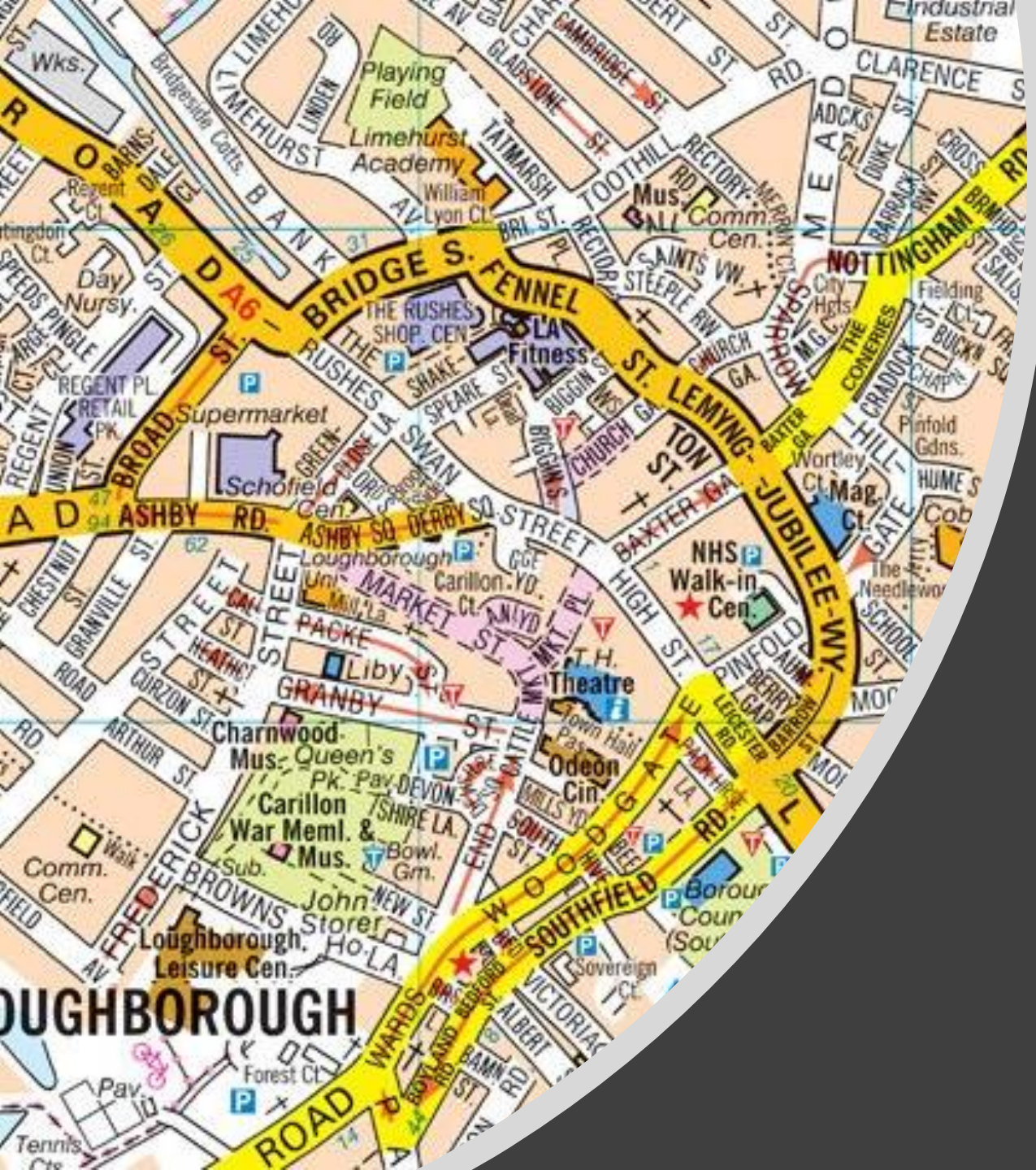


Science Curriculum Roadmap

Limehurst Science Department

Contents

Science Curriculum Road Map

Combined Science Route

Year 7

Lighting Fires – Science Passport	States of Matter	Cells and Human Reproduction	Electricity and Magnetism	Earth and Atmosphere	Food Chains and Ecosystems	Space	Photosynthesis and Plant Reproduction

Each of the units in year 7 and 8 are stand alone units and can be taught in any order. This order is to be agreed upon by the HoD to avoid too much overlap with equipment usage.

Year 8

Lighting Fires – Projects	Energy	Exercise and Health	Forces	Chemical Reactions	Genetics	Light and Sound	The Periodic Table

Year 9

CB1: Key Concepts in Biology	CP1: Motion	CC1/2: States of Matter and Mixtures	CB2:Cells and Control	CP2: Forces and Motion	CC3/4: Atomic Structure & The Periodic Table

Year 10

CB3: Genetics	CP3: Conservation of Energy	CC5/6/7: Bonding and Types of Substance	CB4: Natural Selection and Genetic Modification	CP4/5: Waves & Light and the EM Spectrum	CC8/9: Acids and Alkalis & Calculations with masses	CB5: Health, Disease and Developing Medicine	CP6: Radioactivity	CC10/11/12: Electrolytic Processes

Year 11

CB6: Plant Structure and their functions	CP7/8: Energy – Forces doing work	CC13/14/15: Rates of Reaction and Heat Energy	CB7: Animal Coordination Control and Homeostasis	CP9: Electricity and Circuits	CC16/17: Fuels & Earth and Atmospheric Science	CB8: Exchange and Transport in Animals	CP10/11: Magnetism Electromagnetic Induction	CB9: Ecosystems and Material Cycles	CP12/13: Particle Model & Forces and Matter

Science Curriculum Road Map

Separate Science Route

Year 7

Lighting Fires – Science Passport	States of Matter	Cells and Human Reproduction	Electricity and Magnetism	Earth and Atmosphere	Food Chains and Ecosystems	Space	Photosynthesis and Plant Reproduction

Each of the units in year 7 and 8 are stand alone units and can be taught in any order. This order is to be agreed upon by the HoD to avoid too much overlap with equipment usage.

Year 8

Lighting Fires – Projects	Energy	Exercise and Health	Forces	Chemical Reactions	Genetics	Light and Sound	The Periodic Table

Year 9

CB1: Key Concepts in Biology	CP1: Motion	CC1/2: States of Matter and Mixtures	CB2:Cells and Control	CP2: Forces and Motion	CC3/4: Atomic Structure & The Periodic Table	

Biology Separate Catch Up (SB1/2)	SB3: Genetics	SB4: Natural Selection and Genetic Modification	SB5: Health Disease and the Development of Medicines	SB6: Plant Structures and their Functions	SB7: Animal Coordination and Homeostasis	SB8: Exchange and Transport in Animals	SB9: Ecosystems and Material Cycles	

Chemistry Separate Catch Up (SB1/2/3/4)	SC5/6/7: Bonding and Types of Substance	SC8/9: Acids and Alkalis and Calculations of Masses	SC10/11/12/13: Electrolytic Processes and Reactions	SC14/15/16: Quantitative Analysis and Equilibria	SC17/18/19: Rates of Reaction & Groups in the Periodic Table	SC20/21: Fuels & Earth and Atmospheric Science	SC22/23/24: Hydrocarbons and Polymers	SC25/26: Qualitative Analysis

Physics Separate Catch Up (CP1/2)	SP3: Conservation of Energy	SP4/5: Waves and Light and the EM Spectrum	SP6: Radioactivity	SP7: Astronomy	SP8/9: Energy – Forces Doing Work	SP10/11: Electricity and Circuits & Static Electricity	SP12/13: Magnetism and Electromagnetic Induction	SP14/15: Particle Model & Forces and Matter

Links with the KS2 National Curriculum

Limehurst Science Department

KS2 Science: What they know and how we build upon this

The following slides contain the outline for the KS2 National Curriculum.

This is the basis from which all Primary schools build their Science curriculum and what we assume all pupils will bring knowledge-wise when they arrive at Limehurst.

We realise that whilst most pupils will bring this knowledge with them, many pupils may have gaps in their knowledge due to absence, exclusion, or a host of other reasons.

Therefore when we start to teach any topic with a “This is what you should know” section.

Included on these slides is also the modules that we teach here and how they build upon the knowledge pupils bring with them.

Working Scientifically

KS2 Science: What they know and how we build upon this

Pupils at regular intervals are asked to plan investigations that require significant planning, including use of dependant, independent and control variables.

The lighting fires module in Year 7 covers equipment used for measurement and all of the equipment is regularly used through KS3.

Every opportunity is taken to construct tables and graphs in lessons.

Hypotheses are made from supporting data with guidance from staff in KS3 with the aim that pupils can make their own in KS4

Conclusions are made at the end of each module and the idea of reliable, valid data is built upon throughout KS3.

AS previously mentioned the idea of reliable, valid data is built upon throughout KS3.

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments.

Significant amounts of practical work is conducted in KS3 as this is often the area that Primary schools struggle to provide well as lack of expertise and equipment is often an issue. These skills are built upon throughout the KS3 Curriculum.

Year 5/6

KS2 Science: What they know and how we build upon this

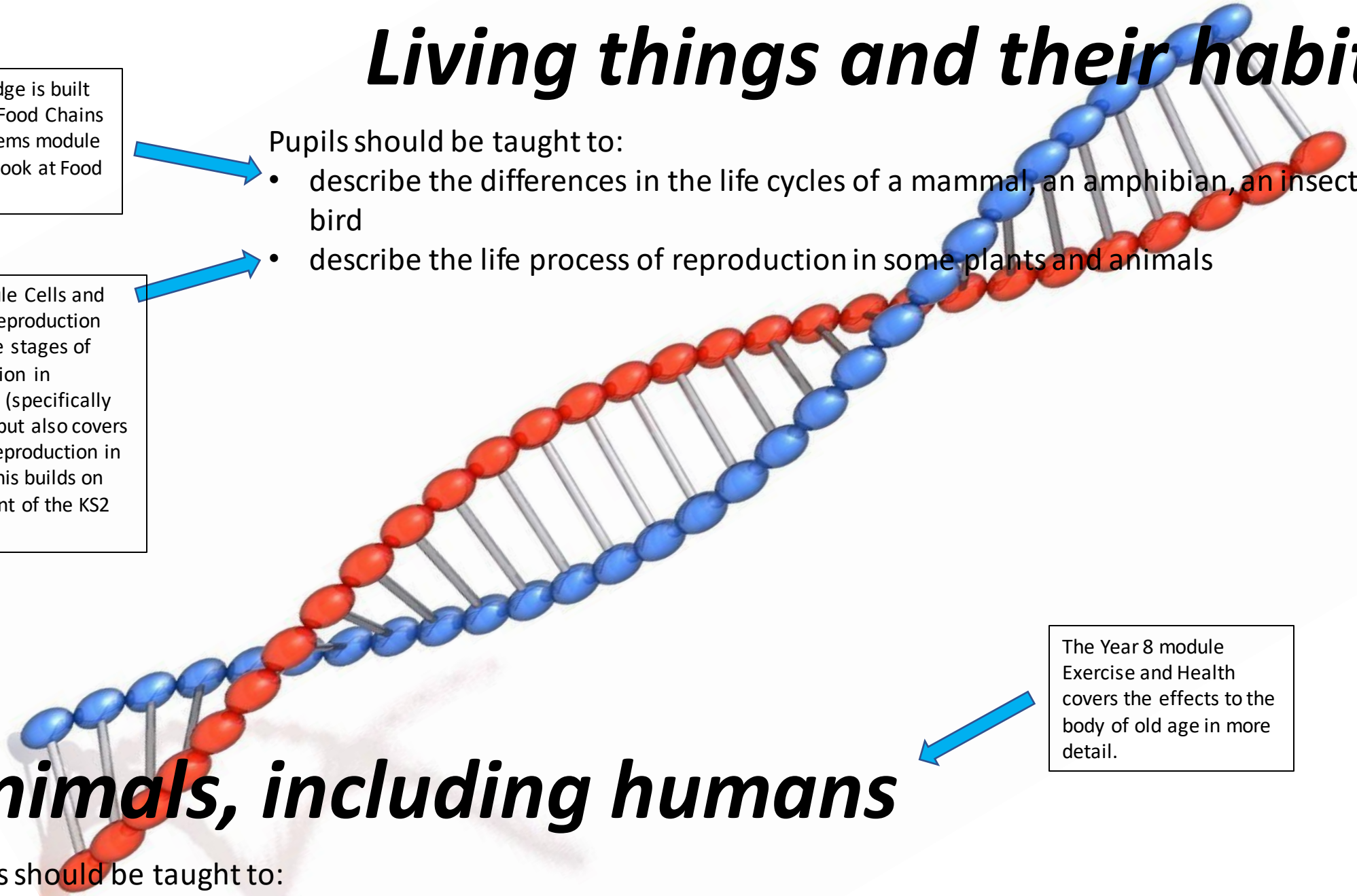
Living things and their habitats

This knowledge is built upon in the Food Chains and Ecosystems module where they look at Food Webs.

Pupils should be taught to:

- describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- describe the life process of reproduction in some plants and animals

The module Cells and Human Reproduction covers the stages of reproduction in mammals (specifically humans) but also covers asexual reproduction in plants. This builds on the content of the KS2 area.



Animals, including humans

The Year 8 module Exercise and Health covers the effects to the body of old age in more detail.

Pupils should be taught to:

- describe the changes as humans develop to old age.

Year 5

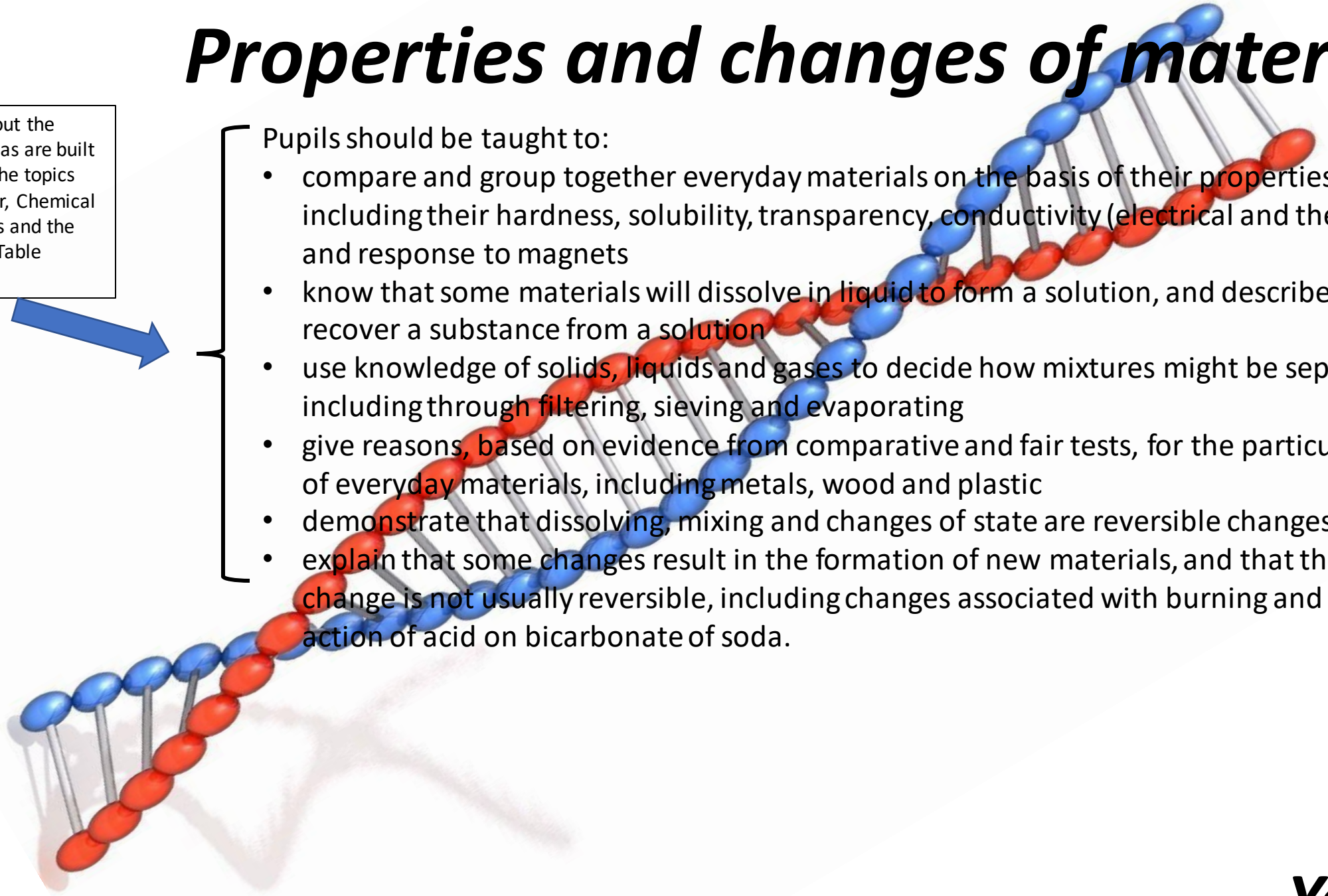
KS2 Science: What they know and how we build upon this

Properties and changes of materials

Ideas about the these ideas are built upon in the topics on Matter, Chemical Reactions and the Periodic Table Modules.

Pupils should be taught to:

- compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- demonstrate that dissolving, mixing and changes of state are reversible changes
- explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.



Year 5

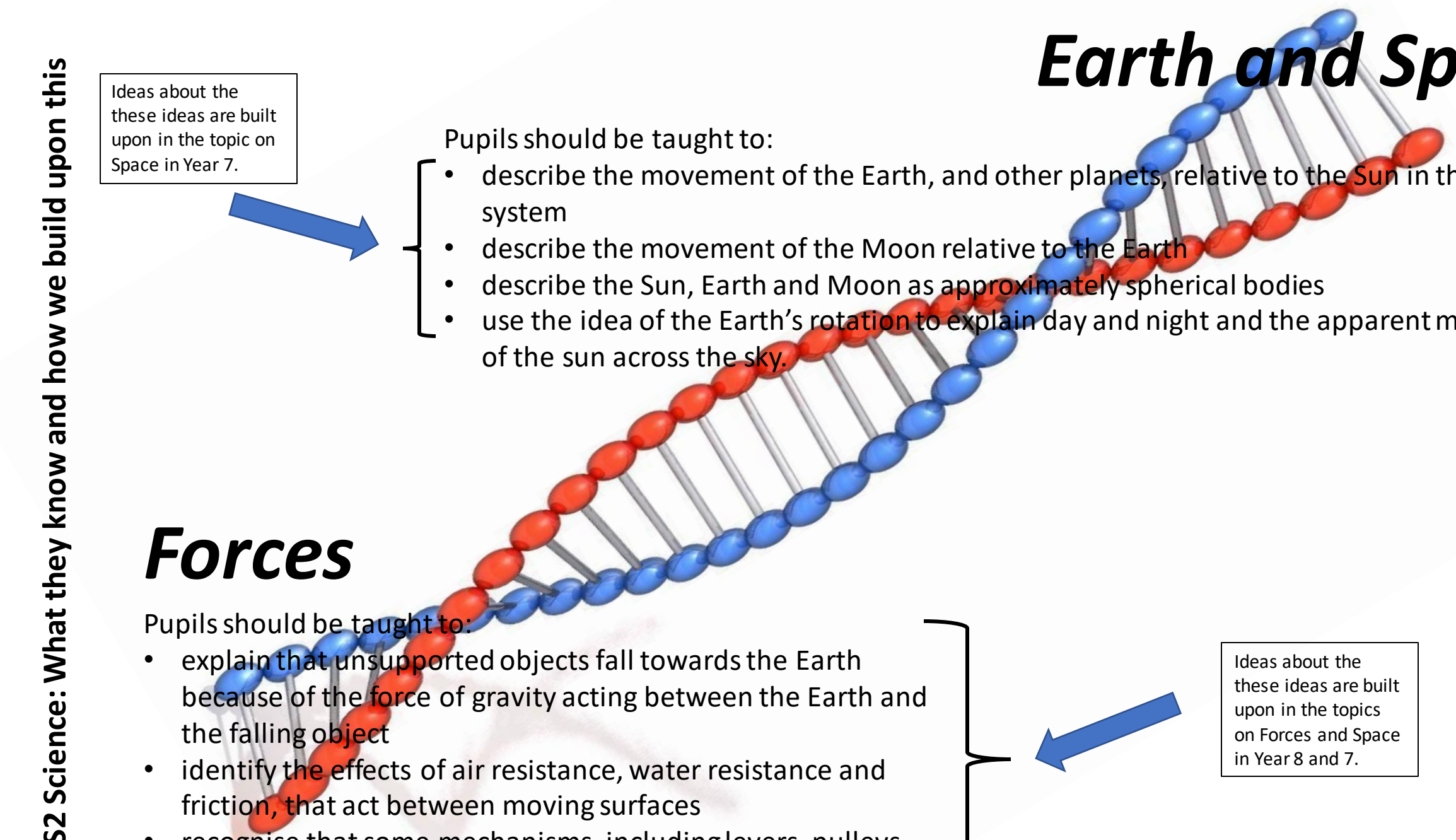
KS2 Science: What they know and how we build upon this

Earth and Space

Ideas about the these ideas are built upon in the topic on Space in Year 7.

Pupils should be taught to:

- describe the movement of the Earth, and other planets, relative to the Sun in the solar system
- describe the movement of the Moon relative to the Earth
- describe the Sun, Earth and Moon as approximately spherical bodies
- use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.



Forces

Pupils should be taught to:

- explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Ideas about the these ideas are built upon in the topics on Forces and Space in Year 8 and 7.

Year 5

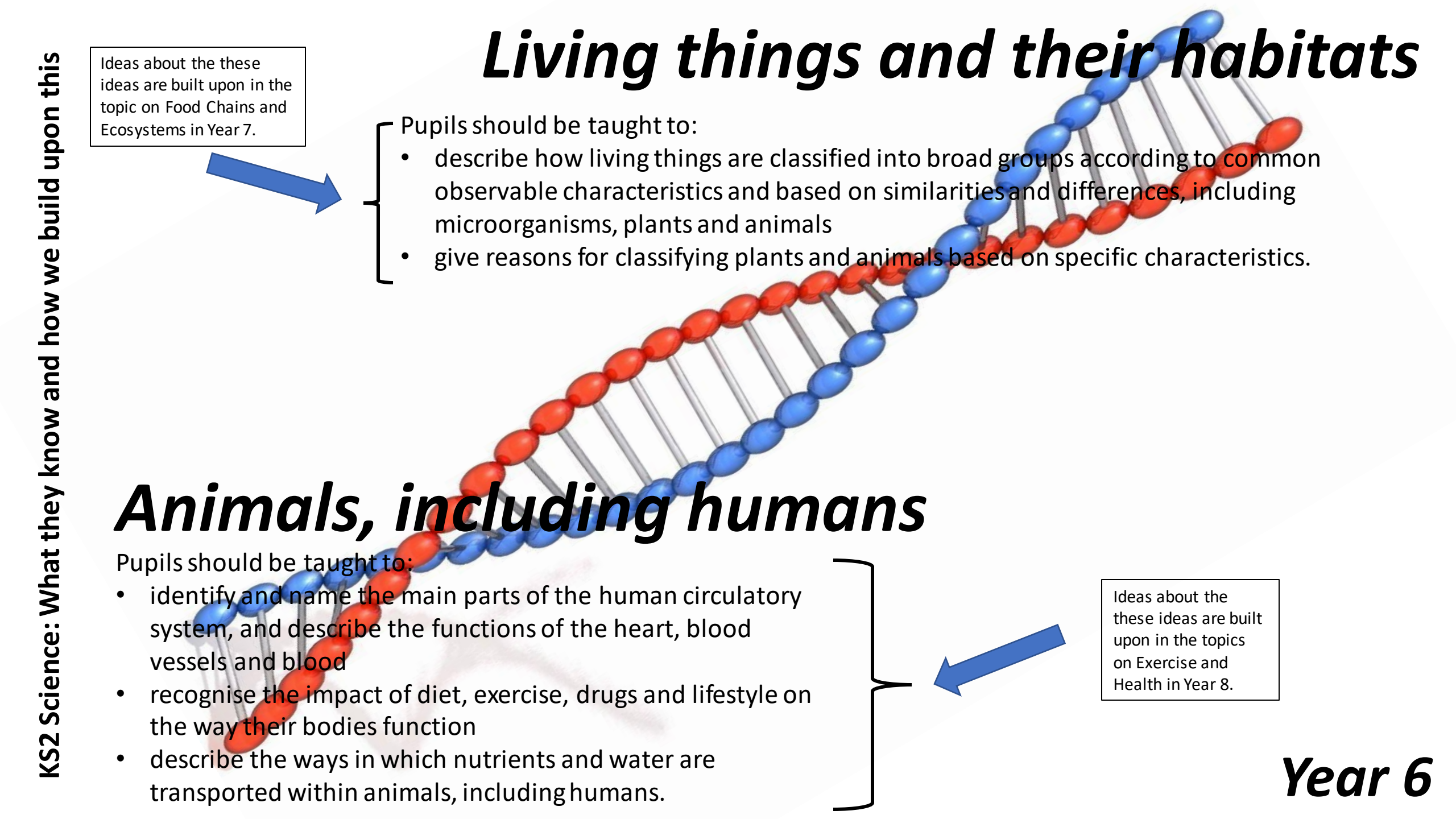
KS2 Science: What they know and how we build upon this

Living things and their habitats

Ideas about the these ideas are built upon in the topic on Food Chains and Ecosystems in Year 7.

