creating opportunities for students to explore STEM activities through practical and encouragement of STEM club.<br>Career links in reading for meaning tasks<br>Careers drop in 1 “Did You Know”: “ <i>Unexpected Careers in Science.</i> ”<br>Careers drop in “Did You Know”: “ <i>Science Behind Sport, Gaming and Entertainment</i> ” |
| Half Term 4 | C5a: Building Blocks of Matter              | Understand how matter is made of atoms, elements, and compounds, how atomic models have developed, and how atomic structure and electron arrangement explain chemical properties and the periodic table. | Know that substances are made of tiny particles.<br>Recall atoms, elements, compounds, and atomic structure.                       | Element<br>Compound<br>Mixture<br>Atom<br>Proton<br>Neutron<br>Electron<br>Isotope<br>Relative atomic mass<br>Electron configuration |                                                                                                                                                                                                                                                                                                                                                                                                            |

|             | Knowledge & Understanding             |                                                                                                                                                                                                                                     |                                                                                                                                  | Subject Specific Literacy Development                                                                                                | Cultural Capital / Enrichment Opportunities                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | Topics (Bigger Picture)               | Knowledge (Key Concepts)                                                                                                                                                                                                            | Recall & Retrieval Practice Focus                                                                                                | Key Vocabulary                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|             | C5b: The Periodic Table               | Understand how elements are arranged in the periodic table, how their structure explains trends and reactivity, and how the properties of metals, non-metals, and groups (e.g. alkali metals, halogens, transition metals) compare. | Know that elements can be grouped by similar properties.<br>Recall how the periodic table is organised and trends in groups.     | Periodic table<br>Group<br>Period<br>Alkali metal<br>Halogen                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Half Term 5 | C5c: Mixtures & Separation Techniques | Understand how mixtures can be separated using filtration, crystallisation, distillation, and chromatography based on differences in physical properties.                                                                           | Know that substances can be mixed and separated physically.<br>Recall methods like filtration, distillation, and chromatography. | Filtration<br>Crystallisation<br>Distillation<br>Chromatography                                                                      | <p>Science in the news.</p> <p>Career spotlights for each topic.</p> <p>Creating opportunities for students to explore STEM activities through practical and encouragement of STEM club.</p> <p>Careers drop in 3 and 4 “Did You Know”: <i>Jobs That Didn't Exist 10 Years Ago</i>” &amp; ”<i>Science Careers Making a Global Difference.</i>”</p> <p>Termly STEM Lesson 3 – Future Technologies and STEM Careers.</p> <p>Career links in reading for meaning tasks</p> |
|             | B7a: Cell Structure & Microscopy      | Understand the structure and function of animal, plant, prokaryotic, and eukaryotic cells, how cells are observed and measured, and how specialised cells, cell division, and stem cells support growth and development.            | Know that living things are made of cells.<br>Recall cell structures, types, and how microscopes are used.                       | Organelle<br>Prokaryotic<br>Eukaryotic<br>Microscope<br>Magnification<br>Differentiation<br>Specialised cell<br>Mitosis<br>Stem cell |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|             | B7b: Transport Processes              | Understand how substances move in and out of cells by diffusion, osmosis, and active transport, and how exchange surfaces are adapted to make this process efficient.                                                               | Know that substances move in living organisms.<br>Recall diffusion, osmosis, active transport, and exchange surfaces.            | Diffusion<br>Concentration gradient<br>Osmosis<br>Variables                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Half Term 6 | B7b: Transport Processes              | Understand how substances move in and out of cells by diffusion, osmosis, and active transport, and how exchange surfaces are adapted to make this process efficient.                                                               | Know that substances move in living organisms.<br>Recall diffusion, osmosis, active transport, and exchange surfaces.            | Evaluation<br>Anomaly<br>Active transport<br>Exchange surface                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

|  | Knowledge & Understanding        |                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                | Subject Specific Literacy Development                                                            | Cultural Capital / Enrichment Opportunities |
|--|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------|
|  | Topics (Bigger Picture)          | Knowledge (Key Concepts)                                                                                                                                                                                                                                                                                                                               | Recall & Retrieval Practice Focus                                                                                              | Key Vocabulary                                                                                   |                                             |
|  | P7: Particles and the properties | Understand how particles behave in solids, liquids, and gases, how substances change state with energy, and how density explains differences in mass, volume, and floating. Understand how internal energy and particle movement change with heating, including changes of state, and how gas temperature affects pressure due to particle collisions. | Know solids, liquids, and gases behave differently. Recall particle behaviour, changes of state, density, and energy transfer. | Intermolecular forces<br>Density<br>Mass<br>Volume<br>Internal energy<br>Latent heat<br>Pressure |                                             |