Pupils should be taught to:

- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals
- give reasons for classifying plants and animals based on specific characteristics.



Animals, including humans

Pupils should be taught to:

- identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- describe the ways in which nutrients and water are transported within animals, including humans.

Ideas about the these ideas are built upon in the topics on Exercise and Health in Year 8.

Year 6

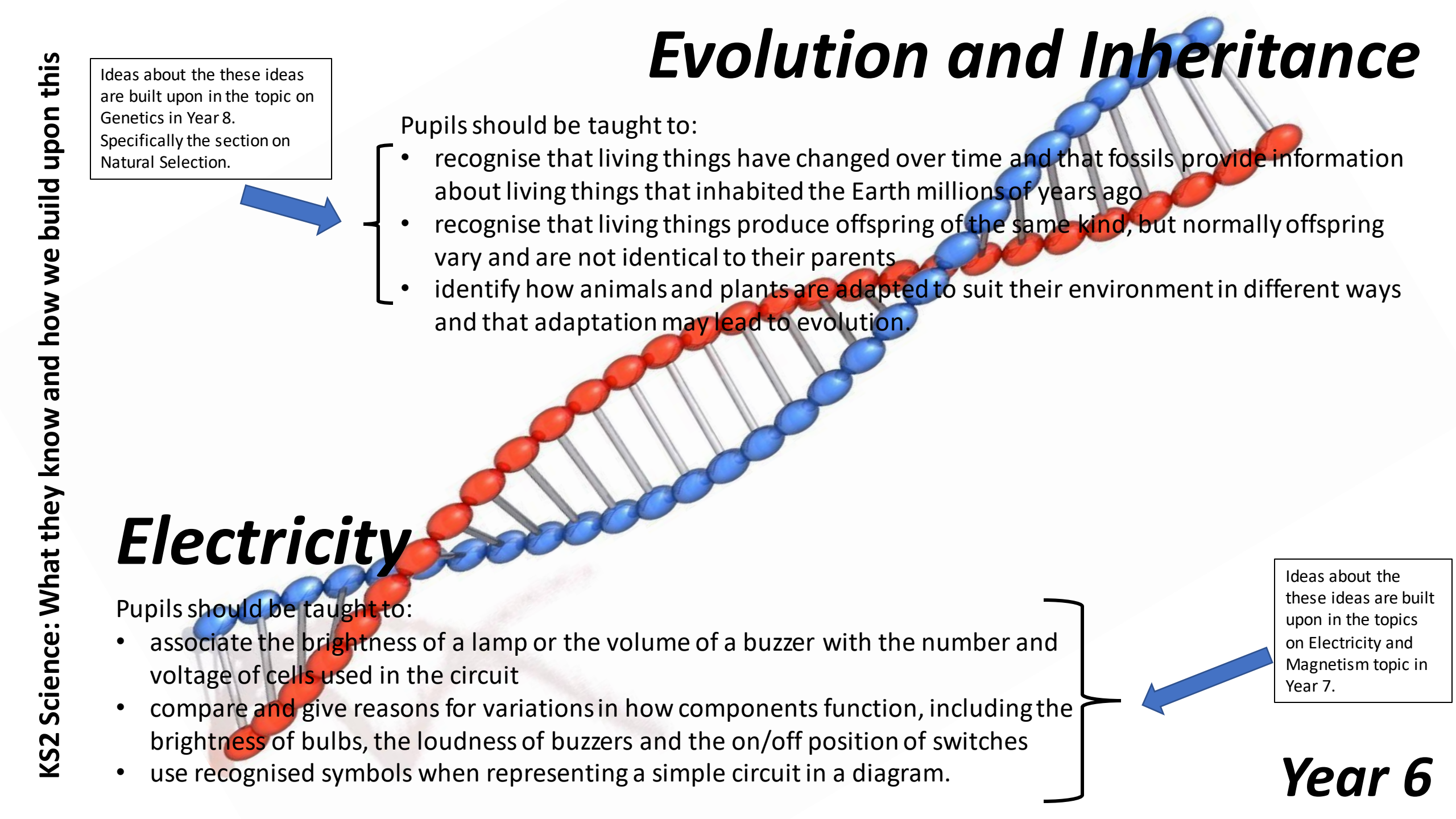
KS2 Science: What they know and how we build upon this

Evolution and Inheritance

Ideas about the these ideas are built upon in the topic on Genetics in Year 8. Specifically the section on Natural Selection.

Pupils should be taught to:

- recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.



Electricity

Pupils should be taught to:

- associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
- use recognised symbols when representing a simple circuit in a diagram.

Ideas about the these ideas are built upon in the topics on Electricity and Magnetism topic in Year 7.

Year 6

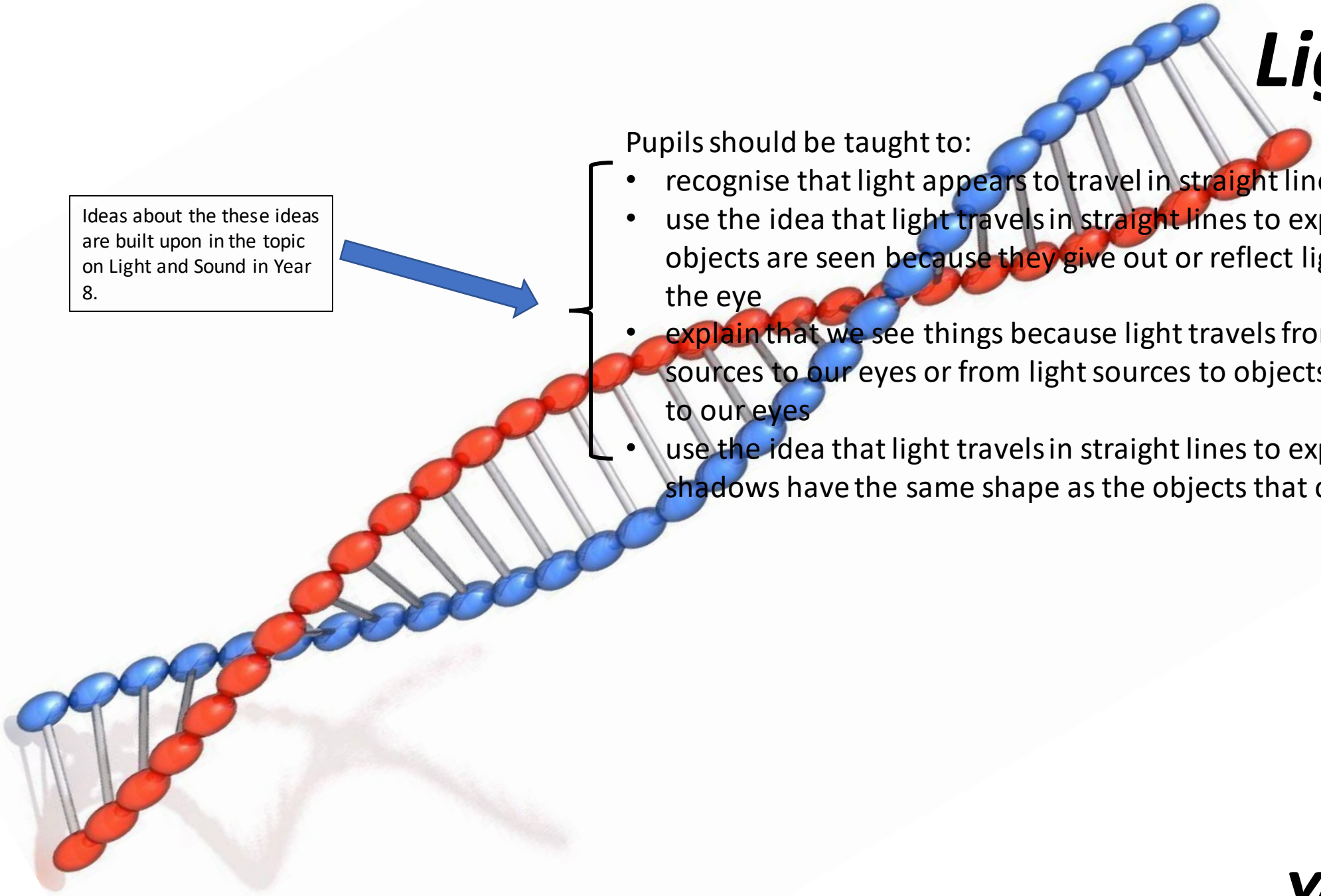
KS2 Science: What they know and how we build upon this

Light

Ideas about the these ideas are built upon in the topic on Light and Sound in Year 8.

Pupils should be taught to:

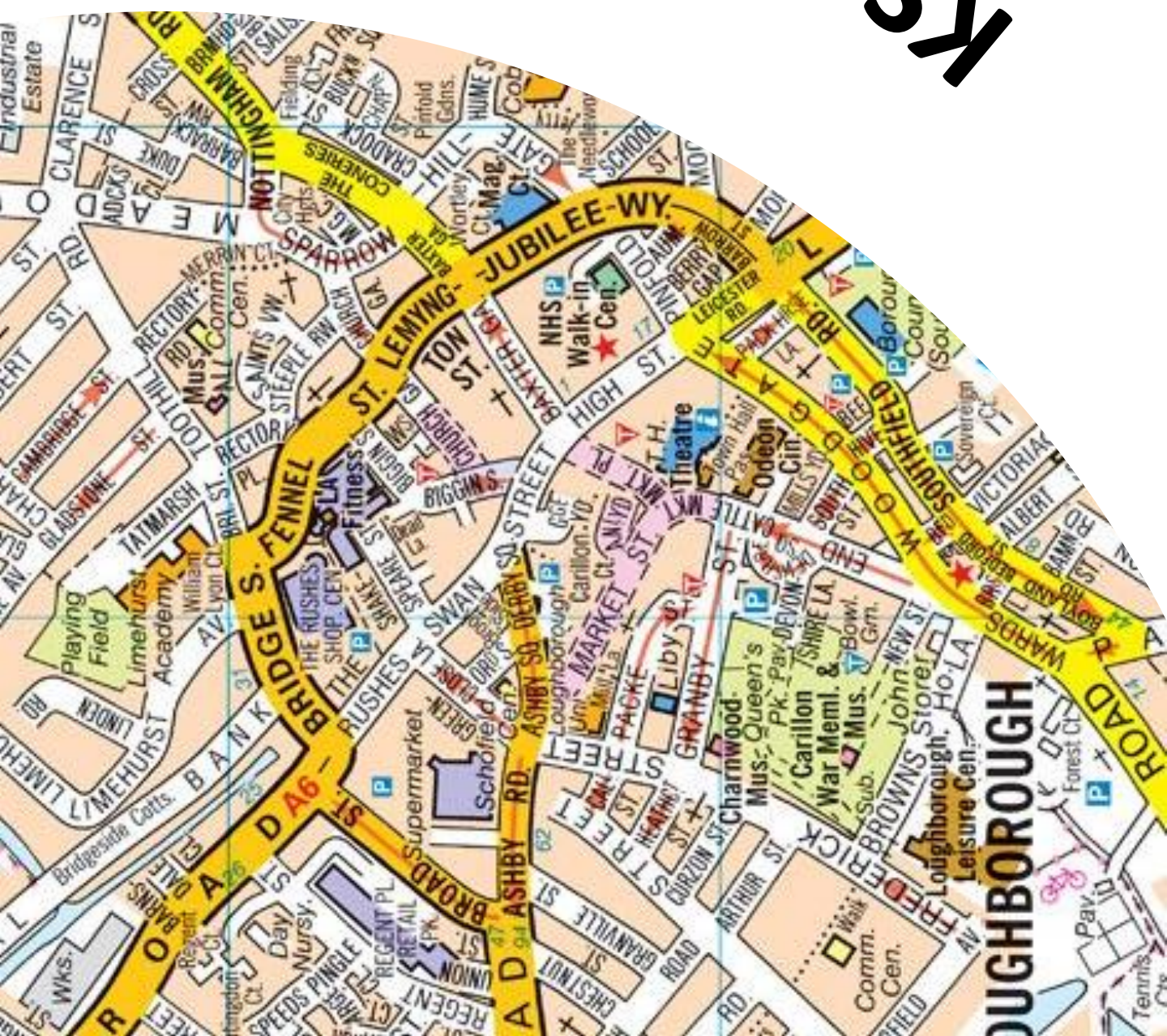
- recognise that light appears to travel in straight lines
- use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them



Year 6

Limehurst Science Department

KS3 – Lighting Fires



Lighting Fires

KS3 Science: Staring the year in 7, 8 and 9

At the start of years 7, 8 and 9 we complete a short project designed to enthuse the pupils and "turn them on" to the subject. This hopefully will increase engagement to what can be a very demanding subject for a lot of pupils. Below are details of the projects completed in each of the year groups

Year 7

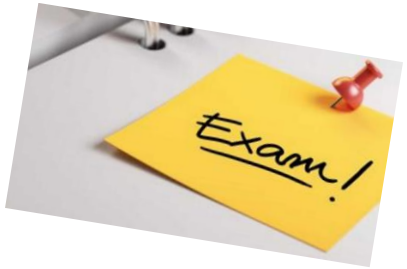
Pupils complete a "Science Passport" which when completed will allow them to use all of the common equipment in the lab safely.

Year 8

Pupils complete 2 projects (each takes 2 weeks to complete). The first one they have to design and build a system to safely transport tomatoes, the second challenges them to turn waste plastic into profit.

Year 9

The year project is an introduction to life in GCSE. In this project pupils will complete several GCSE practical tasks including their first ever "Core Practical" which form an important part of their GCSE exams in the future.



Year 7, 8 & 9

KS3 Science

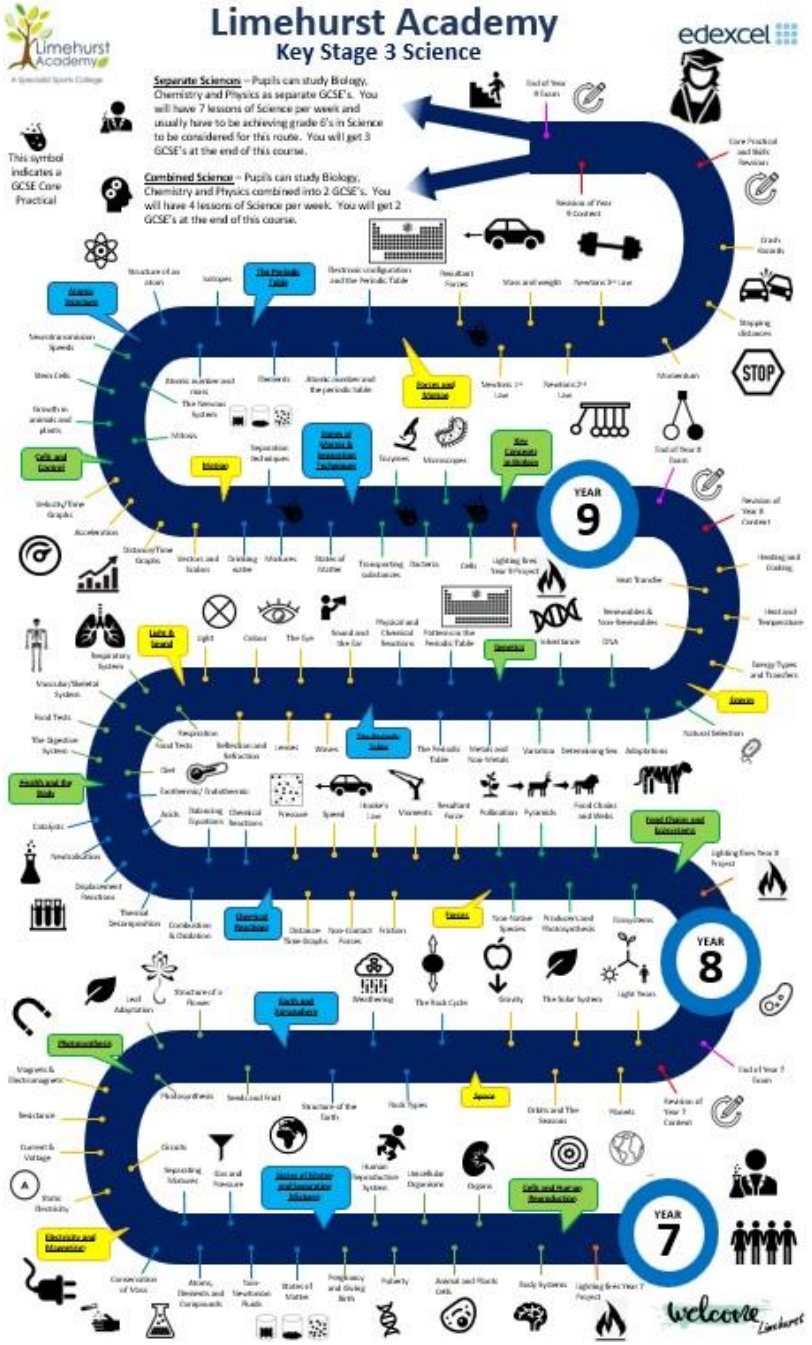
Intent & Implementation

Limehurst Science Department

Intent – A summary

Science teaching at Limehurst Academy aims to give all children a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically, to gain an understanding of scientific processes and also an understanding of the uses and implications of Science today and for the future.

The Science department delivers a course that not only fulfils all the requirements of the National Curriculum, but also looks towards to the new GCSEs, helping to lay secure foundations for work in Years 9, 10 and 11. With the changes to terminally examined GCSEs, their increasing focus on the application of ideas and their amplified requirements for maths, literacy and communication, we have integrated these skills into the whole of our Key Stage 3 course. This means that, from the start of Year 7, students will steadily grow in confidence when using mathematical skills, thinking scientifically and communicating their ideas clearly and logically.



Implementation – A summary

At KS3, Science is taught in distinct units. Each unit is designed to take a similar amount of teaching time. This means that even though teachers will endeavour to keep to the roadmap they can alter the order the units are taught in when necessary, taking pressure off the resources available. Students will need help with things such as measuring, graph plotting and so on at different stages in their studies, these are dealt with via the comprehensive range of “Skills” delivered throughout the units. Ideas introduced earlier in the course are further reinforced and extended throughout the course, allowing students to revisit material on a regular basis and therefore progress in their knowledge and skills.

Each unit is assessed to check that students are making the progress expected of them. Monitoring every student’s progress is of key importance to ensure no learner gets left behind or ‘stuck’ in the Key Stage. At KS3, we use a range of materials to support formative and summative assessment, helping us to evaluate student progress and adapt teaching strategies accordingly.

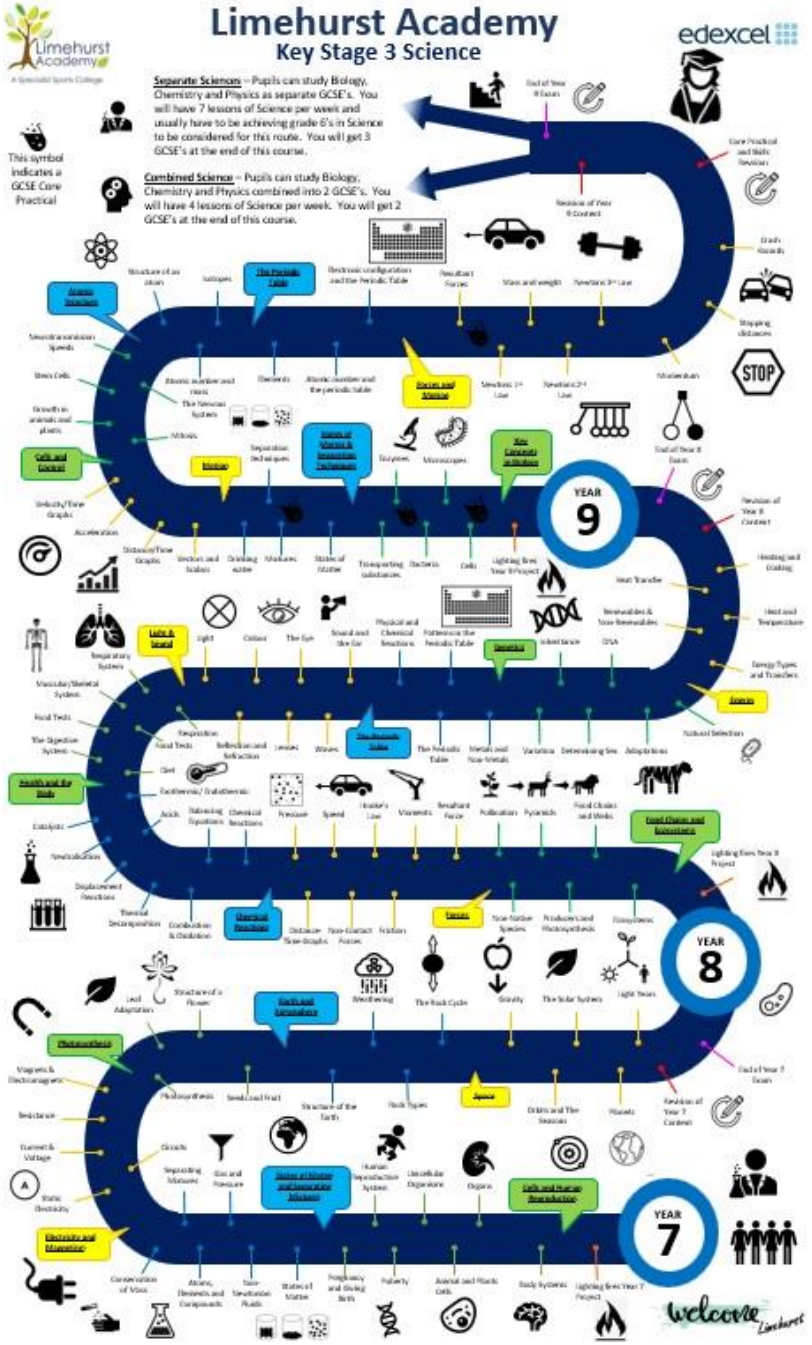
- Specialist vocabulary for topics is taught and built upon.
- Complex processes are broken down into smaller steps to aid students’ progression.
- Questioning is used to check understanding before moving on.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous leaming (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Teachers regularly use modelling. This could be modelling of a written answer, a calculation, or how to use practical equipment.
- Students receive regular verbal feedback as they complete tasks.
- To support progress with some more challenging work students are provided with a scaffold to help get them started and build confidence.
- Students will complete a mid-topic assessment, with feedback provided and time used to address areas of weakness.
- Students complete end of module tests for each topic, with feedback provided and time used to address areas of weakness.
- Students complete end of year assessments at the end of Y7 and Y8.

Impact – A summary

Students assessment scores (end of topic and mid-topic) are entered on to a Go4Schools database. Students are then given a score that allows us to see progress across the whole year group.

We use tracking data to celebrate the success of good progress and to put in place support for any students not making the expected progress. We keep previous years data to compare progress with that made by previous year groups.

At the end of key stage 3 students progress on to either GCSE Combined Science or GCSE Separate Sciences (Edexcel).



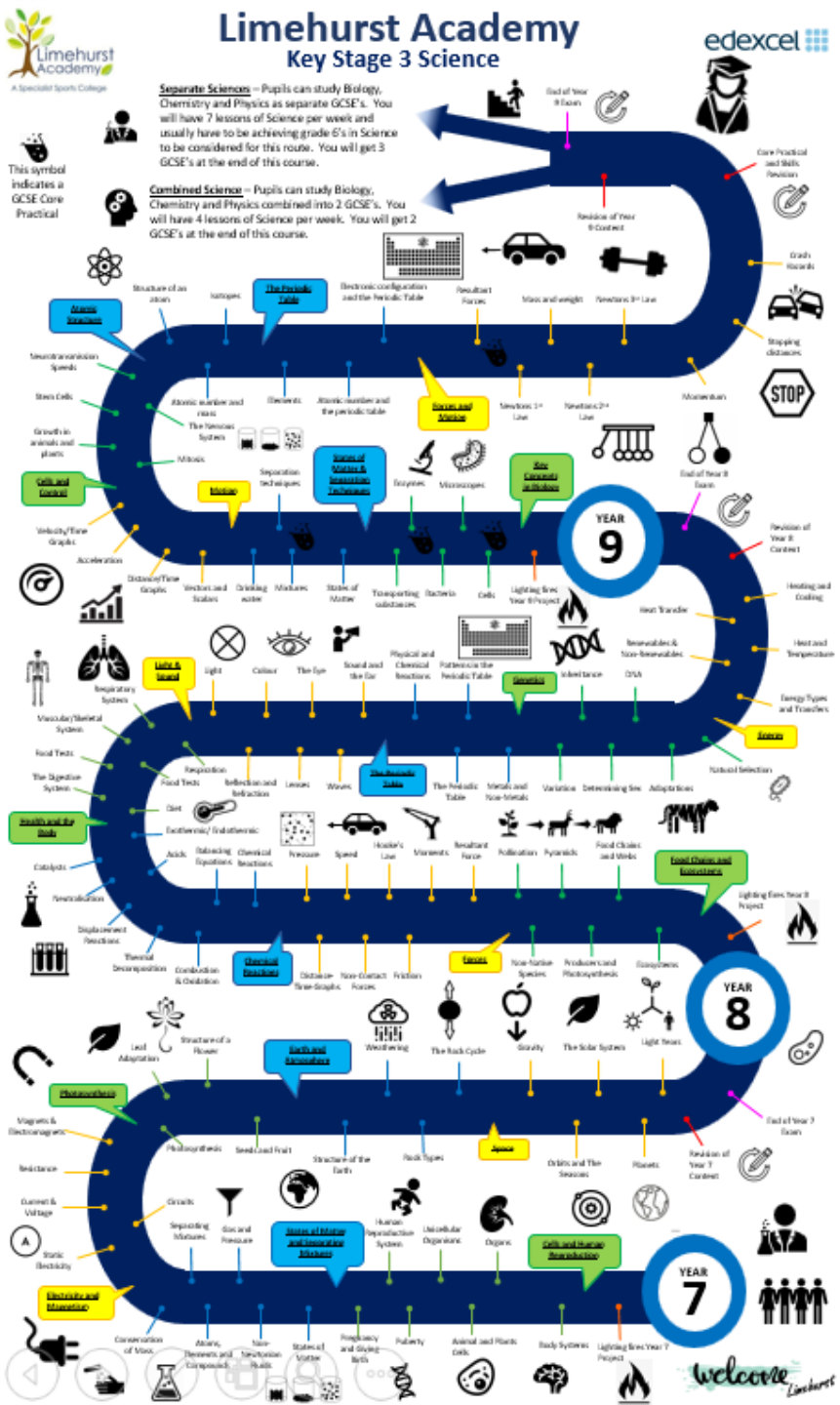
Challenge and Engagement

Ways in which our highest ability students are challenged in this subject (KS3):

1 Provision of extension work both during lesson and for homework
2 Challenging questions and discussion is common
3 Differentiated assessment on ability including homework and classwork tasks
4 The offer of various science enrichment trips
5 A consistent differentiated scheme of work on ability across the key stage.

Key ways in which we aim to engage and support all students in this subject (KS3)

1 Effective deployment of teaching staff to maximise the impact in teaching and learning
3 Revision resources made available for students
3 KS3 online resources signposted that allows pupils to recap as well as read ahead during their GCSEs
4 The offer of various science enrichment trips to engage and support
5 A consistent differentiated scheme of work on ability across the key stage



KS3 Science – Year 7

Cells and Human Reproduction

Knowledge acquired:

In this module you will learn about how plant and animal cells are adapted to there function and how they work together to allow life to flourish. You will also learn how plants and animals pass on there genetic information to the next generation.

Skills developed:

Practical Skills: How to use microscopes safely and effectively

Maths Skills: Calculating sizes of cells and working out a menstrual cycle.

Understanding (in this module you will learn about):

- cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope
- the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts
- the similarities and differences between plant and animal cells
- the role of diffusion in the movement of materials in and between cells (in body systems for the alveoli/gaseous exchange practical)
- the structural adaptations of some unicellular organisms
- the hierarchical organisation of multicellular organisms
- reproduction in humans and plants

Links to previous study (where applicable):

- KS2 Unit Living Things and their habitats.

Links to future study / the wider world (where applicable):

- Links with GCSE units Key Concepts in Biology. Explicit links made with work conducted in the NHS.

KS3 Science – Year 7

Cells and Human Reproduction

Number of lessons: 13

Sequence of lessons

Lesson	Lesson title
1	A&E Body Systems
2	Organs
3	Animal Cells
4	Plant Cells
5	Unicellular Organisms
6	Puberty
7	Human Reproductive System
8	Menstrual Cycle
9	Fertilisation
10	Pregnancy
11	Giving birth
12	Preparing for assessment/exams
13	End of Module Assessment

Main resources:

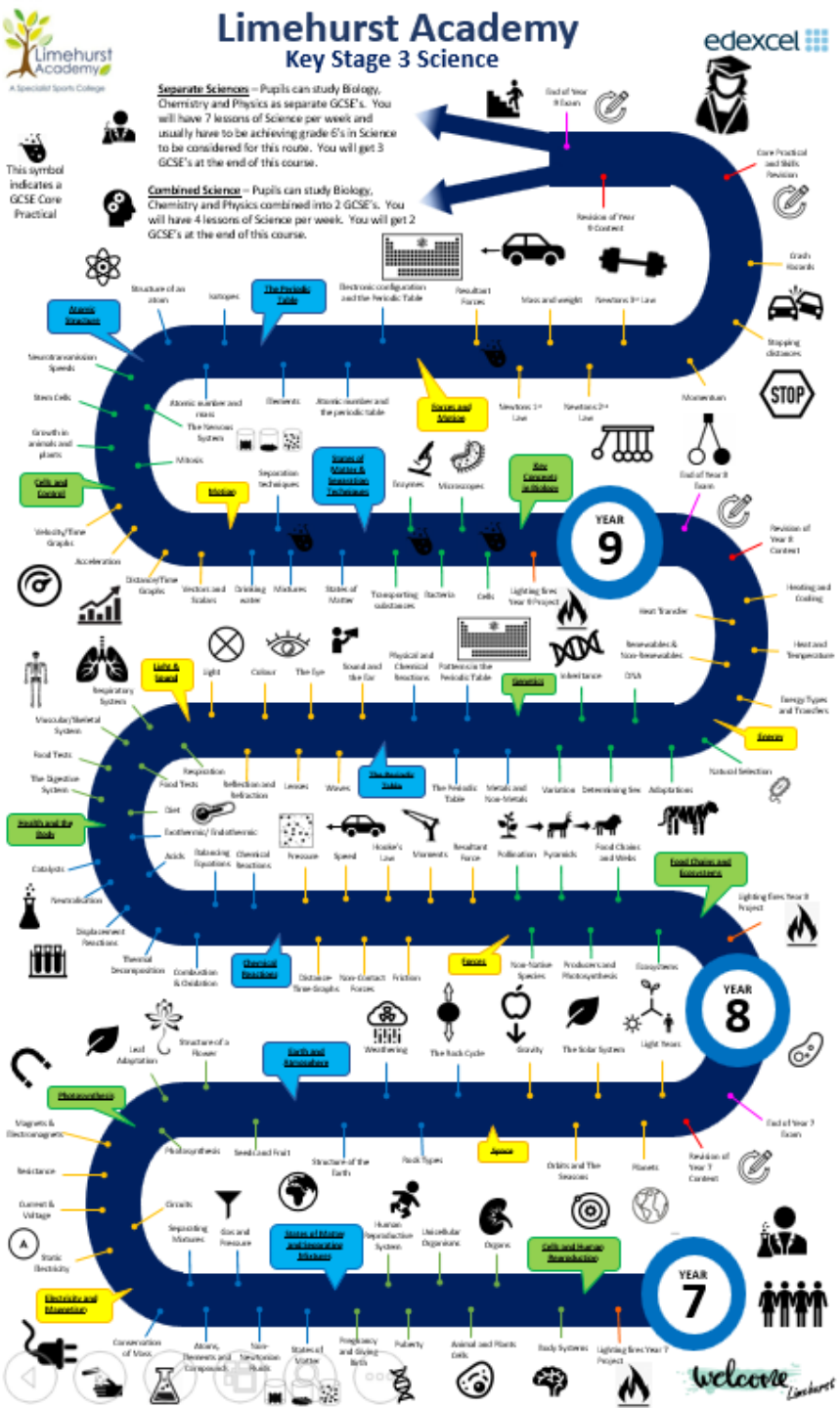
- PowerPoint presentations for each of the individual lessons.
- Worksheets that directly link to the PowerPoints.
- Use of online clips and programmes to enhance lessons.
- BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- Mid-topic assessment to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of an end of KS3 Assessment in Year 8.

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS3 Science – Year 7

Photosynthesis and Plant Reproduction

Knowledge acquired:

In this unit you will learn about how plants make their own food using the process photosynthesis and how they can spread their seeds over a wide area of land and sea.

Skills developed:

Practical Skills: Stomata counting, Photosynthesis Investigation, Flower dissection.

Maths Skills: Constructing and using charts and graphs.

Understanding (in this module you will learn about):

- How plants make there own food using energy from the sun
- How leaves are adapted to their function
- How flowers are adapted to their function
- How seeds and fruits are formed
- How seeds can be dispersed over a large area

Links to previous study (where applicable):

- KS2 Unit Living things and their habitats
- KS2 Working scientifically.

Links to future study / the wider world (where applicable):

- Links to the GCSE unit Photosynthesis. Links to lots of areas including farming and horticulture.

KS3 Science – Year 7

Photosynthesis and Plant Reproduction

Number of lessons: 8

Sequence of lessons

Lesson	Lesson title
1	Photosynthesis I
2	Photosynthesis II
3	Adaptations of the leaf
4	Structure of a flower
5	Seed and fruit formation
6	Seed dispersal
7	Preparing for assessment/exams
8	End of Module Assessment

Main resources:

- PowerPoint presentations for each of the individual lessons.
- Worksheets that directly link to the PowerPoints.
- Use of online clips and programmes to enhance lessons.
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Method(s) of assessment:

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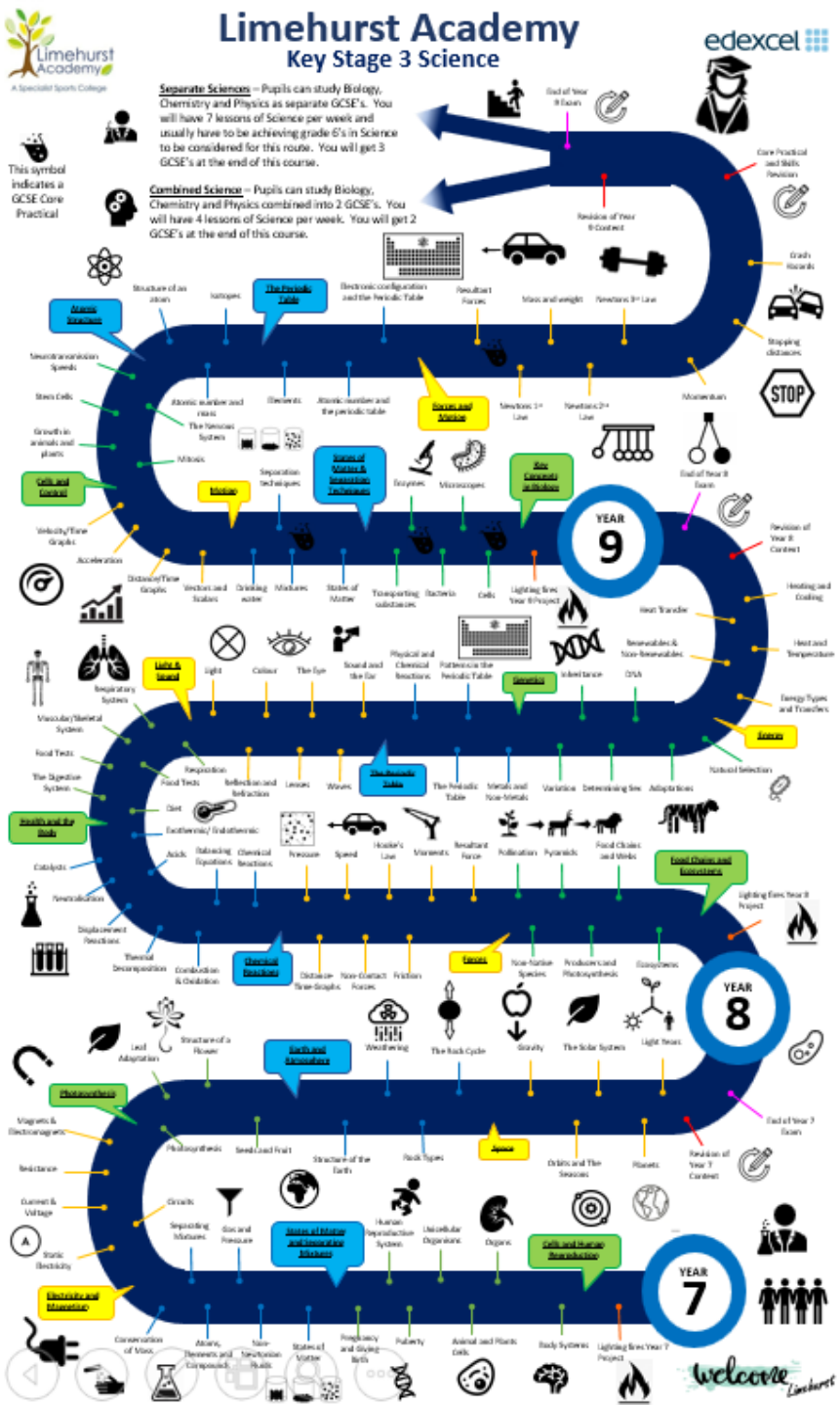

KS3 Science – Year 7

States of Matter, Elements, Compounds and Mixtures

Knowledge acquired:

In this unit you will find out about how scientists explain how solids, liquids and gases behave and how they classify them as elements, compounds and mixtures.

Skills developed:

Practical Skills: Chromatography, Distillation, Filtration, Changes of State, Diffusion practical.

Maths Skills: Working of changes in mass, constructing and interpreting tables and charts.

Understanding (in this module you will learn about):

- the properties of the different states of matter (solid, liquid and gas) in terms of the particle model
- changes of state in terms of the particle model.
- a simple (Dalton) atomic model
- differences between atoms, elements and compounds
- chemical symbols and formulae for elements and compounds
- conservation of mass changes of state and chemical reactions.
- the concept of a pure substance and mixtures, including dissolving.
- diffusion in terms of the particle model
- simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography

Links to previous study (where applicable):

- KS2 Unit Properties and uses of materials
- KS2 Unit Working Scientifically

Links to future study / the wider world (where applicable):

- Links to the GCSE module States of Matter and Separating Mixtures.

KS3 Science – Year 7

States of Matter, Elements, Compounds and Mixtures

Number of lessons: 14

Sequence of lessons

Lesson	Lesson title
1	States of Matter
2	Changes of State
3	Non-Newtonian Fluid
4	Gases and Pressure
5	Atoms and Elements
6	Compounds
7	Solutions
8	Filtration
9	Chromatography
10	Distillation
11	Diffusion
12	Conservation of Mass
13	Preparing for assessment/exams
14	End of Module Assessment

Main resources:

- PowerPoint presentations for each of the individual lessons.
- Worksheets that directly link to the PowerPoints.
- Use of online clips and programmes to enhance lessons.
- BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

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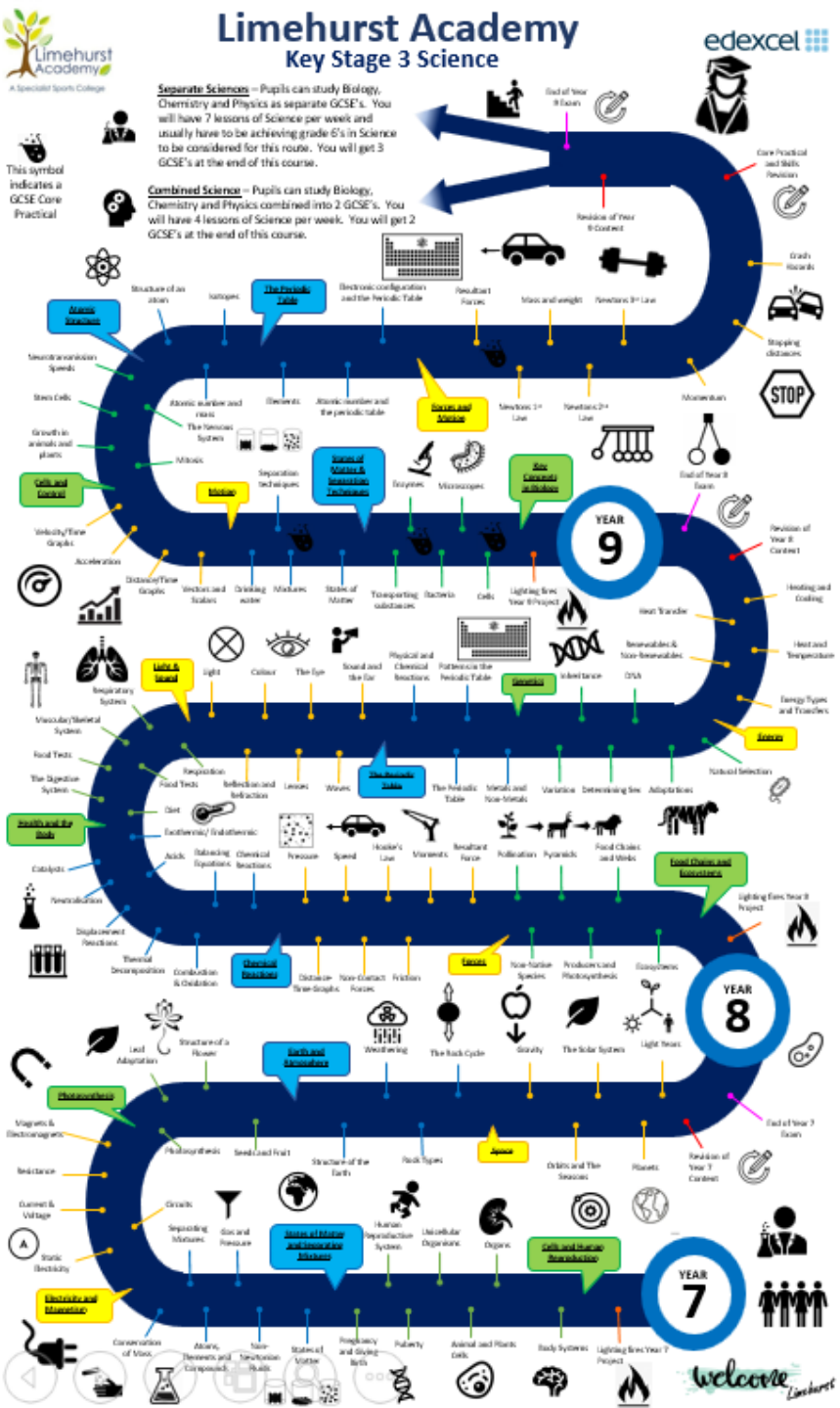


KS3 Science – Year 7

Earth and Atmosphere

Knowledge acquired:

In this unit you will find out about the internal structure of the Earth as well as how the rocks of which it's made are formed and altered over time.

Skills developed:

Practical Skills: Making sedimentary rocks, Salol practical.

Maths Skills: N/A

Understanding (in this module you will learn about):

- the composition of the Earth
- the structure of the Earth
- the rock cycle and the formation of igneous, sedimentary and metamorphic rocks
- Earth as a source of limited resources and the efficacy of recycling
- the carbon cycle
- the composition of the atmosphere
- the production of carbon dioxide by human activity and the impact on climate.

Links to previous study (where applicable):

- KS2 Unit Working Scientifically

Links to future study / the wider world (where applicable):

- Links to the GCSE unit the Earth and Atmosphere.

KS3 Science – Year 7

Earth and Atmosphere

Number of lessons: 10

Sequence of lessons

Lesson	Lesson title
1	Structure of the Earth
2	Weathering
3	Igneous Rock
4	Sedimentary Rock
5	Metamorphic Rock
6	The Rock Cycle
7	The Atmosphere
8	Climate Change
9	Preparing for assessment/exams
10	End of Module Assessment

Main resources:

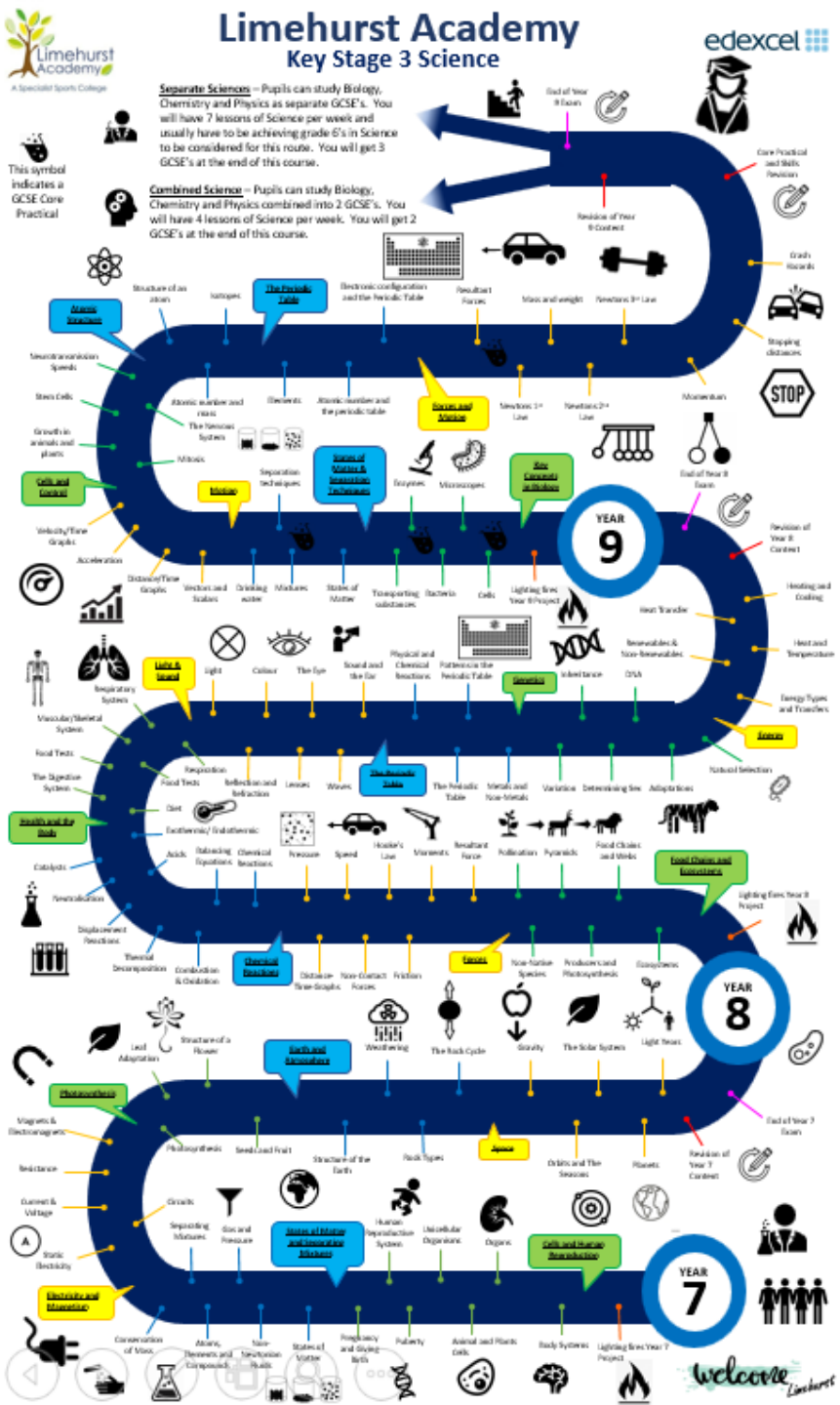
- PowerPoint presentations for each of the individual lessons.
- Worksheets that directly link to the PowerPoints.
- Use of online clips and programmes to enhance lessons.
- BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- Mid-topic assessment to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of an end of KS3 Assessment in Year 8.

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS3 Science – Year 7

Electricity and Magnetism

Knowledge acquired:

In this unit you will learn how we understand electricity and how we use its properties everyday. You will also learn how electricity and magnetism are linked and how we can exploit these phenomena.

Skills developed:

Practical Skills: Measuring current, voltage and resistance in a circuit. Measuring a magnetic field. Making electromagnets

Maths Skills: Using equations. Constructing and interpreting graphs and charts.

Understanding (in this module you will learn about):

- electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge
- potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current
- differences in resistance between conducting and insulating components
- separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects
- magnetic poles, attraction and repulsion and fields
- Earth's magnetism, compass and navigation
- the magnetic effect of a current, electromagnets, D.C. motors

Links to previous study (where applicable):

- KS2 Unit Electricity

Links to future study / the wider world (where applicable):

- Links to the GCSE module Electricity and Magnetism. Links to many areas of the real world e.g. lift construction.