## Key Assessments

| When        | What will be assessed?                                                                                                                                                                                                                                                                                                                                                                                      | Why is this being assessed?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | How will results be stored & students receive feedback?                                                                                |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Half Term 1 | Biology – Inheritance & Evolution - End of topic test<br><u>Explain</u> how inheritance and variation lead to evolution.                                                                                                                                                                                                                                                                                    | To assess students understanding of inheritance occurs and links to evolution.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | SIMs marksheet.<br>Teacher marked with WWW and EBI on green sheet.                                                                     |
| Half Term 2 | Physics – Forces – End of topic test<br><u>Explain</u> why forces cause objects to move and change.<br>Biology – Ecosystems & interdependence – End of topic test<br><u>Evaluate</u> the importance of maintaining biodiversity for ecosystems and humans.                                                                                                                                                  | To assess students understanding of forces and motion.<br><br>To assess students understanding of ecosystems and relationships.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SIMs marksheet.<br>Teacher marked with WWW and EBI on green sheet.                                                                     |
| Half Term 3 | The Mid-Year Exam will assess content covered in the year so far, from biology (inheritance, ecosystems) and physics (forces, waves) and science skills, variables, analysing data etc.<br>Fundamental knowledge from Y7/Y8 will also be assessed (cells, atoms) (Summative assessment)<br>Physics – Waves – End of topic test<br><u>Explain</u> how sound and light waves transfer energy and information. | To assess students' understanding of Biology, Chemistry and Physics topics and working scientifically skills, specifically their ability to: <ul style="list-style-type: none"> <li>Identify variables.</li> <li>Analyse/evaluate data</li> <li>Recall and apply knowledge about: <ul style="list-style-type: none"> <li>Inheritance</li> <li>Interdependence</li> <li>Forces &amp; Motion</li> </ul> </li> </ul><br>To assess students understanding of light and sound waves.                                                                                                                                       | SIMs marksheet.<br>Whole class feedback.<br><br><br><br><br><br><br>SIMs marksheet.<br>Teacher marked with WWW and EBI on green sheet. |
| Half Term 4 | In class assessment – 4-6 short command word-based questions.                                                                                                                                                                                                                                                                                                                                               | To assess students understanding of chemistry fundamental ideas – atoms & periodic table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | SIMs marksheet.<br>Teacher marked with WWW and EBI on green sheet.                                                                     |
| Half Term 5 | Chemistry – Building Blocks – End of topic test<br><u>Evaluate</u> how the development of atomic theory and the periodic table has improved our understanding of matter.<br>In class assessment – 4-6 short command word based questions.                                                                                                                                                                   | To assess students understanding of building blocks of chemistry.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | SIMs marksheet.<br>Teacher marked with WWW and EBI on green sheet.                                                                     |
| Half Term 6 | End of Year Exam (Summative Assessment) will assess knowledge and skills from the topics covered to this point, including scientific skills and fundamental knowledge from Y7/Y8.<br><br>Physics – Particles & their properties – End of topic test <u>Evaluate</u> how the particle model helps us understand the properties and behaviour of matter.                                                      | To assess students' understanding of Biology, Chemistry and Physics topics and working scientifically skills, specifically their ability to: <ul style="list-style-type: none"> <li>Identify variables.</li> <li>Analyse information/data.</li> <li>Recall and apply knowledge about: <ul style="list-style-type: none"> <li>Inheritance</li> <li>Ecosystems</li> <li>Forces</li> <li>Cells, structures &amp; transport</li> <li>Atoms &amp; Elements</li> <li>Periodic Table</li> <li>Separation techniques</li> </ul> </li> </ul><br>To assess students understanding of particles and how their properties relate. | SIMs marksheet.<br>Whole class feedback.<br><br><br><br><br><br><br>SIMs marksheet.<br>Teacher marked with WWW and EBI on green sheet. |