KS3 Science – Year 7

Electricity and Magnetism

Number of lessons: 12

Sequence of lessons

Lesson	Lesson title
1	Static Electricity
2	Series circuits and current
3	Parallel circuits
4	Voltage
5	Modelling voltage and current
6	Resistance
7	Resistance Investigation
8	Magnets
9	Force Field
10	Electromagnets
11	Preparing for assessment/exams
12	End of Module Assessment

Main resources:

- PowerPoint presentations for each of the individual lessons.
- Worksheets that directly link to the PowerPoints.
- Use of online clips and programmes to enhance lessons.
- BBC bitesize for revision of each component.
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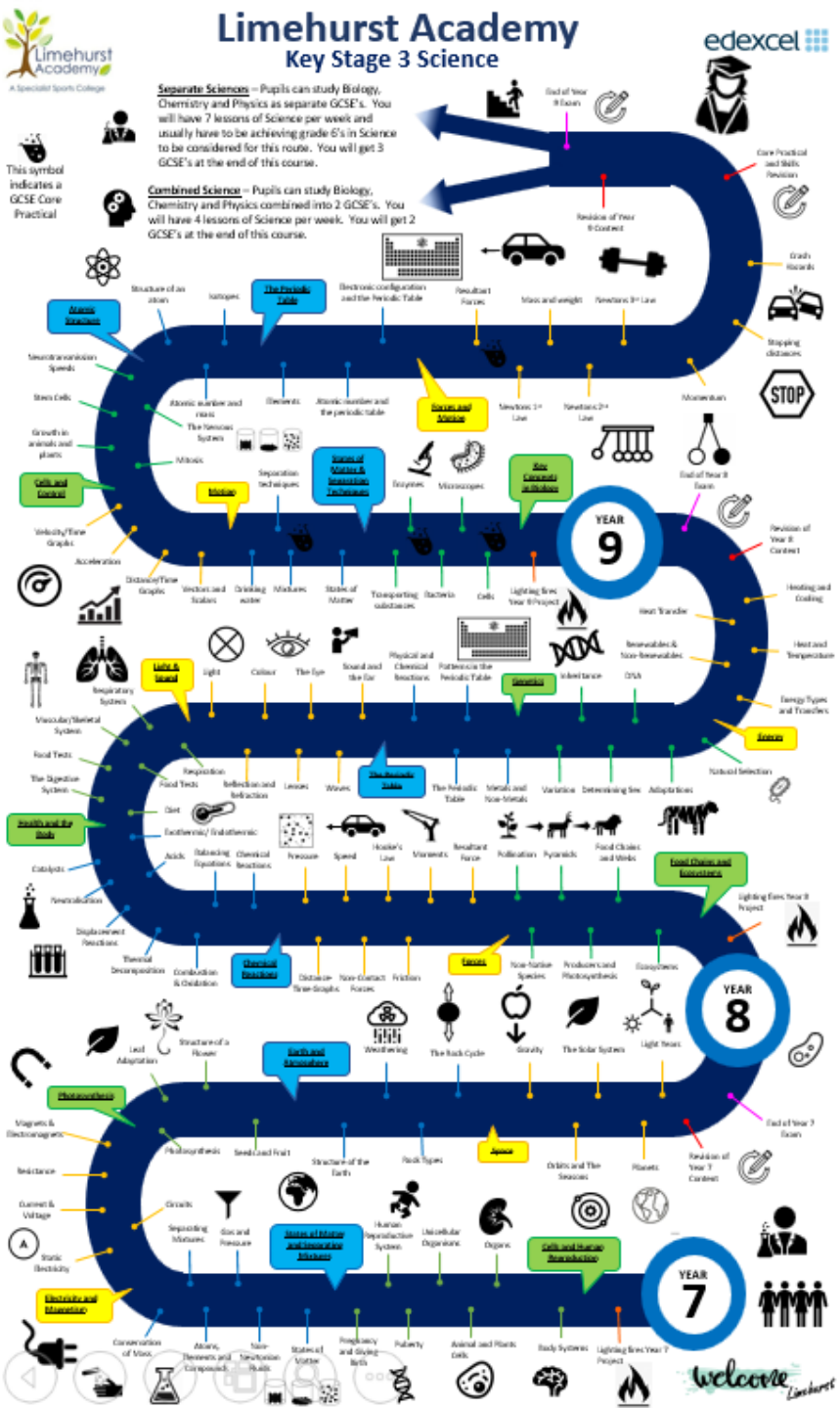

KS3 Science – Year 7

Space

Knowledge acquired:

In this unit you will learn about our place in the universe by looking at our solar system and beyond as well as the forces that hold it all together.

Skills developed:

Practical Skills: Measuring weight, a model solar system.

Maths Skills: Calculating weight using equations, working out distances using light years.

Understanding (in this module you will learn about):

- gravity force, weight = mass x gravitational field strength (g)
- on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun
- our Sun as a star, other stars in our galaxy, other galaxies
- the seasons and the Earth's tilt, day length at different times of year, in different hemispheres
- the light year as a unit of astronomical distance.

Links to previous study (where applicable):

- KS2 Unit Earth and Space

Links to future study / the wider world (where applicable):

- Links to the Separate Science Unit Astronomy. Links to many areas of work including meteorology and space exploration.

KS3 Science – Year 7

Space

Number of lessons: 6

Sequence of lessons

Lesson	Lesson title
1	Gravitiy
2	Orbit and the Seasons
3	The Sun and Solar System
4	Light Years and Planets
5	Preparing for assessment/exams
6	End of Module Assessment

Main resources:

- PowerPoint presentations for each of the individual lessons.
- Worksheets that directly link to the PowerPoints.
- Use of online clips and programmes to enhance lessons.
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- Practical equipment and individual workbooks for students.

Method(s) of assessment:

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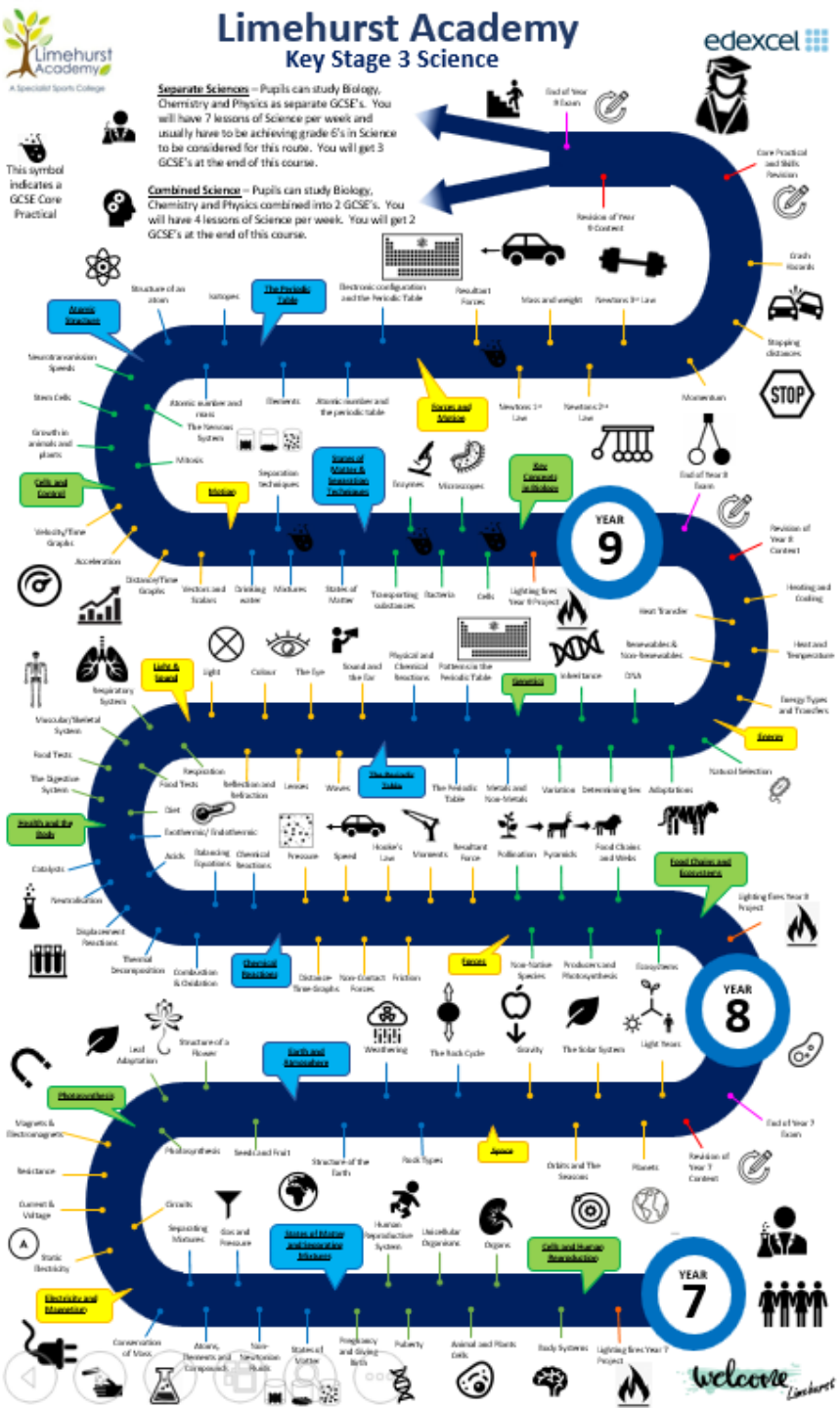

KS3 Science – Year 8

Food Chains and Ecosystems

Knowledge acquired:

In this unit you will learn how all of the organisms in an ecosystem interact with each other to reach a balanced state and how sometimes changes in this balance can lead to dramatic consequences.

Skills developed:

Practical Skills: Ecological techniques (e.g. Quadrats).

Maths Skills: Interpreting and constructing graphs. Forming accurate pyramids of number.

Understanding (in this module you will learn about):

- How to use key words like ecosystem and community correctly
- how animals and plants interact in food chains and webs
- What a producer is and why they are important
- About pyramids of biomass and number
- About the impact of bioaccumulation of toxins in the environment and why this is serious
- About pollination and its importance in food security.

Links to previous study (where applicable):

- Links to the Year 7 unit Photosynthesis and Plant Reproduction

Links to future study / the wider world (where applicable):

- Links to the GCSE unit Ecosystems. Links to many areas of work on ecology as well as being a very important topic for the future of the planet.

KS3 Science – Year 8

Food Chains and Ecosystems

Number of lessons: 10

Sequence of lessons

Lesson	Lesson title
1	Ecosystems
2	Food Chains and Webs
3	Producers and photosynthesis
4	Pyramids of Number
5	Non-native species
6	Bioaccumulation
7	Pollination
8	Pollinators and Food Security
9	Preparing for assessment/exams
10	End of Module Assessment

Main resources:

- PowerPoint presentations for each of the individual lessons.
- Worksheets that directly link to the PowerPoints.
- Use of online clips and programmes to enhance lessons.
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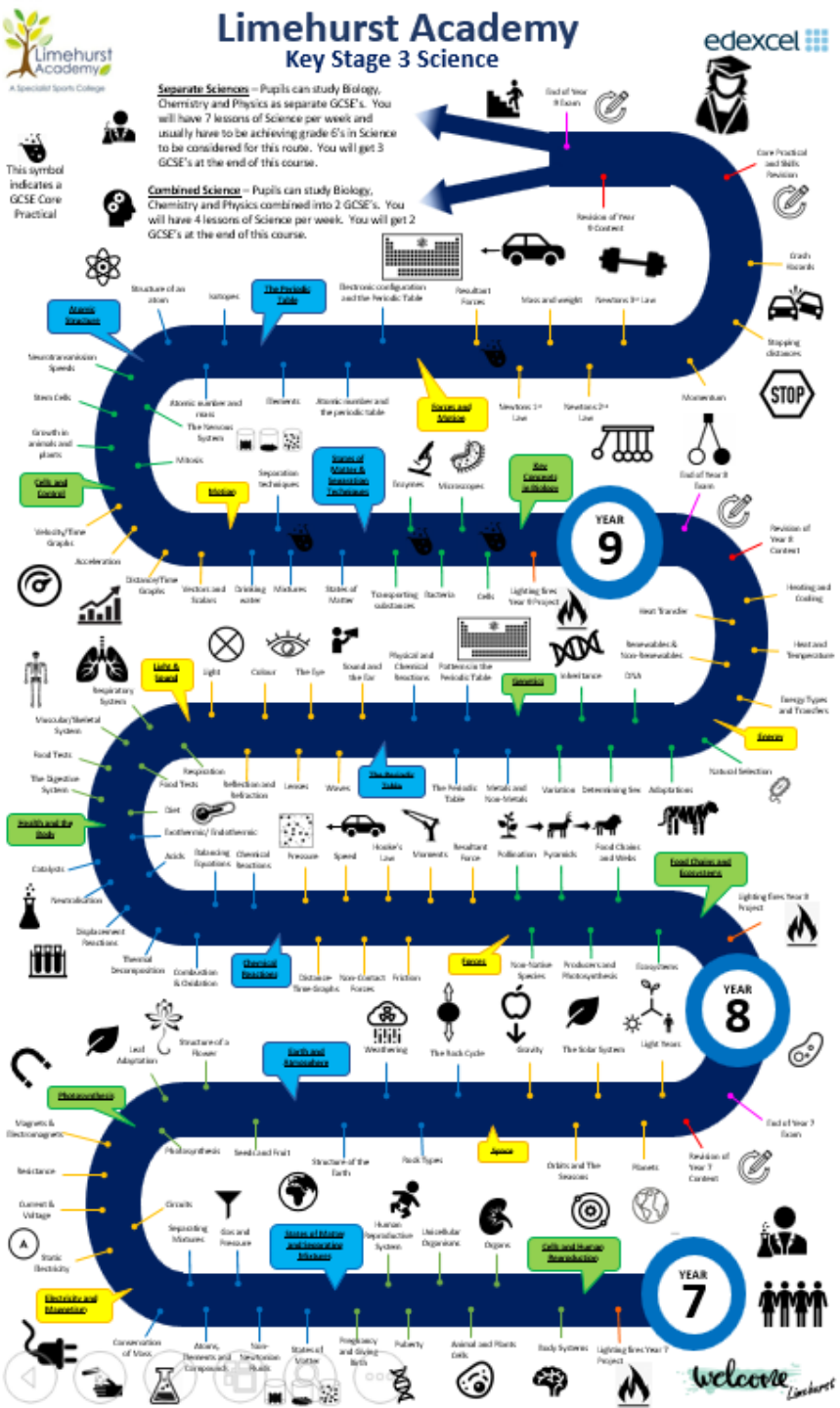

KS3 Science – Year 8

Health and The Body

Knowledge acquired:

In this unit we will be looking at the role of different systems in the body and why maintaing physical health is important.

Skills developed:

Practical Skills: Food Testing, Model Gut, Chicken wing dissection, Investigating Enzymes, Lung tissue diffusion.

Maths Skills: Interpreting and constructing graphs and charts.

Understanding (in this module you should):

- Be able to explain the composition and function of foods types.
  Be able to explain the impact of vitamin and mineral deficiencies
  Be able to explain the role of different organs in promoting digestion
  Be able to explain the uses of food testing
  Be able to explain that there are specific enzymes for different foods and their importance
  Be able to explain the functions of the skeleton
  Be able to explain the importance of surface area to rates of diffusion
  Be able to explain how our cells respire
  Be able to explain the impact of using drugs on health and society.

Links to previous study (where applicable):

Links to the Year 7 Unit Cells and Human Reproduction

Links to future study / the wider world (where applicable):

- Links to the GCSE unit on Aerobic and Anaerobic Respiration, and Health

KS3 Science – Year 8

Health and The Body

Number of lessons: 11

Sequence of lessons

Lesson	Lesson title
1	Healthy Diet
2	Unhealthy Diet
3	The Digestive System
4	Food Tests
5	Enzymes
6	Muscular and Skeletal System
7	Respiratory System
8	Aerobic Respiration
9	Anaerobic Respiration
10	Preparing for assessment/exams
11	End of Module Assessment

Main resources:

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- Worksheets that directly link to the PowerPoints.
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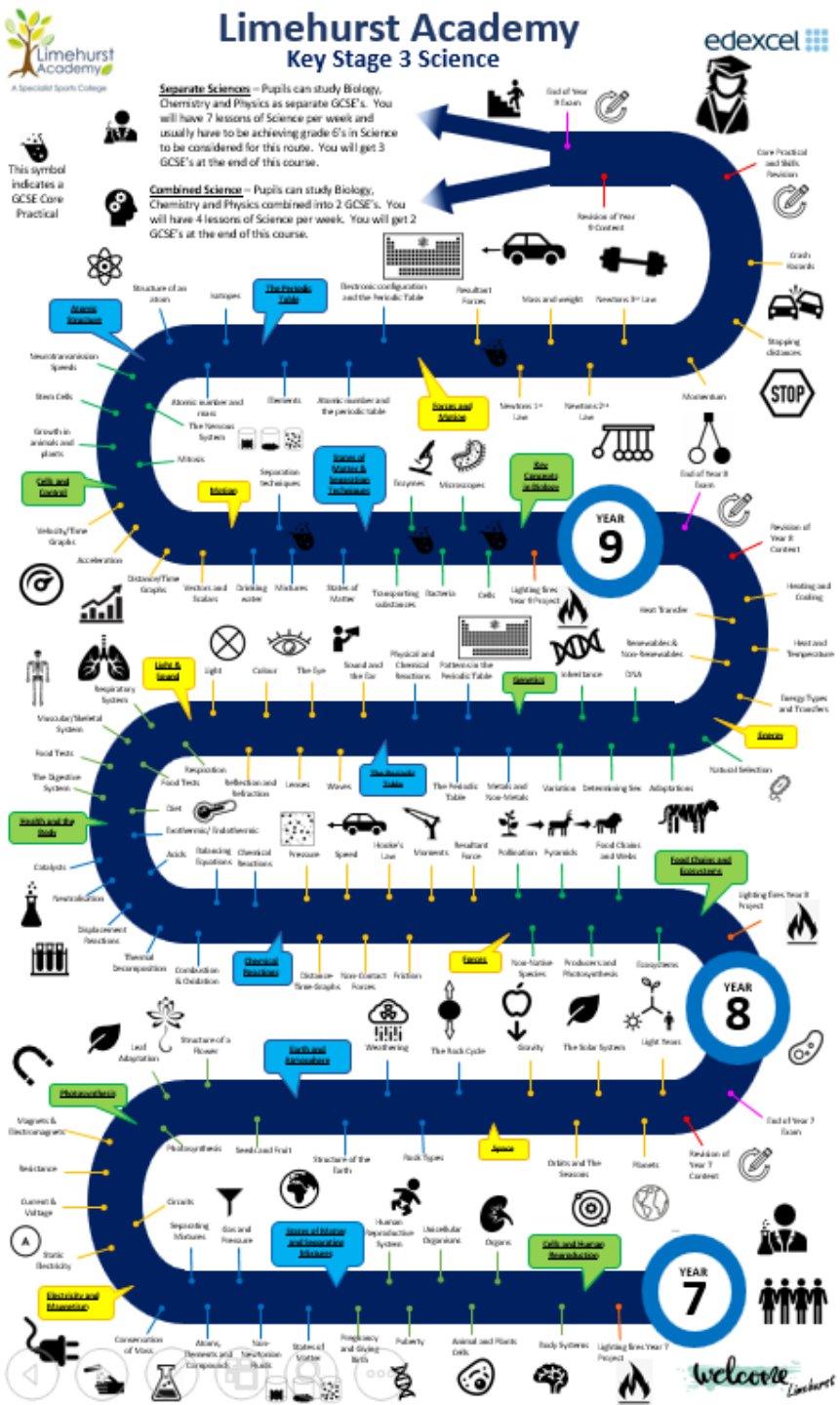

KS3 Science – Year 8

Genetics

Knowledge acquired:

In this unit you will discover how the human genome was first discovered, how it works and why this is so important in todays society.

Skills developed:

Practical Skills: DNA Extraction.

Maths Skills: Ratios and probabilities.

Understanding (in this module you will learn about):

- heredity as the process by which genetic information is transmitted from one generation to the next
- a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model
- differences between species
- the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation
- the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection
- changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction
- the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.

Links to previous study (where applicable):

- Links to the Year 7 Unit Cells and Human Reproduction.

Links to future study / the wider world (where applicable):

- Links to the GCSE Unit Genetics. Also links to many other relevant issues both in the world of work and society.

KS3 Science – Year 8

Genetics

Number of lessons: 10

Sequence of lessons

Lesson	Lesson title
1	Variation
2	Inheritance
3	Determining Sex
4	Genes and DNA
5	Discovery of DNA
6	Adaptations
7	Natural Selection
8	Biodiversity
9	Preparing for assessment/exams
10	End of Module Assessment

Main resources:

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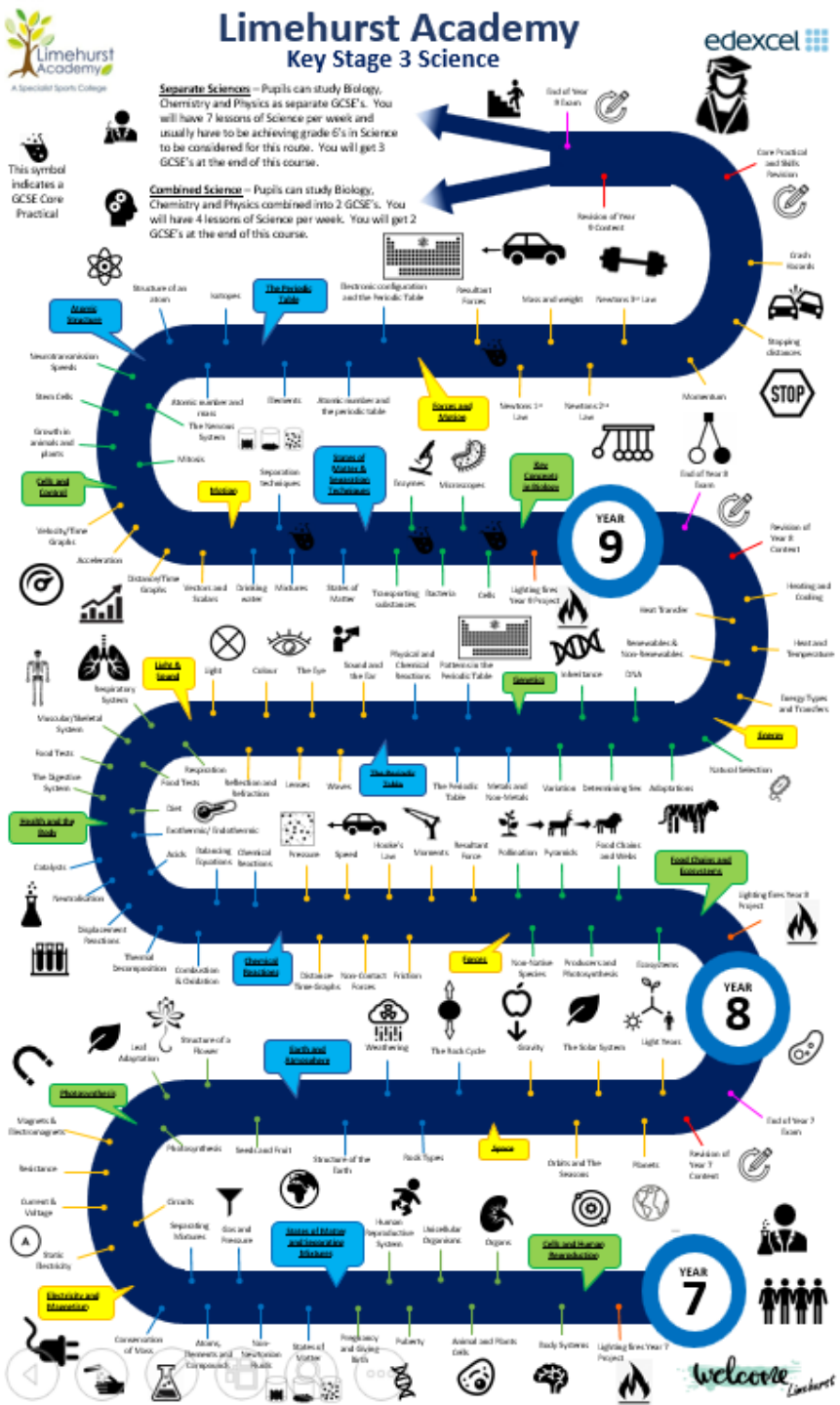

KS3 Science – Year 8

Chemical Reactions

Knowledge acquired:

In this unit you will find out about many different types of chemical reaction and how we can use these reactions usefully in real world situations.

Skills developed:

Practical Skills: Oxidation/Combustion/Neutralisation/Exothermic/Endothermic/Catalysed reactions all done.

Maths Skills: working out energy calculations, balancing equations.

Understanding (in this module you will learn about):

- chemical reactions as the rearrangement of atoms
- representing chemical reactions using formulae and using equations
- combustion, thermal decomposition, oxidation and displacement reactions
- defining acids and alkalis in terms of neutralisation reactions
- the pH scale for measuring acidity/alkalinity; and indicators
- reactions of acids with metals to produce a salt plus hydrogen
- reactions of acids with alkalis to produce a salt plus water
- what catalysts do.
- energy changes on changes of state (qualitative)
- exothermic and endothermic chemical reactions (qualitative).

Links to previous study (where applicable):

- Links to the KS2 Unit Properties and change of materials.

Links to future study / the wider world (where applicable):

- Links to the GCSE Units Acids and Alkalis and Rates of Reaction. It also links to many areas of work, e.g. chef.

KS3 Science – Year 8

Chemical Reactions

Number of lessons: 12

Sequence of lessons

Lesson	Lesson title
1	Chemical Reactions
2	Balancing equations
3	Combustion and Oxidation
4	Thermal Decomposition
5	Displacement reactions
6	Acid and metal Reactions
7	pH scale
8	Neutralisation Reactions
9	Catalysts
10	Exothermic & Endothermic Reaction's
11	Preparing for assessment/exams
12	End of Module Assessment

Main resources:

- PowerPoint presentations for each of the individual lessons.
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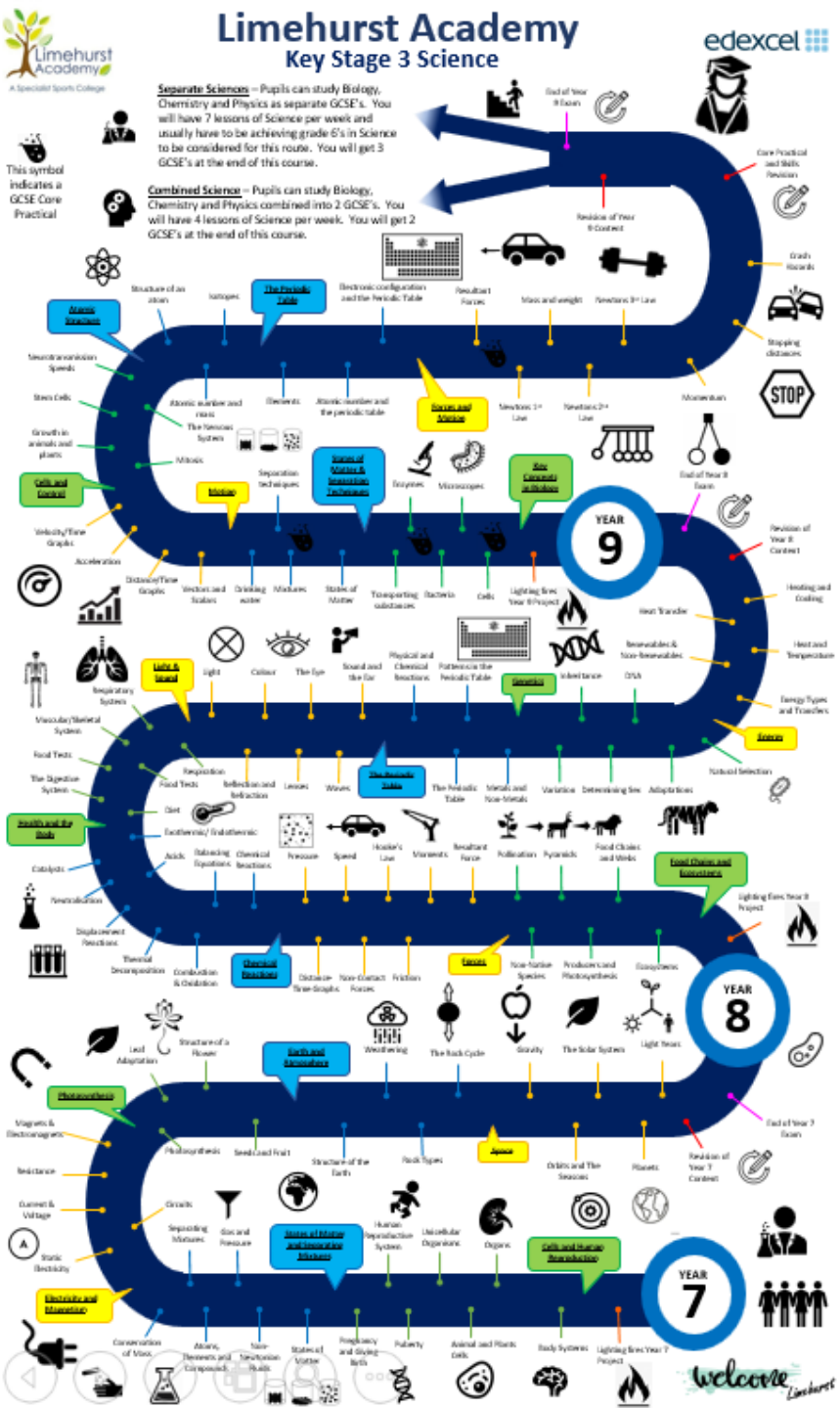

KS3 Science – Year 8

The Periodic Table

Knowledge acquired:

In this unit you will discover how the Periodic Table was constructed, the information held in it and why this is useful to scientists even today.

Skills developed:

Practical Skills: The Reactions of metals and non-metals.

Maths Skills: Using atomic number and mass

Understanding (in this module you will learn about):

- The varying physical and chemical properties of different elements
- The principles underpinning the Mendeleev Periodic Table
- The periodic table (period, groups, metals, non-metals)
- How patterns in reactions can be [predicted using the table
- The properties of metals and non-metals

Links to previous study (where applicable):

- Links to the Year 7 Unit on Elements, Mixtures and Compounds.

Links to future study / the wider world (where applicable):

- Links to the GCSE unit on The Periodic Table

KS3 Science – Year 8

The Periodic Table

Number of lessons: 8

Sequence of lessons

Lesson	Lesson title
1	Physical and Chemical Reactions
2	Early Periodic Table
3	Modern Periodic Table
4	Patterns in the Periodic Table
5	Metals and Non-metals
6	Reactions of Metals and Non-metals
7	Preparing for assessment/exams
8	End of Module Assessment

Main resources:

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- Worksheets that directly link to the PowerPoints.
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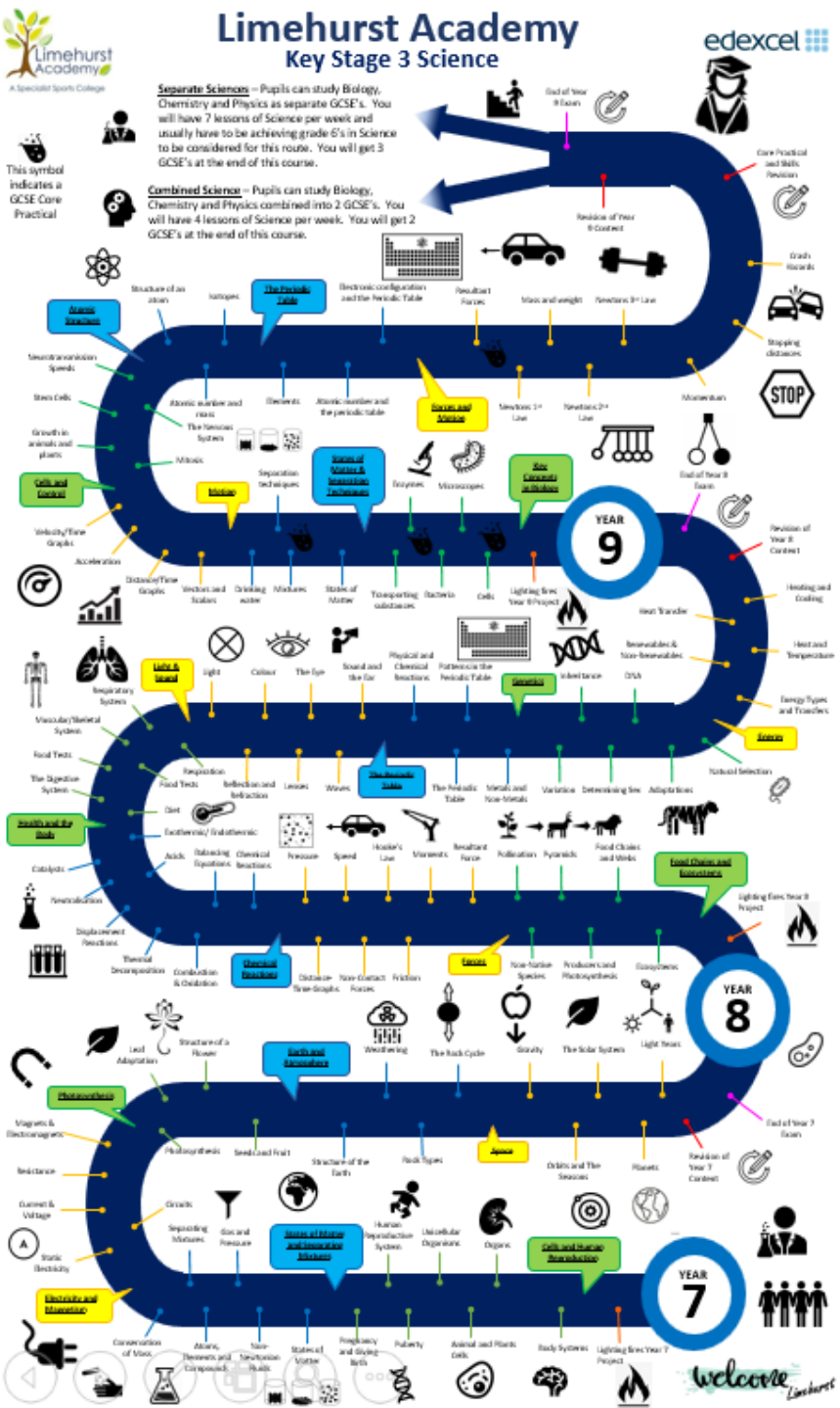

KS3 Science – Year 8

Forces

Knowledge acquired:

In this unit you will look into the different types of forces all around us and learn how we can harness them.

Skills developed:

Practical Skills: Investigating speed, Investigating forces.

Maths Skills: Using Equations, Constructing and Interpreting graphs

Understanding (in this module you will learn about):

- forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only)
- change depending on direction of force and its size.
- speed and the quantitative relationship between average speed, distance and time

- moment as the turning effect of a force
- forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water
- forces measured in Newton's, measurements of stretch or compression as force is changed
- work done and energy changes on deformation
- non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity.

Links to previous study (where applicable):

- Links to the KS2 Unit Forces

Links to future study / the wider world (where applicable):

- Links to the GCSE Units Forces and doing work, and Forces and Matter. Very important in industries like engineering

KS3 Science – Year 8

Forces

Number of lessons: 11

Sequence of lessons

Lesson	Lesson title
1	Resultant force
2	Moments
3	Friction
4	Hooke's Law
5	Non-contact forces
6	Bouncing balls
7	Speed
8	Distance/time Graphs
9	Pressure
10	Preparing for assessment/exams
11	End of Module Assessment

Main resources:

- PowerPoint presentations for each of the individual lessons.
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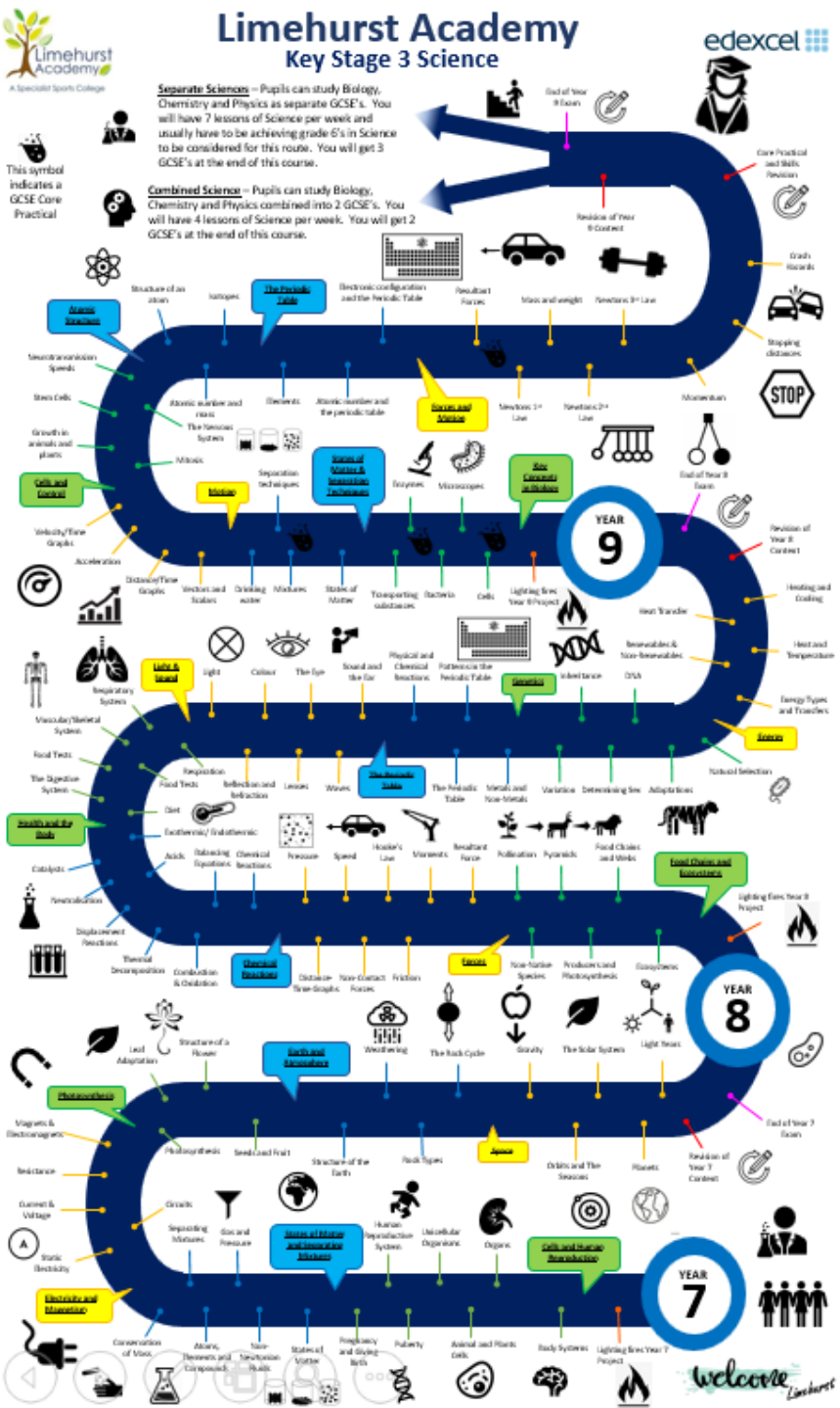

KS3 Science – Year 8

Light and Sound

Knowledge acquired:

In this unit you will learn what light is and how it behaves. You will also learn about how sound is created and how both are detected by the body.

Skills developed:

Practical Skills: Reflection and Refraction practical's, Colour practical's, Eye dissection, Detecting sound

Maths Skills: Angles, working out the speed of light and sound, interpreting graphs.

Understanding (in this module you will learn about):

- What light is and how it reacts
- About refraction and refraction.
- About the speed of light and colour.
- About how lenses affect light and how this knowledge can be used.
- About how our bodies detect light and sound.
- About how sound is formed and special types of sound (ultra and infra)

Links to previous study (where applicable):

- Links to the KS2 Unit Light.

Links to future study / the wider world (where applicable):

- Links to the GCSE Unit Light and the Electromagnetic Spectrum. Links to jobs such as optometry.

KS3 Science – Year 8

Light and Sound

Number of lessons: 12

Sequence of lessons

Lesson	Lesson title
1	Light
2	The Speed of Light
3	Reflection of Light
4	Refraction of Light
5	Colour and Energy Transfer
6	Lenses and Glasses
7	Eyes
8	Waves
9	Sound
10	The Ear
11	Preparing for assessment/exams
12	End of Module Assessment

Main resources:

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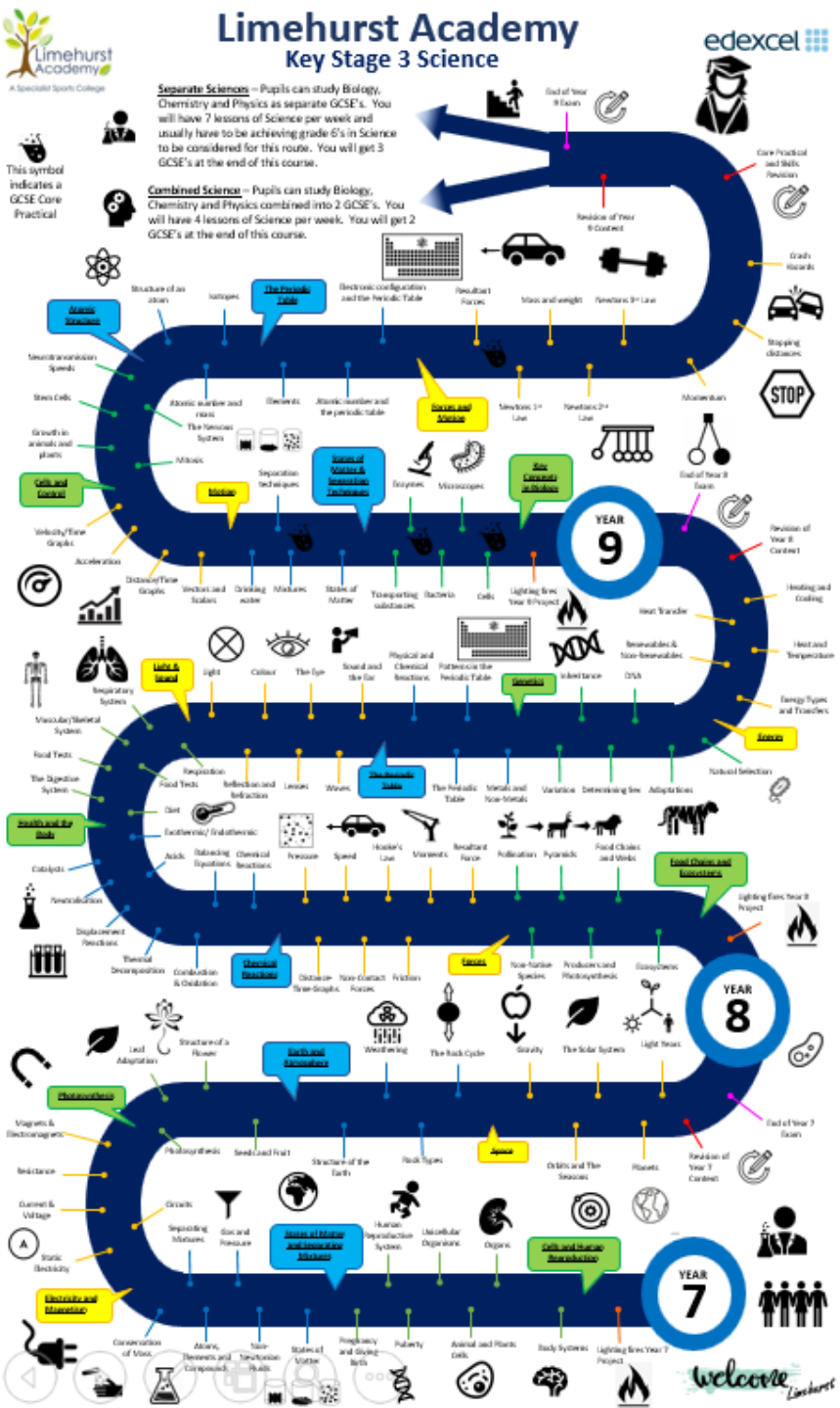

KS3 Science – Year 8

Energy

Knowledge acquired:

In this unit you will learn about energy and energy transfers, in particular how heat is transferred from one area to another. You will also learn about the different sources of energy used to generate electricity.

Skills developed:

Practical Skills: Heating and Cooling curves, Conduction/Convection/Radiation.

Maths Skills: Calculating energy loss. Constructing and interpreting graphs.

Understanding (in this module you will learn about):

- The types of energy and how they are transferred from one form to another
- About renewable and non-renewable sources of energy
- About the difference between heat and temperature
- Learn about how systems lose and gain heat energy

Links to previous study (where applicable):

- This links to the KS2 Unit Working Scientifically.

Links to future study / the wider world (where applicable):

- This links to the GCSE unit called the Conservation of Energy. It also has many real world applications including insulating homes.

KS3 Science – Year 8

Energy

Number of lessons: 9

Sequence of lessons

Lesson	Lesson title
1	Energy Types
2	Energy Transfers
3	Fossil Fuels
4	Renewable Sources
5	Heat and Temperature
6	Heat Transfer
7	Heating and Cooling
8	Preparing for assessment/exams
9	End of Module Assessment

Main resources:

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Use of assessment result(s):

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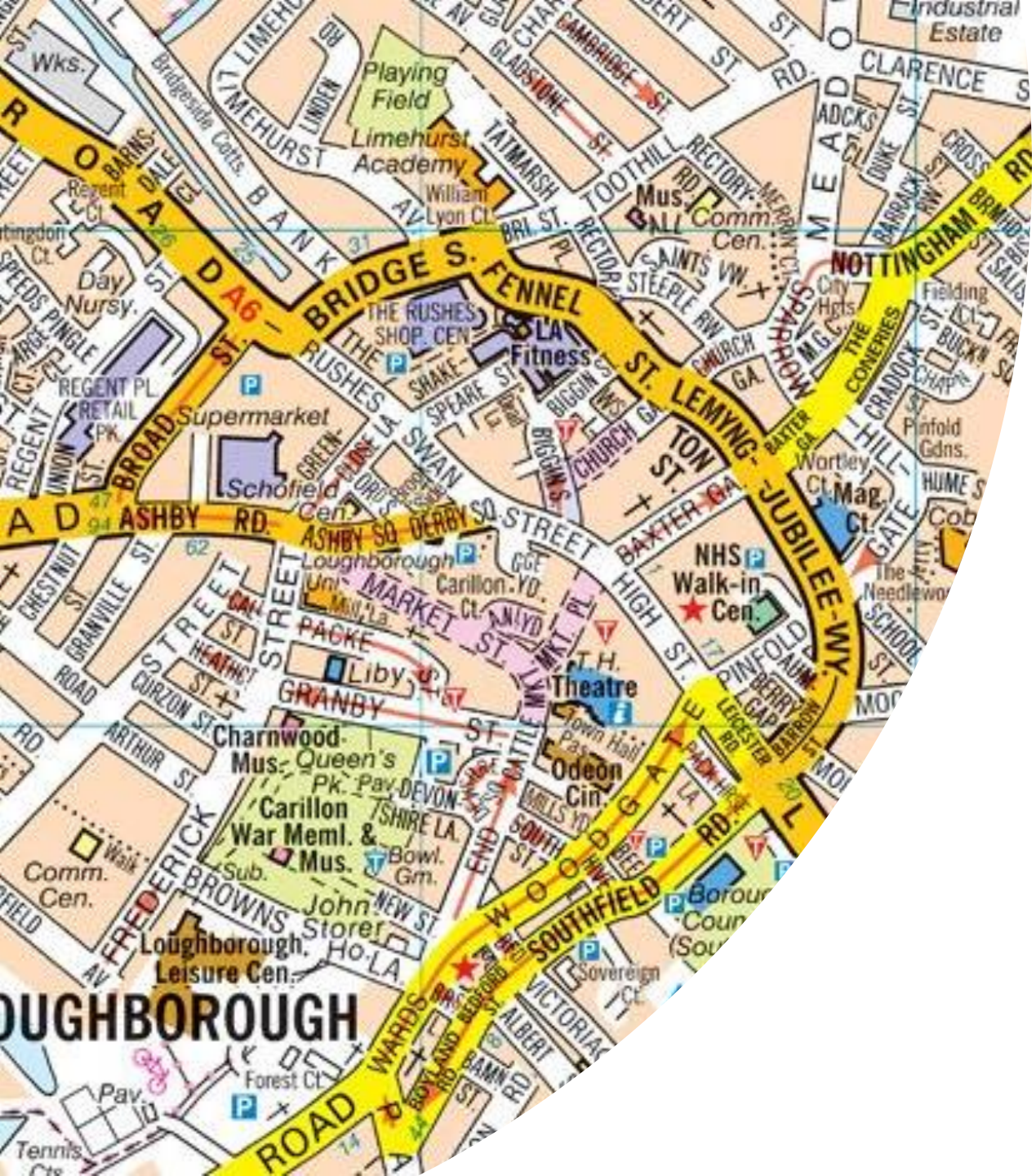


KS4 Science

Intent & Implementation

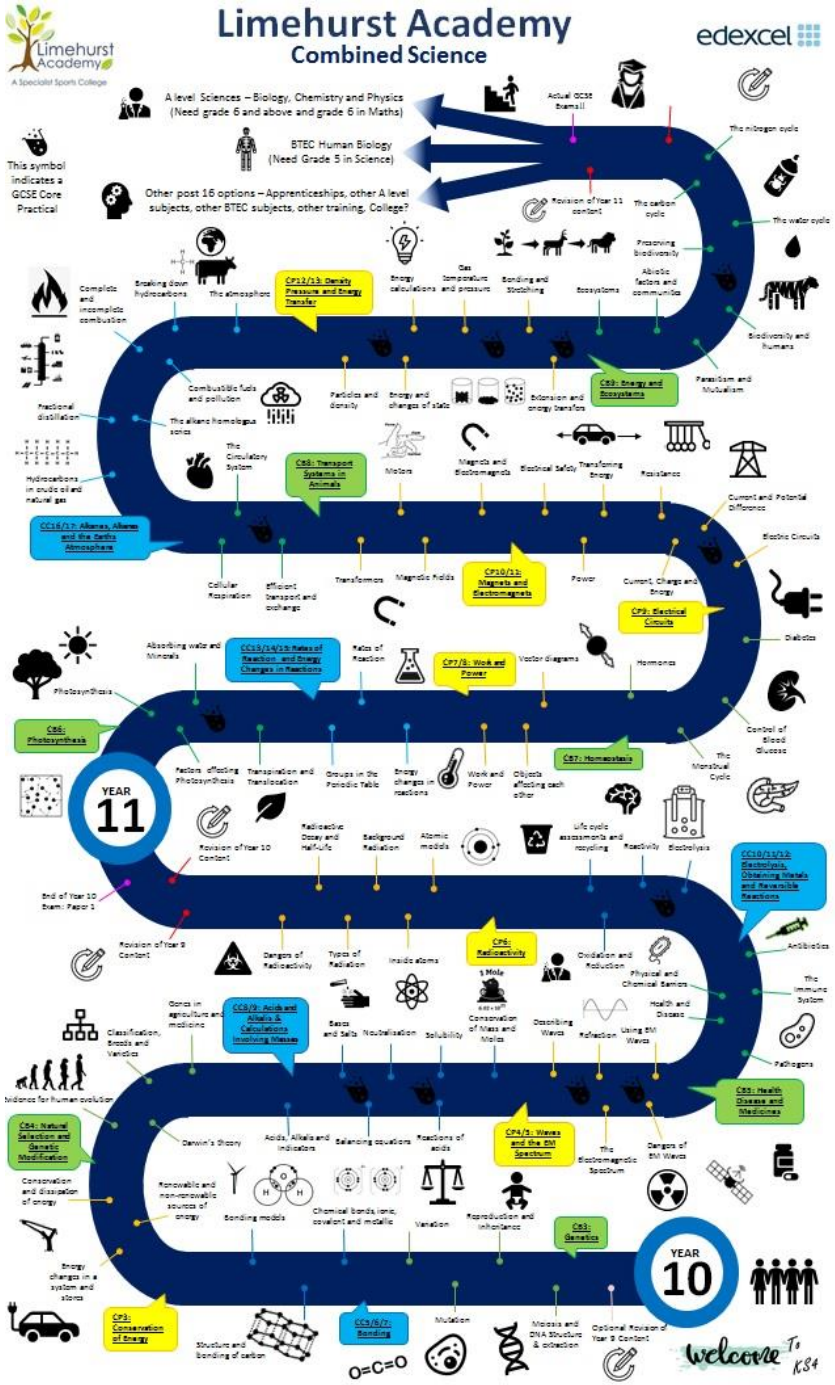
Limehurst Science Department

Intent – A summary

Science teaching at Limehurst Academy provides the foundations for understanding the world and promotes curiosity. Students are encouraged to understand how science can be used to explain what is occurring and why, predict how things will behave, and question evidence. Scientific understanding is changing our lives and is vital to the world's future prosperity. All students must learn the essential aspects of the knowledge, methods, processes and uses of science. They must gain an understanding of how complex and diverse phenomena of the natural world can be described in terms of a small number of key ideas that relate to the sciences.

GCSEs in Science will enable the students to:

- Develop scientific knowledge and understanding through the disciplines of Biology, Chemistry and Physics.
- Develop and learn to apply observational, practical, modelling, enquiry and problem-solving skills in the laboratory, in the field and in other learning environments.
- Develop their ability to evaluate claims based on science through critical analysis of the methodology, evidence and conclusions, both qualitatively and quantitatively.



Implementation – A summary

At KS4, Science is taught in distinct units. Each unit is designed to take a similar amount of teaching time. This means that even though teachers will endeavour to keep to the roadmap they can alter the order the units are taught in when necessary, taking pressure off the resources available. Students will continue to need help with things such as measuring accurately, graph plotting and so on at different stages in their studies, these are developed and supported via the comprehensive range of "Skills" delivered throughout the units. Ideas introduced earlier in the course are further reinforced and extended throughout the course, allowing students to revisit material on a regular basis and therefore progress in their knowledge and skills.

Each unit is assessed to check that students are making the progress expected of them. Monitoring every student's progress is of key importance to ensure no learner gets left behind or 'stuck' in the Key Stage. At KS4, we use a range of materials to support formative and summative assessment, helping us to evaluate student progress and adapt teaching strategies accordingly.

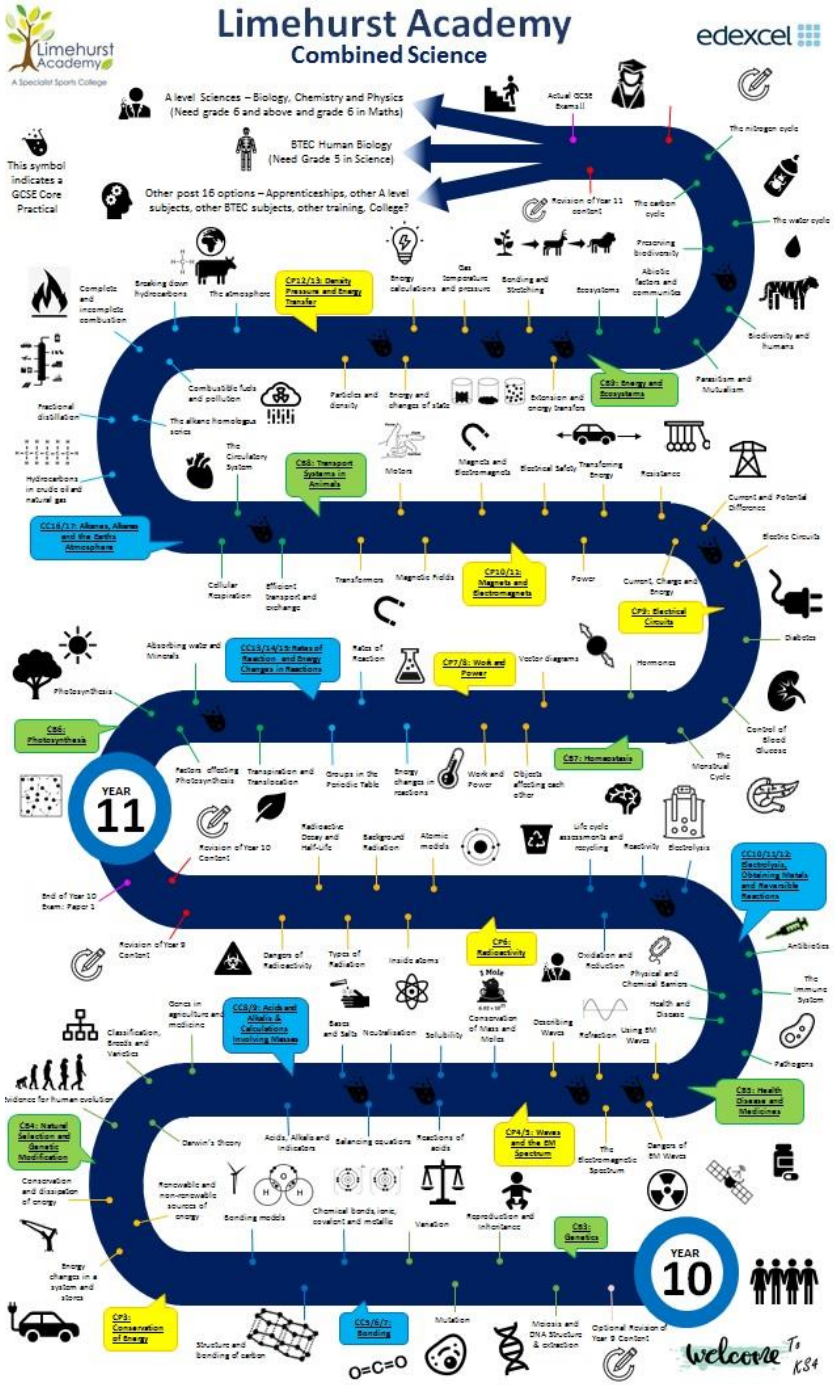
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Specialist vocabulary for topics is taught and built upon. Students are expected to use technical vocabulary in their answers.
- Complex processes are broken down into smaller steps to aid students' progression.
- Questioning is used to check understanding before moving on.
- Teachers regularly use modelling. This could be modelling of a written answer, a calculation, or how to use practical equipment.
- Students receive regular verbal feedback as they complete tasks.
- To support progress with some more challenging work students are provided with a scaffold to help get them started and build confidence.
- Students complete mid-topic and end of topic assessments for each topic, with feedback provided and time used to address areas of weakness.
- Exam practise in Y11 is used to build confidence, refine skills and the adequate use of technical vocabulary.
- Key Stage 4 students complete a number of mock exams to help prepare them for their final GCSE exams.

Impact – A summary

Students assessment scores are entered into the Go4Schools database. Students are given a grade which allows us to see progress across the whole year group.

We use tracking data to celebrate the success of good progress and to put in place support for any students not making the expected progress. We keep previous years data to compare progress with that made by previous year groups.

At the end of key stage 4 students are able to progress onto A level sciences or other vocational science courses.



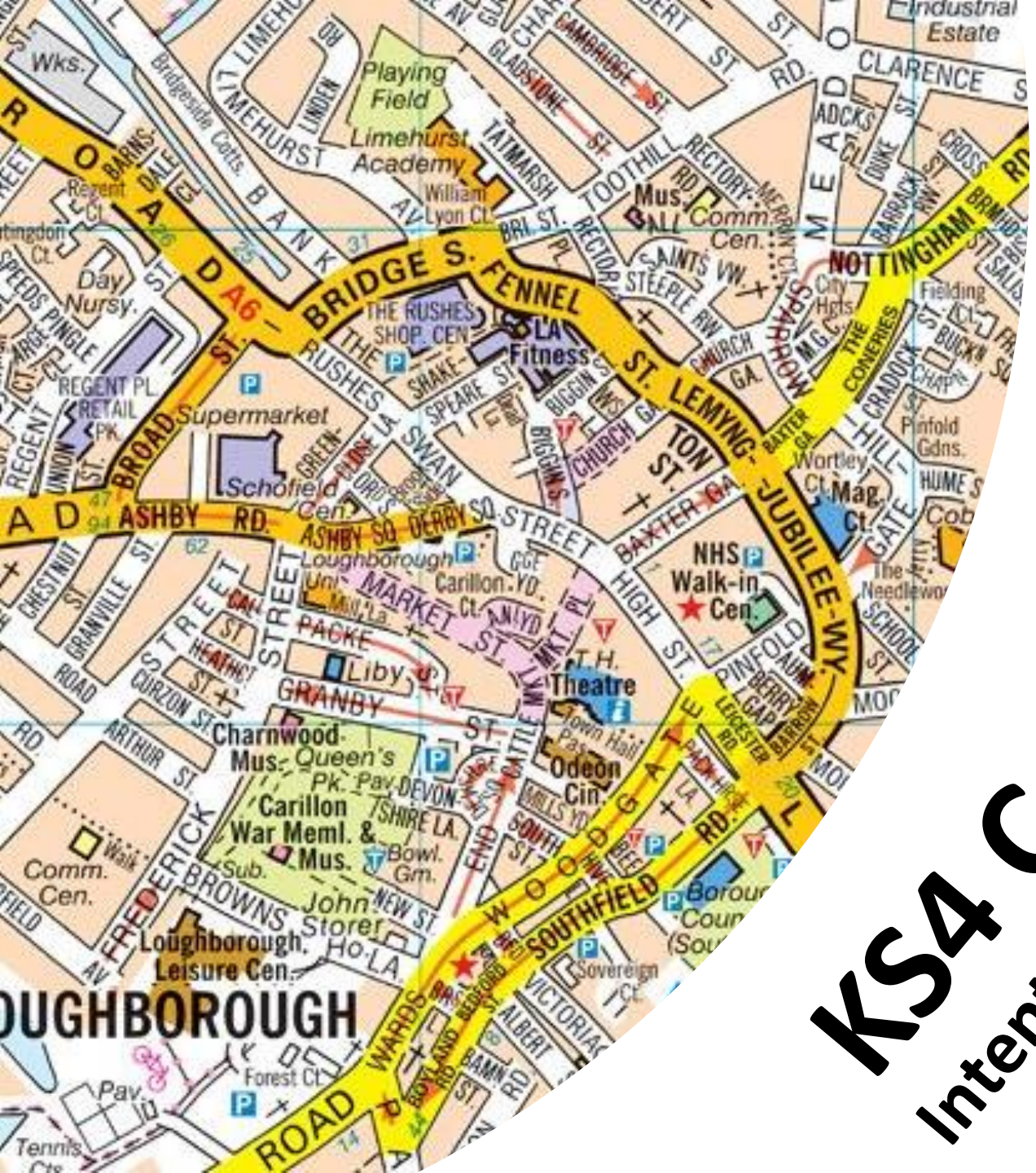
Challenge and Engagement

Ways in which our highest ability students are challenged in this subject (KS4):

1 Provision of extension work both during lesson and for homework
2 Challenging questions and discussion is common
3 Differentiated assessment on ability including homework and classwork tasks
4 The offer of various science enrichment trips
5 A consistent differentiated scheme of work on ability across the key stage.

Key ways in which we aim to engage and support all students in this subject (KS4)

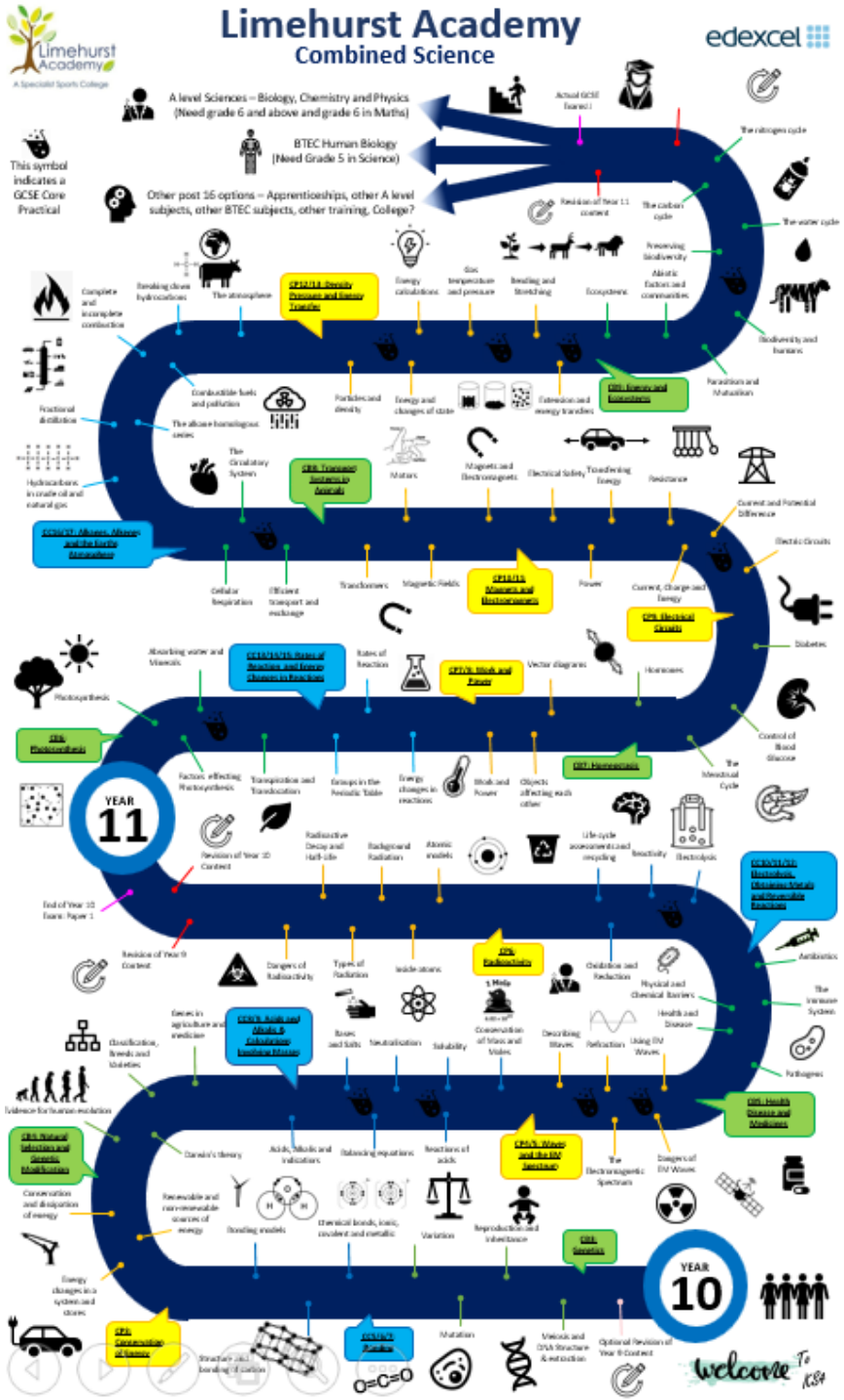
1 Effective deployment of teaching staff to maximise the impact in teaching and learning
2 Weekly KS4 study sessions available for all
3 Revision guides made available for students
4 KS4 online resources signposted that allows pupils to recap as well as read ahead during their GCSEs
5 The offer of various science enrichment trips to engage and support
6 A consistent differentiated scheme of work on ability across the key stage



KS4 Combined Science

Intent & Implementation

Limehurst Science Department



KS4 Combined Science

CB1 Key Concepts in Biology

Knowledge acquired:

In this unit you will learn about some of the central ideas in biology, including ideas about cells, microscopy, enzymes, nutrition, diffusion, osmosis and active transport.

Skills developed:

Maths Skills: orders of magnitude / magnification calculations / making estimates / size and scale / standard form

Core Practical Skills: Using Microscopes / pH and Enzymes / Osmosis in potato slices

Understanding (In this topic you will learn):

- How developments in microscopy have allowed us to find out more about the sub-cellular structures found in plant, animal and bacterial cells.
- About the importance of enzymes in nutrition, growth and development
- How enzymes are effected by pH and temperature and why each enzyme only works on a certain type of molecule
- How substances are carried by diffusion, osmosis and active transport.

Links to previous study (you previously learned in KS3):

- How to use a microscope
- About the differences between cells from different organisms
- How some cells are specialised and adapted to their functions
- How enzymes help to digest food in the digestive system.

Links to future study / the wider world (where applicable):

Links to Paper 1 and 2 in year 11, A level Biology/Human Biology and many areas of employment e.g. detergents.

KS4 Combined Science

CB1 Key Concepts in Biology

Number of lessons: 13

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Microscopes	
2	Plant and Animal Cells	
3	Using Microscopes	*
4	Specialised cells	
5	Inside bacteria	
6	Enzymes and nutrition	
7	Enzyme action	
8	Enzyme activity	
9	pH and enzymes	*
10	Transporting substances	
11	Osmosis in potato slices	*
12	Preparing for assessment/exams	
13	End of Module Assessment	

Main resources:

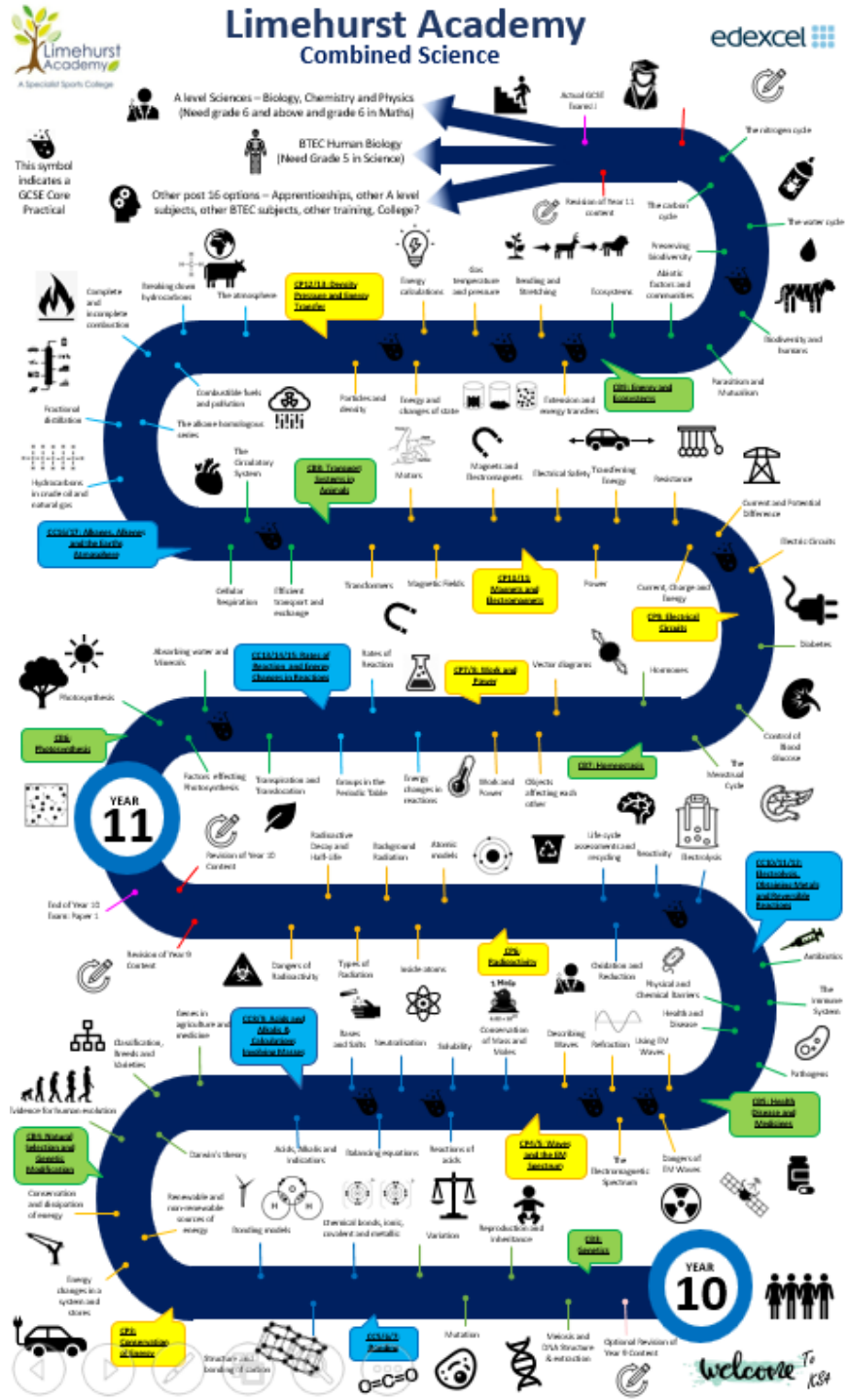
- Pearson Edexcel (9-1) Combined Science pages 2-24.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Biology Paper 1 and 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Combined Science

CB2 Cells and Control

Knowledge acquired:

In this unit you will discover how plants and animals develop from single cells the size of full stops to become complex organisms made of many different types of cells, which all need to be controlled and coordinated.

Skills developed:

Maths Skills: Using ratios, fractions and percentages / averages / transferring data between graphs and numbers

Core Practical Skills: N/A

Understanding (In this topic you will learn):

- About mitosis and its importance in growth, repair and asexual reproduction.
- How cells become specialised, and the importance of stem cells.
- To identify different specialised cells in the nervous system and explain how the system works.

Links to previous study (you previously learnt at KS3):

- That cells divide.
- About the structure of plant and animal cells.
- That your nervous system helps to coordinate your actions.

Links to future study / the wider world (where applicable):

Links to Paper 1 and 2 in year 11, A level Biology/Human Biology/Genetics and many areas of employment e.g. development of gene therapy.

KS4 Combined Science

CB2 Cells and Control

Number of lessons: 8

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Mitosis	
2	Growth in Animals	
3	Growth in Plants	
4	Stem cells	
5	The nervous system	
6	Neurotransmission speeds	
7	Preparing for assessment/exams	
8	End of Module Assessment	

Main resources:

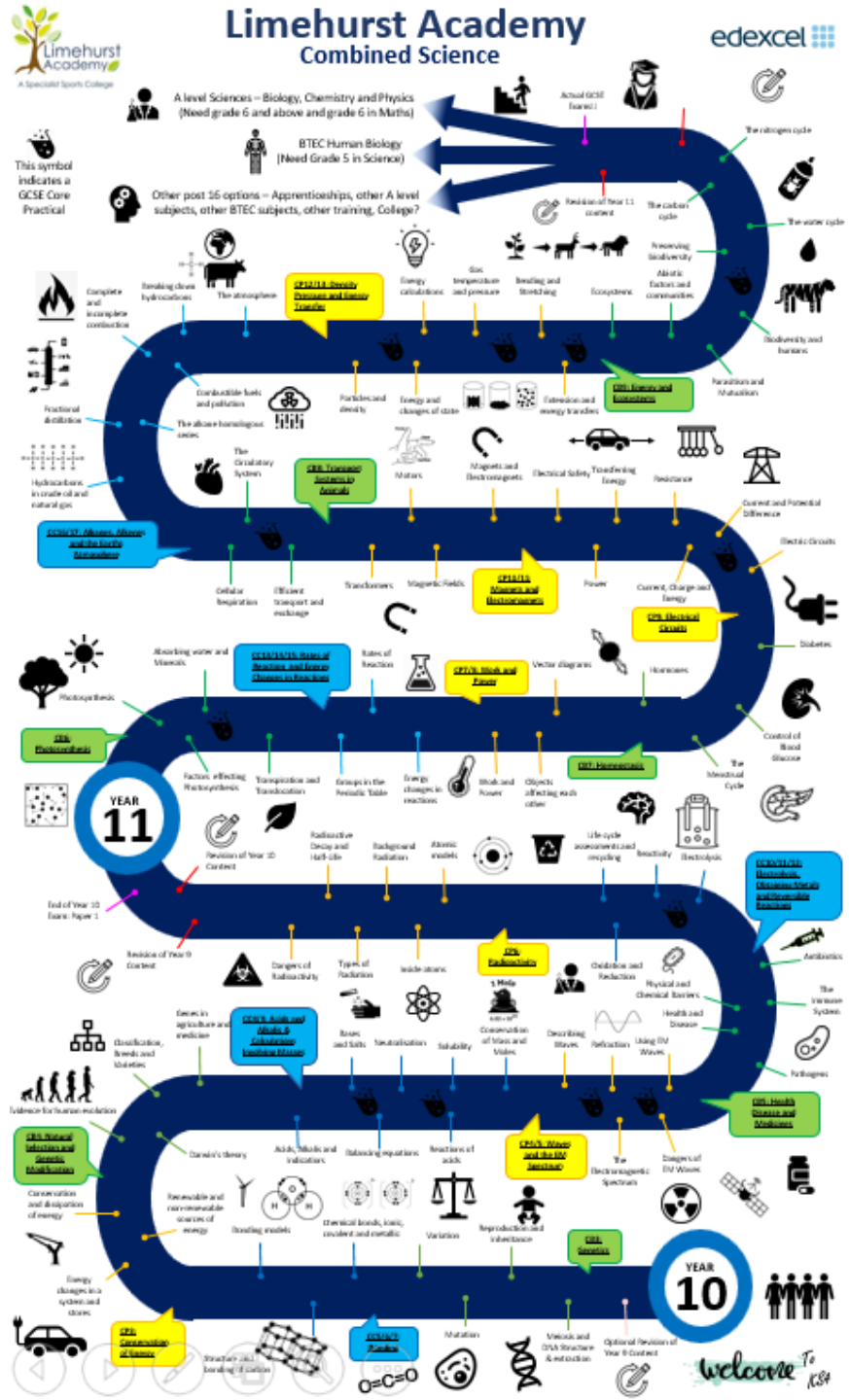
- Pearson Edexcel (9-1) Combined Science pages 25-38.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Biology Paper 1 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Combined Science

CB3 Genetics

Knowledge acquired:

In this unit you will learn about the DNA code that produces our features and the processes that allow features to be passed on from parents to there offspring.

Skills developed:

Maths Skills: Using ratios, fractions and percentages / Construction frequency charts, bar charts and histograms

Core Practical Skills: Extracting DNA

Understanding (In this topic you will learn):

- How gametes are produced by meiosis.
- About the structure of DNA.
- About mutations and how genes cause genetic variation.
- Why certain characteristics are passed down through families.

Links to previous study (you previously learnt in KS3):

- About the differences between environmental and inherited variation.
- How two gametes fuse during fertilisation to produce a single zygote.
- How the nuclei of eukaryotic cells contain chromosomes that contain DNA.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 10, A level Biology/Human Biology and many areas of employment e.g. geneticist.

KS4 Combined Science

CB3 Genetics

Number of lessons: 9

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Meiosis	
2	DNA	
3	DNA extraction	*
4	Alleles	
5	Inheritance	
6	Gene mutation	
7	Variation	
8	Preparing for assessment/exams	
9	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 39-54.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
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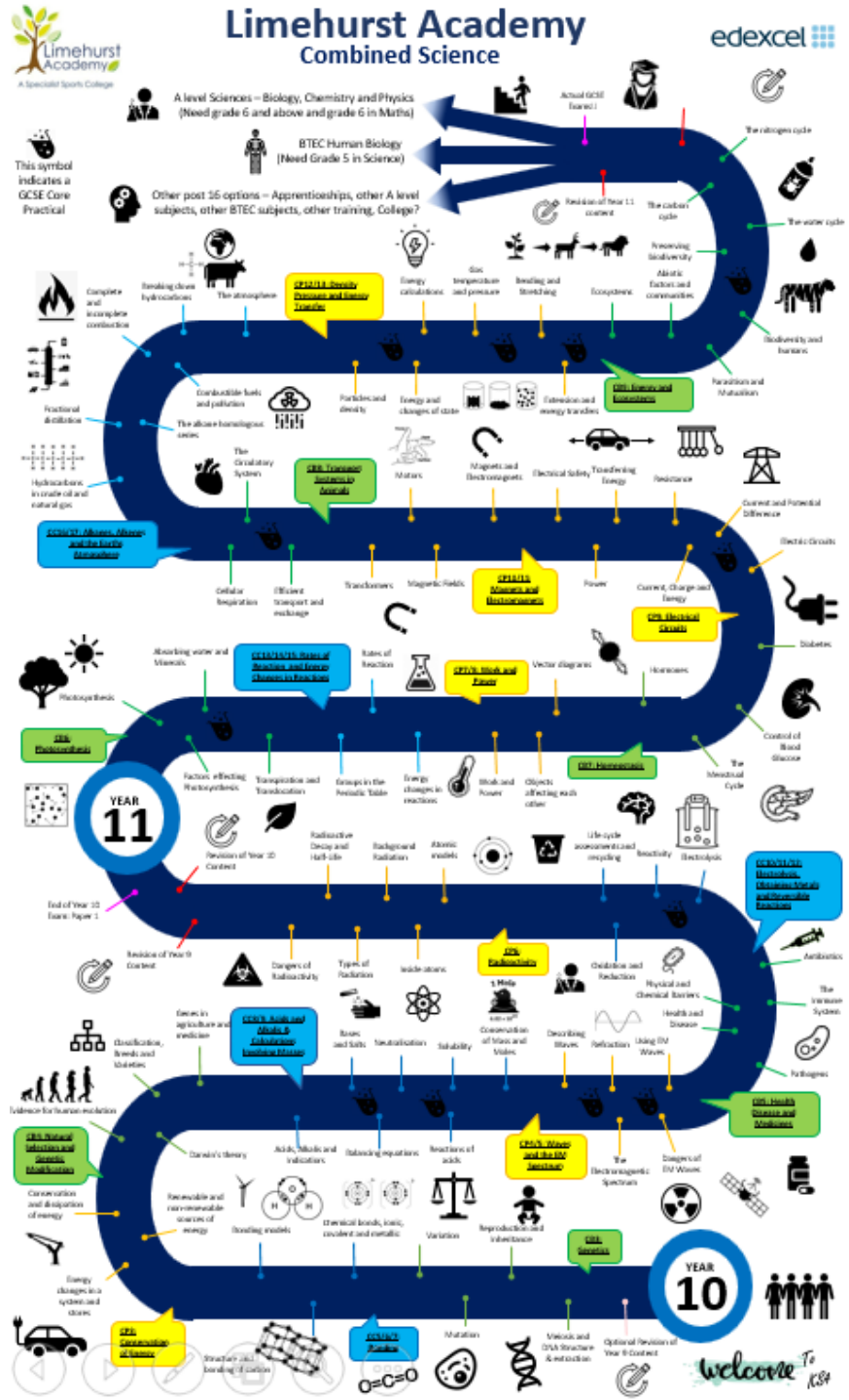

KS4 Combined Science

CB4 Natural Selection and Genetic Modification

Knowledge acquired:

In this unit you will find out more about how organisms are changed genetically by natural selection and by humans.

Skills developed:

Maths Skills: Decimal numbers / Understanding ratios, fractions and percentages / Constructing charts and graphs

Core Practical Skills: N/A

Understanding (In this topic you will learn):

- About Darwin's theory of evolution by natural selection.
- How different methods, including genetic analysis, are being used to investigate evolution.
- How organisms are classified.
- About selective breeding.
- How gene modification is done.

Links to previous study (you previously learnt at KS3):

- That organisms change over time (evolution).
- That Charles Darwin came up with a theory to explain this.
- About how DNA contains instructions for the characteristics of organisms.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 10, A level Biology/Human Biology and many areas of employment e.g. medicine.

KS4 Combined Science

CB4 Natural Selection and Genetic Modification

Number of lessons: 7

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Evidence for human evolution	
2	Darwin's theory	
3	Classification	
4	Breeds and varieties	
5	Genes in agriculture and medicine	
6	Preparing for assessment/exams	
7	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 55-66.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

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- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
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Use of assessment result(s):

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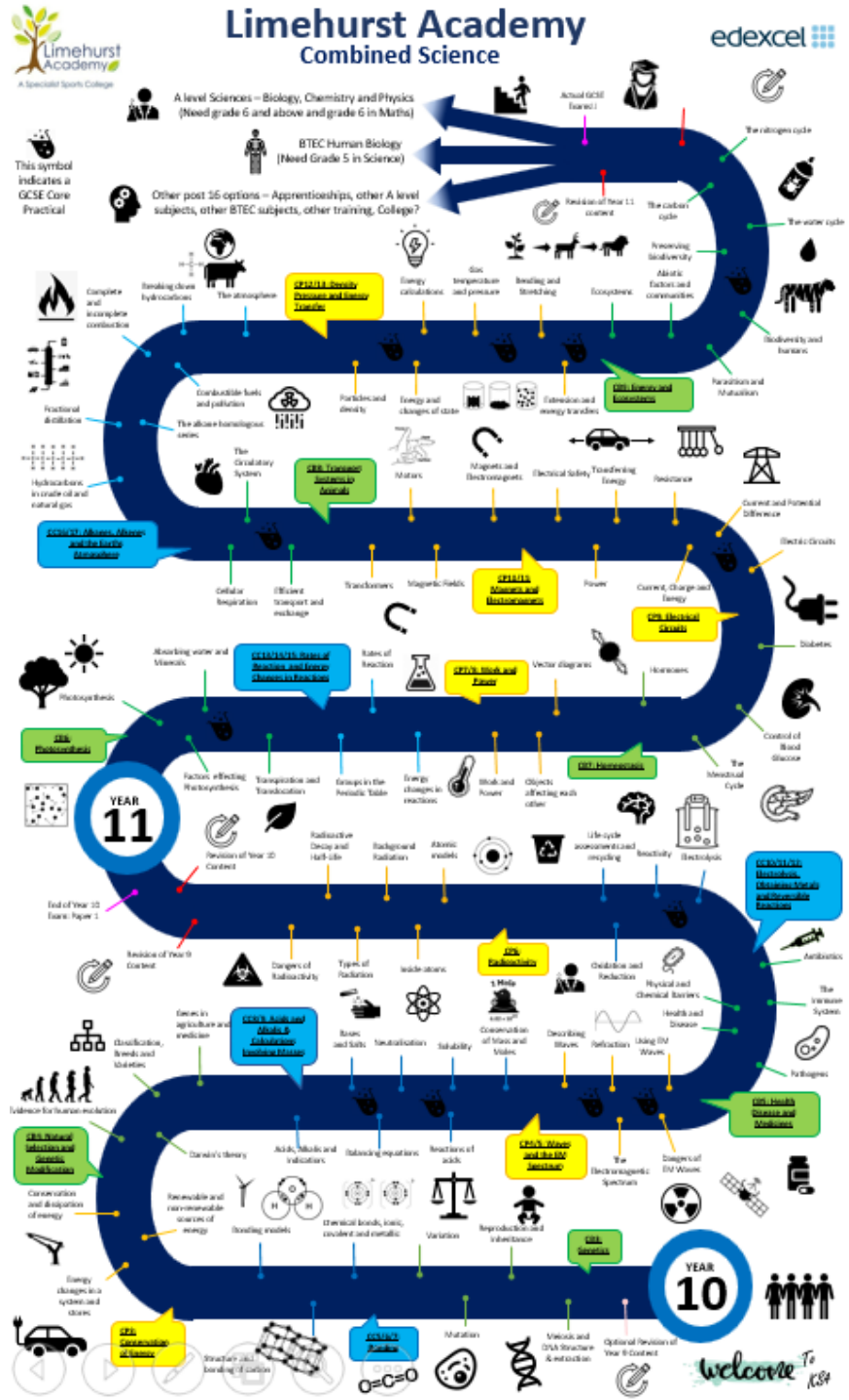


KS4 Combined Science

CB5 Health, Disease and the Development of Medicines

Knowledge acquired:

In this unit you will find out about how we define health and how we can use science to keep people healthy.

Skills developed:

Maths Skills: Construction and interpret frequency charts, bar charts and histograms / Understand sampling

Understanding (In this topic you will learn):

- About we define health.
- About how pathogens cause disease and how they spread.
- How the body is protected against infection and how the immune system works.
- How antibiotics work and how medicines are developed

Links to previous study (you previously learned in KS3):

- That imbalances in diet can lead to obesity and deficiency diseases.
- That recreational drugs can affect behaviour, health and life processes.

Links to previous study (you previously learned in CB1):

- About the structure of bacteria.
- About the use of microscopes to study cells.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 10, A level Biology/Human Biology and many areas of employment e.g. geneticist.

KS4 Combined Science

CB5 Health, Disease and the Development of Medicines

Number of lessons: 9

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Health and disease	
2	Non-communicable disease	
3	Cardiovascular disease	
4	Pathogens	
5	Spreading pathogens	
6	Physical and chemical barriers	
7	The immune system	
8	Antibiotics	
9	Preparing for assessment/exams	
10	End of Module Assessment	

Main resources:

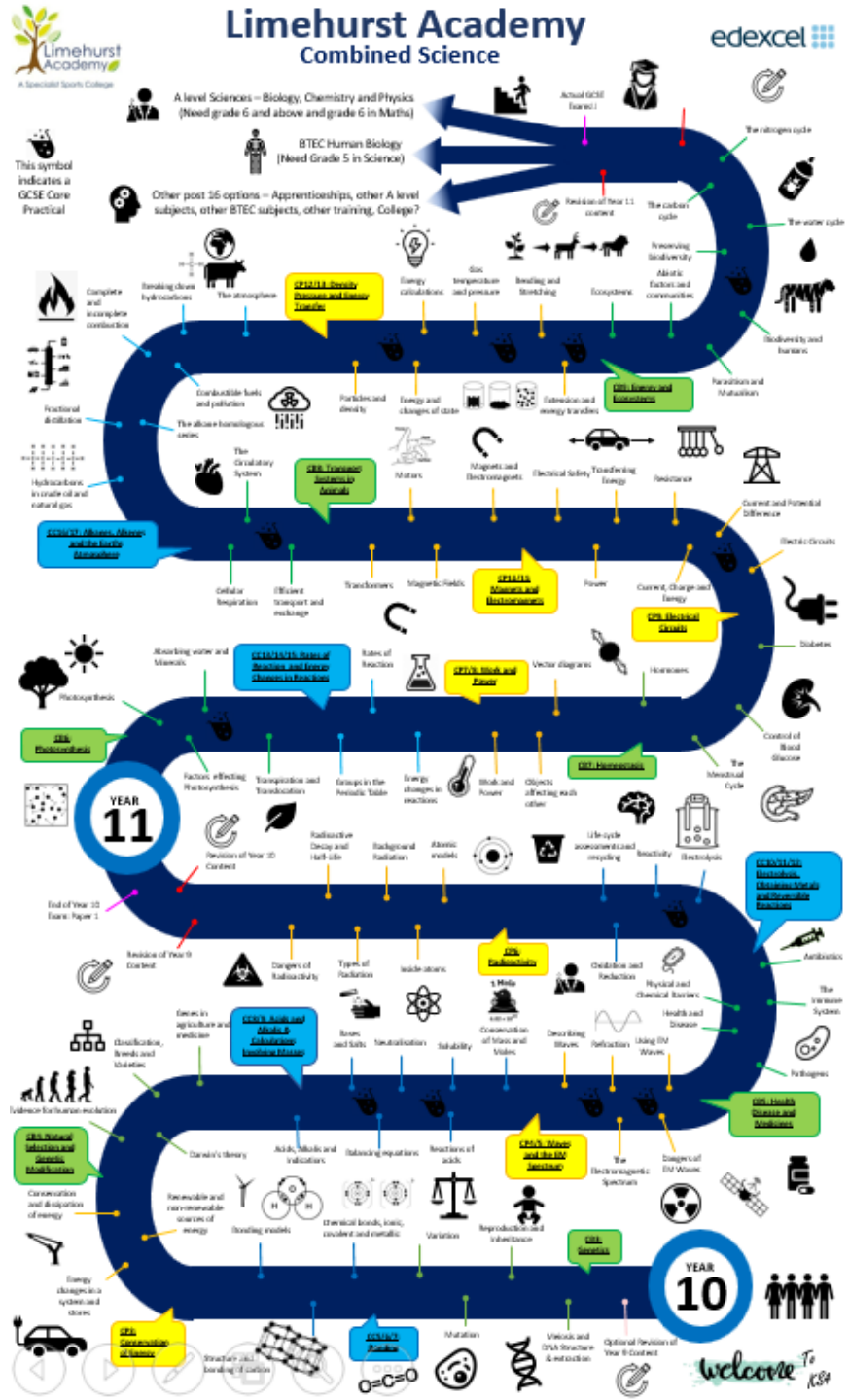
- Pearson Edexcel (9-1) Combined Science pages 67-84.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Biology Paper 1 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Combined Science

CB6 Plant Structures and their Functions

Knowledge acquired:

In this unit you will learn how plants are adapted to exploit the natural environment.

Skills developed:

Maths Skills: Sampling / Averages / Constructing tables and graphs / Modify equations / Work out the slope

Core Practical Skills: Light intensity and photosynthesis.

Understanding (In this topic you will learn):

- More about photosynthesis and how different factors affect its rate.
- How the rate of water uptake by a plant is affected by different factors.
- How the reactants for and products of photosynthesis are transported.
- More about specialised cells (including palisade, root hair, xylem and phloem cells).

Links to previous study (you previously learnt at KS3):

- That plants make their own food using photosynthesis.
- How light and chlorophyll are necessary for photosynthesis.
- Links to previous study (you previously learnt in CB1):
- About certain plant cells being specialised and adapted to their functions.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Biology and Botany and many areas of employment e.g. horticulture.

KS4 Combined Science

CB6 Plant Structures and their Functions

Number of lessons: 7

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Photosynthesis	
2	Factors that affect photosynthesis	
3	Light intensity and photosynthesis	*
4	Absorbing water and mineral ions	
5	Transpiration and translocation	
6	Preparing for assessment/exams	
7	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 85-96.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
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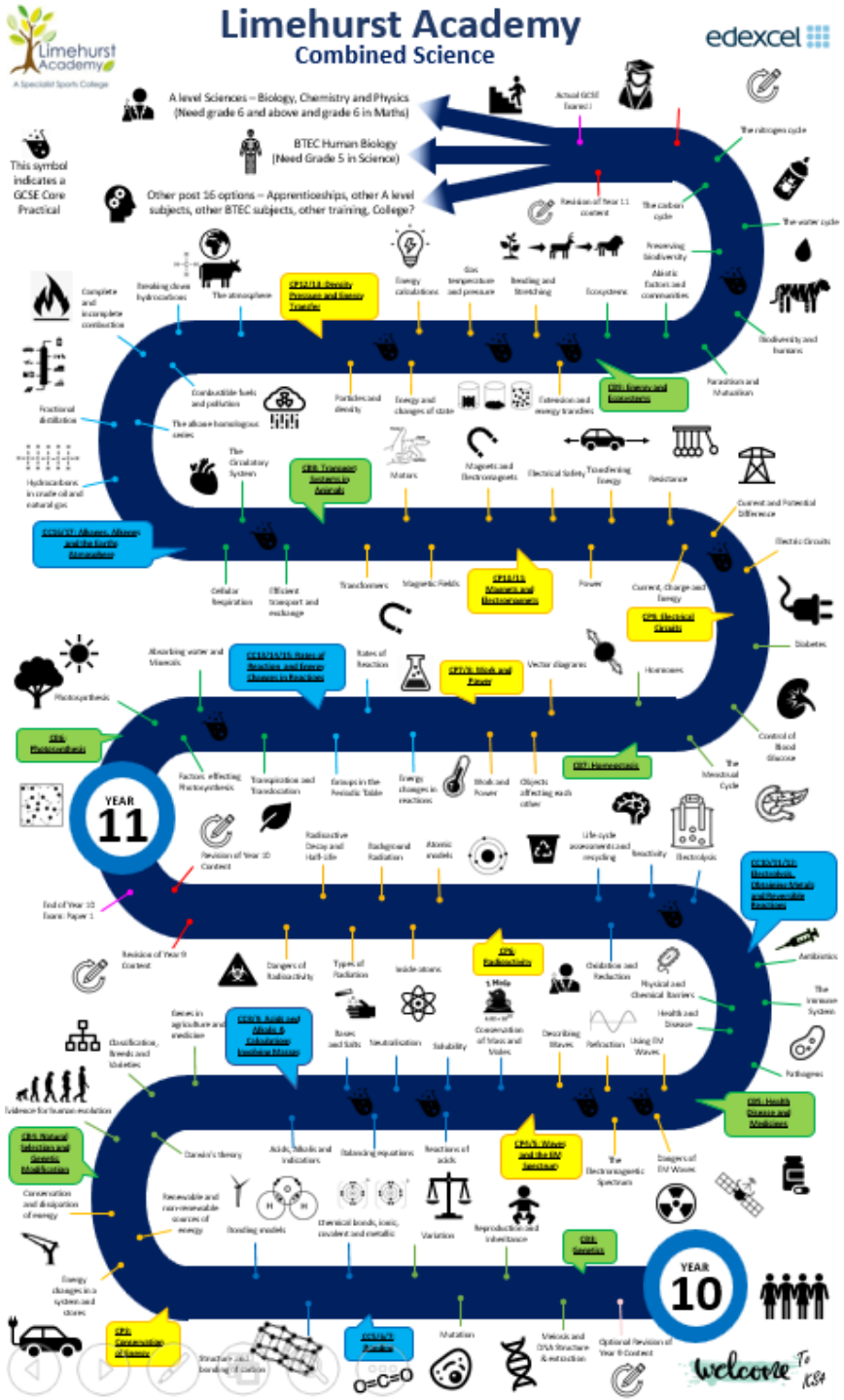
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of December Mock in Year 11.
- Final assessment: assessed within Biology Paper 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Combined Science

CB7 Animal Coordination, Control and Homeostasis

Knowledge acquired:

In this unit you will learn how the human body maintains control of its internal environment.

Skills developed:

Maths Skills: Construction graphs / Understand probability / Use ration, fractions and decimals

Understanding (In this topic you will learn):

- About endocrine glands and how their products are transported to the target organs.
- How the menstrual cycle is controlled and how these hormones are used in contraception.
- How blood sugar is controlled and how thyroxine and adrenaline affect the body.
- What negative feedback is.

Links to previous study (you previously learnt at KS3):

- How obesity is caused.
- About how the human reproductive system works and the menstrual cycle.
- Links to previous study (you previously learnt in CB1):
- About the structure of sperm and egg cells.
- How enzymes help to digest food molecules.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Biology and Human Biology and many areas of employment e.g. dietician.

KS4 Combined Science

CB7 Animal Coordination, Control and Homeostasis

Number of lessons: 8

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Hormones	
2	Hormonal control of metabolic rate	
3	The menstrual cycle	
4	Hormones and the menstrual cycle	
5	Control of blood glucose	
6	Type 2 diabetes	
7	Preparing for assessment/exams	
8	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 97-110.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
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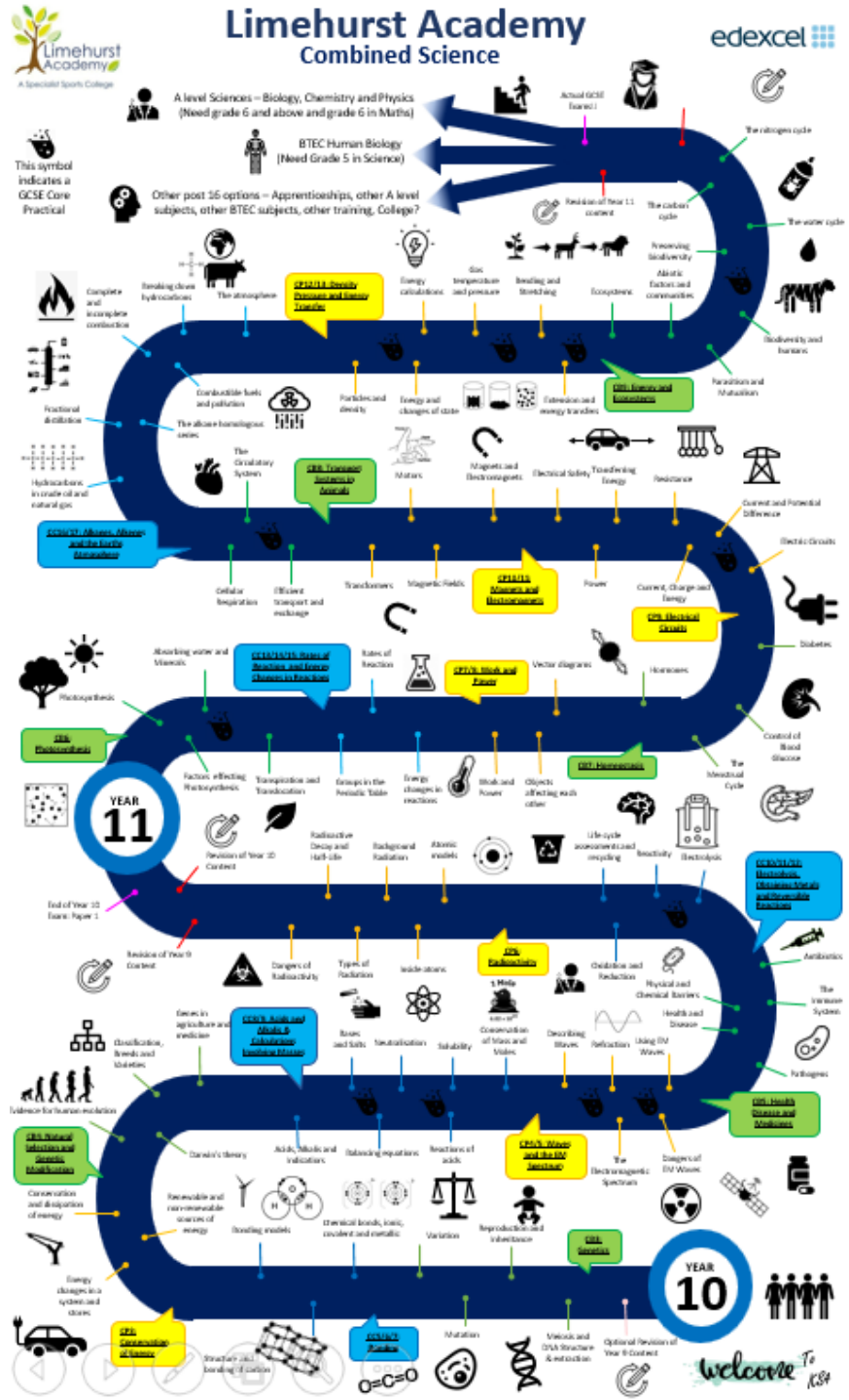
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of December Mock in Year 11.
- Final assessment: assessed within Biology Paper 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Combined Science

CB8 Exchange and Transport in Animals

Knowledge acquired:

In this unit you will find out about the importance of the circulatory system and how it works.

Skills developed:

Maths Skills: Use ratios, fractions & decimals / Areas of triangles, rectangles and the area of a cube / Use equations

Core Practical Skills: Respiration rates.

Understanding (In this topic you will learn):

- More about diffusion, gas exchange, and the surface area:volume ratio.
- More about the different types of respiration.
- How the circulatory system is adapted and how you calculate cardiac output.

Links to previous study (you previously learnt at KS3):

- How glucose and oxygen are transported around the body.
- About aerobic and anaerobic respiration.
- Links to previous study (you previously learnt in CB1):
- About diffusion.
- About different animal cells and their adaptations.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Biology and Human Biology and many areas of employment e.g. sports coach.

KS4 Combined Science

CB8 Exchange and Transport in Animals

Number of lessons: 7

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Efficient transport and exchange	
2	The circulatory system	
3	The heart	
4	Cellular respiration	
5	Respiration rates	*
6	Preparing for assessment/exams	
7	End of Module Assessment	

Main resources:

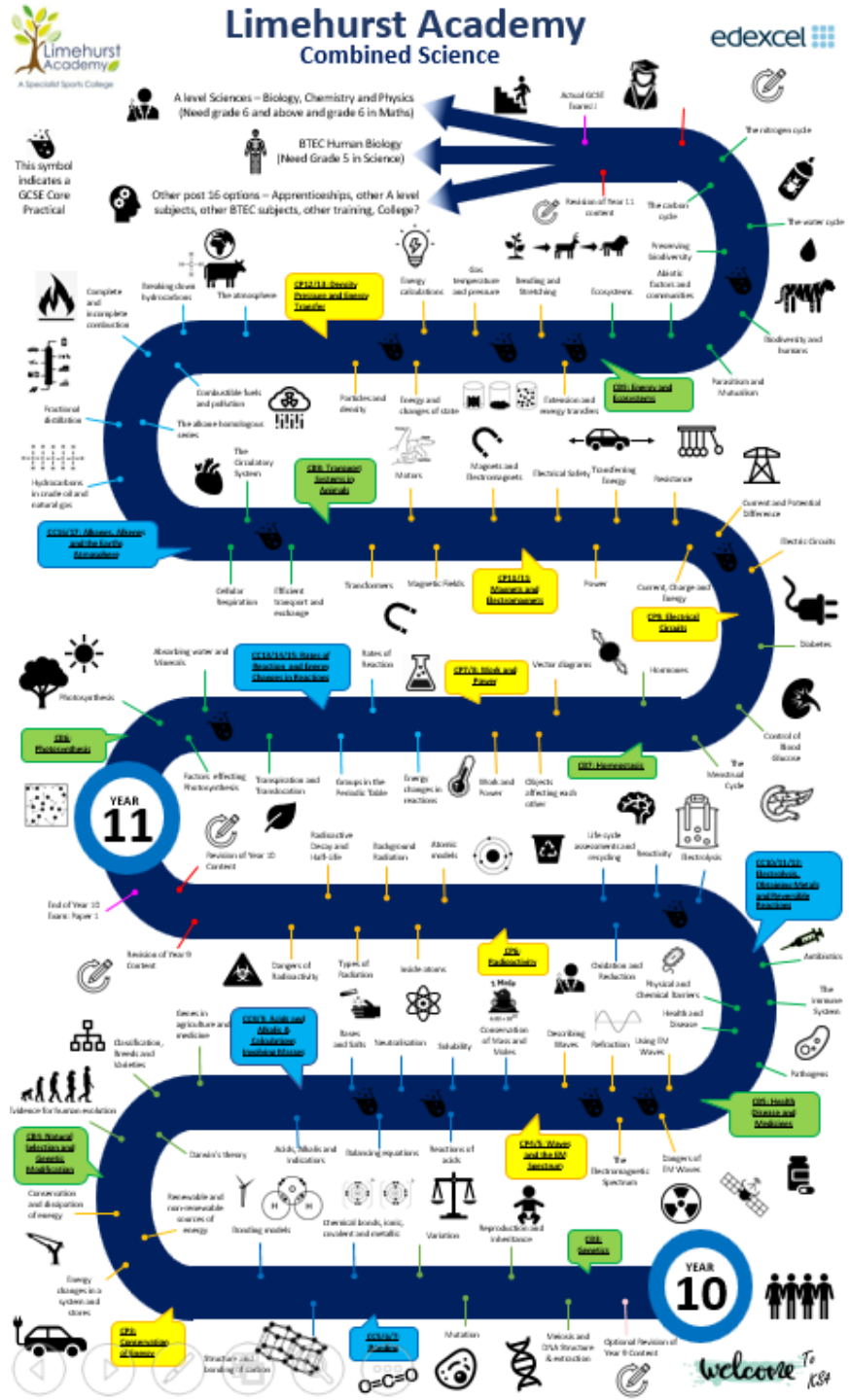
- Pearson Edexcel (9-1) Combined Science pages 111-122.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of December Mock in Year 11.
- Final assessment: assessed within Biology Paper 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Combined Science

CB9 Ecosystems and Material Cycles

Knowledge acquired:

In this unit you will find out about how the organisms in a ecosystem interact and how we can measure them effectively. You will also study how mans effects on these systems can be assessed.

Skills developed:

Maths Skills: Use ratios, fractions & decimals / Areas of triangles, rectangles and the area of a cube / Using equations

Core Practical Skills: Quadrats and transects.

Understanding (In this topic you will learn):

- How ecosystems are organised and how communities are affected by abiotic and biotic factors.
- How the abundance and distribution of organisms are measured.
- About how energy is transferred through trophic levels.
- About parasitism and mutualism.
- About how humans can affect ecosystems and how indictor species can be used to assess pollution levels.
- About the importance of the carbon, water and nitrogen cycles.

Links to previous study (you previously learnt at KS3):

- How almost all life on Earth depends on photosynthesis in plants and algae.
- About the interdependence of organisms and how they are affected by their environments.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Biology and Environmental Science and many areas of employment e.g. Ecologist.

KS4 Combined Science

CB9 Ecosystems and Material Cycles

Number of lessons: 12

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Ecosystems	
2	Abiotic factors and communities	
3	Quadrats and transects	*
4	Biotic factors and communities	
5	Parasitism and mutualism	
6	Biodiversity and humans	
7	Preserving biodiversity	
8	The water cycle	
9	The carbon cycle	
10	The nitrogen cycle	
11	Preparing for assessment/exams	
12	End of Module Assessment	

Main resources:

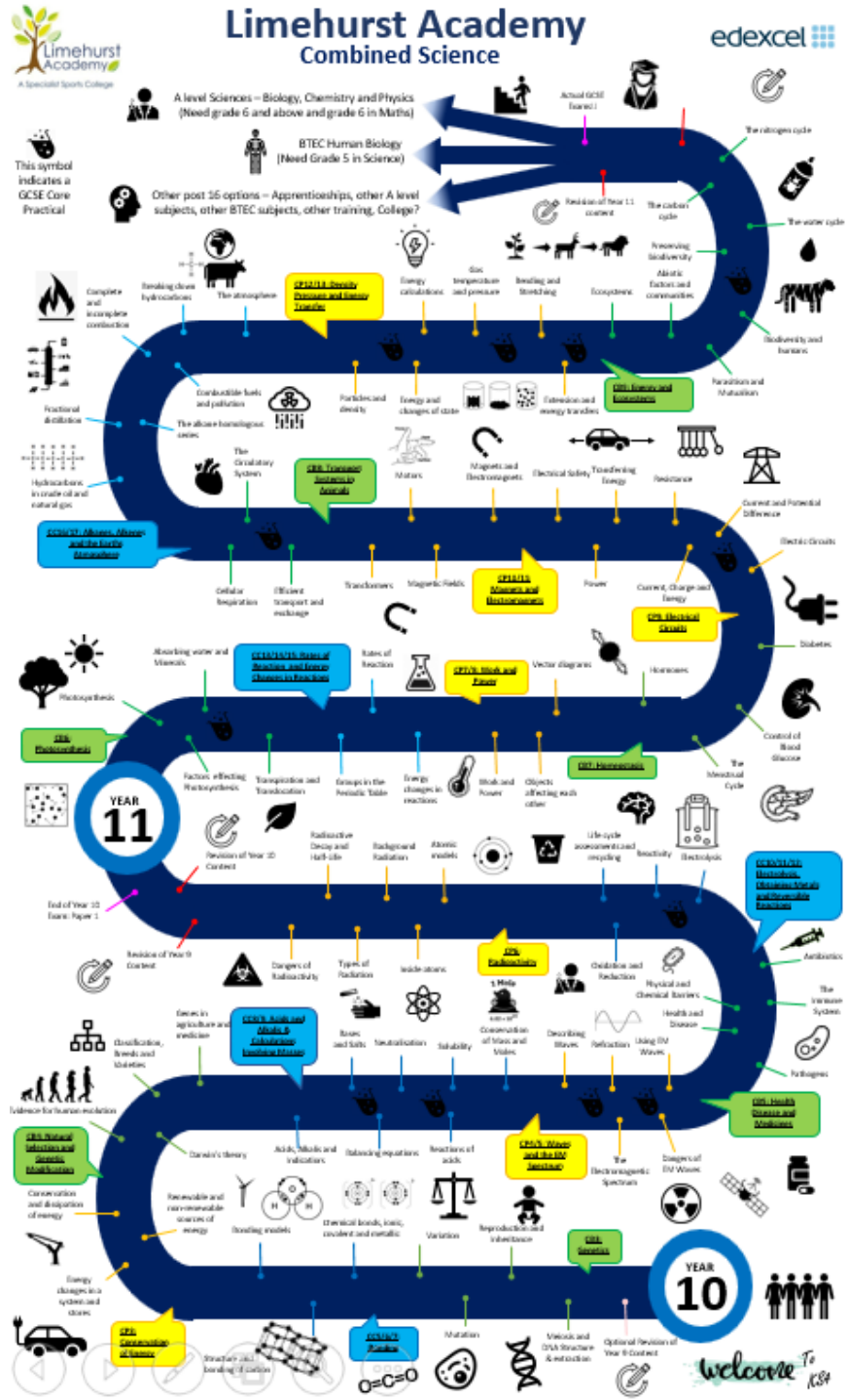
- Pearson Edexcel (9-1) Combined Science pages 123-144.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of December Mock in Year 11.
- Final assessment: assessed within Biology Paper 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Combined Science

CC1/2 States of Matter & Methods of Separating and Purifying Substances

Knowledge acquired:

In this unit you will learn about how materials can be separated from one another using their properties.

Skills developed:

Maths Skills: Translate information between graphs and numbers / Use decimals / Use ratios, fractions, percentages

Core Practical Skills: Investigating inks

Understanding (In this topic you will learn):

- How the arrangement, movement and energy of particles change during a state change.
- How to tell the difference between pure substances and mixtures.
- How different methods of separation work.
- How to choose a separation technique based on the properties of the substance.
- How to identify substances using melting points and chromatography.

Links to previous study (you previously learnt in KS3):

- How particles are arranged in solids, liquids and gases and how their energy changes with changes of state.
- How mixtures differ from pure substances.
- How to separate some mixtures using filtration, distillation and chromatography.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 10, A level Chemistry and many areas of employment e.g. Severn Trent Water.

KS4 Combined Science

CC1/2 States of Matter & Methods of Separating and Purifying Substances

Number of lessons: 9

Sequence of lessons

Lesson	Lesson title	Core Practical
1	States of matter	
2	Mixtures	
3	Filtration and crystallisation	
4	Paper chromatography	
5	Distillation	
6	Investigating inks	*
7	Drinking water	
8	Preparing for assessment/exams	
9	End of Module Assessment	

Main resources:

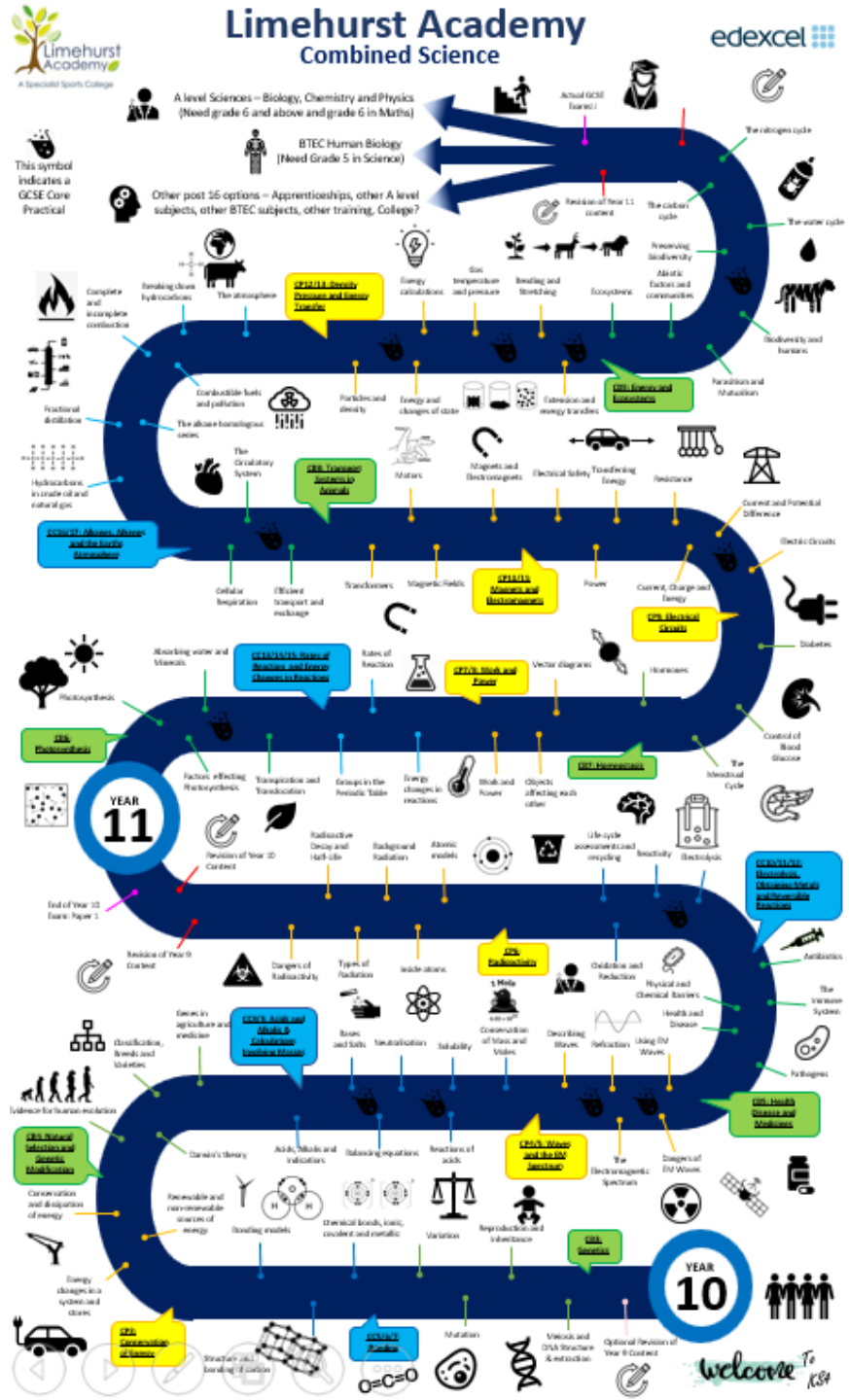
- Pearson Edexcel (9-1) Combined Science pages 145-160.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Chemistry Paper 1 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Combined Science

CC3/4 Atomic Structure & The Periodic Table

Knowledge acquired:

In this unit you will find out more about atoms and their structure and how this relates to the periodic table.

Skills developed:

Maths Skills: Solve simple algebraic equations / Ratios, percentages, fractions / calculate averages

Understanding (In this topic you will learn):

- About the particle model.
- What relative atomic mass is and how to calculate it for an element
- How Mendeleev arranged the elements in his table and predicted the existence of undiscovered elements.
- How ideas, by scientists like Dalton developed the periodic table.
- How to use the periodic table to predict and model the arrangement of electrons in an atom.

Links to previous study (you previously learnt in KS3):

- About the particle model of matter.
- About how elements are arranged in the periodic table.
- About chemical symbols for elements
- About metals and non-metals, their properties and their positions in the periodic table.

Links to future study / the wider world (where applicable):

Links to Paper 1 and 2 in year 10/11, A level Chemistry and many areas of employment e.g. Chemist.

KS4 Combined Science

CC3/4 Atomic Structure & The Periodic Table

Number of lessons: 8

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Structure of an atom	
2	Atomic number and mass number	
3	Isotopes	
4	Elements and the periodic table	
5	Atomic number and the periodic table	
6	Electronic configurations and the periodic table	
7	Preparing for assessment/exams	
8	End of Module Assessment	

Main resources:

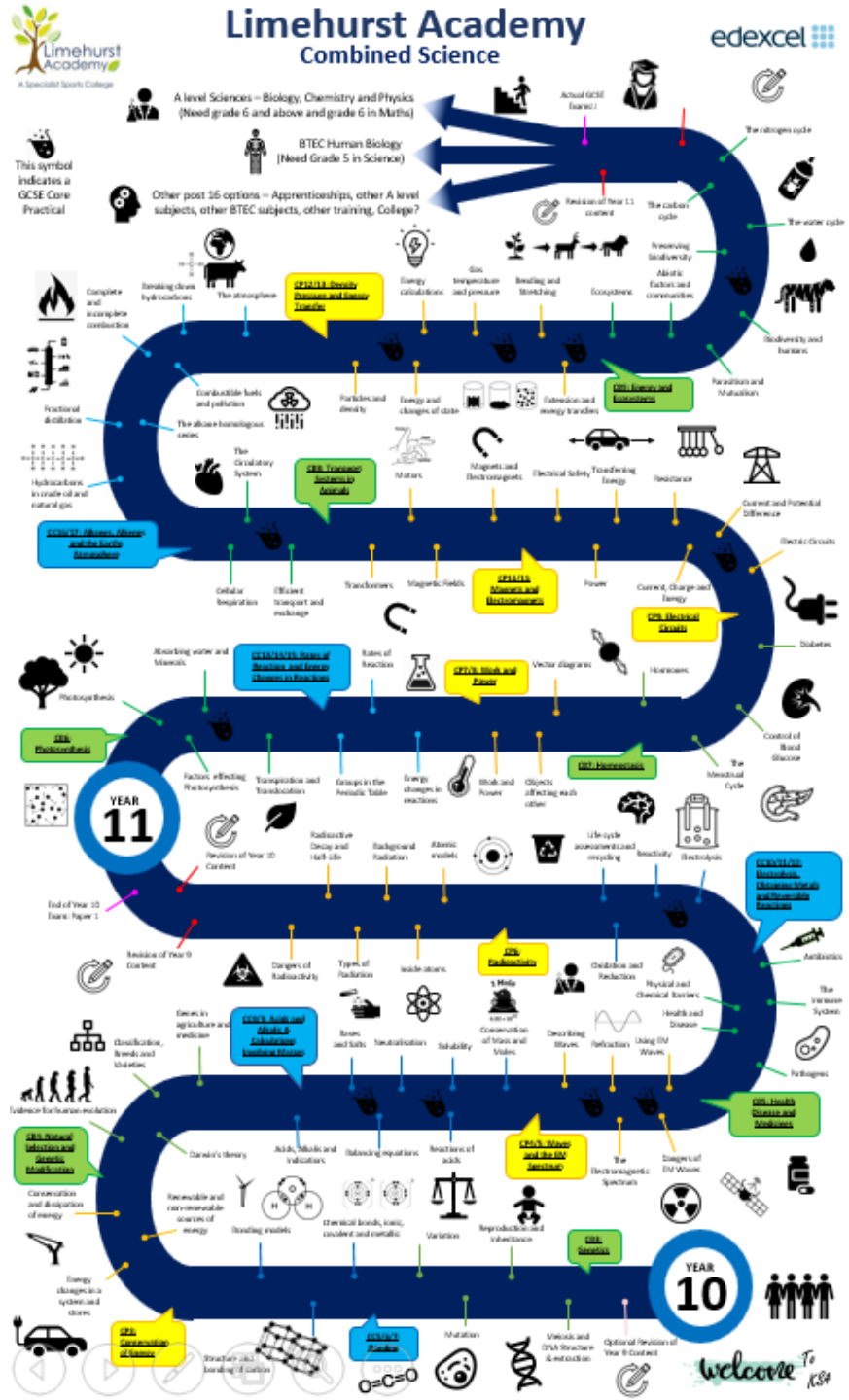
- Pearson Edexcel (9-1) Combined Science pages 161-176.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Chemistry Paper 1 and 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Combined Science

CC5/6/7 Ionic Boning, Covalent Bonding & Types of Substance

Knowledge acquired:

In this unit you will learn how bonds are formed and broken and use these ideas to explain physical/chemical reactions.

Skills developed:

Maths Skills: Solve simple algebraic equations / Ratios, percentages, fractions / Visualise and explain 2D and 3D shapes

Understanding (In this topic you will learn):

- How ionic, covalent and metallic bonds are formed.
- About the formation of lattice and molecular structures.
- How the physical properties of a substance are linked to its bonding structure.

Links to previous study (you previously learnt in KS3):

- About the particle model of matter.
- How Dalton's ideas about atoms and molecules helped to explain the properties of matter.
- How elements are arranged in the periodic table.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 10, A level Chemistry and many areas of employment e.g. metal worker.

KS4 Combined Science

CC5/6/7 Ionic Boning, Covalent Bonding & Types of Substance

Number of lessons: 10

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Ionic bonds	
2	Ionic lattices	
3	Properties of ionic compounds	
4	Covalent bonds	
5	Molecular compounds	
6	Allotropes of carbon	
7	Properties of metals	
8	Bonding models	
9	Preparing for assessment/exams	
10	End of Module Assessment	

Main resources:

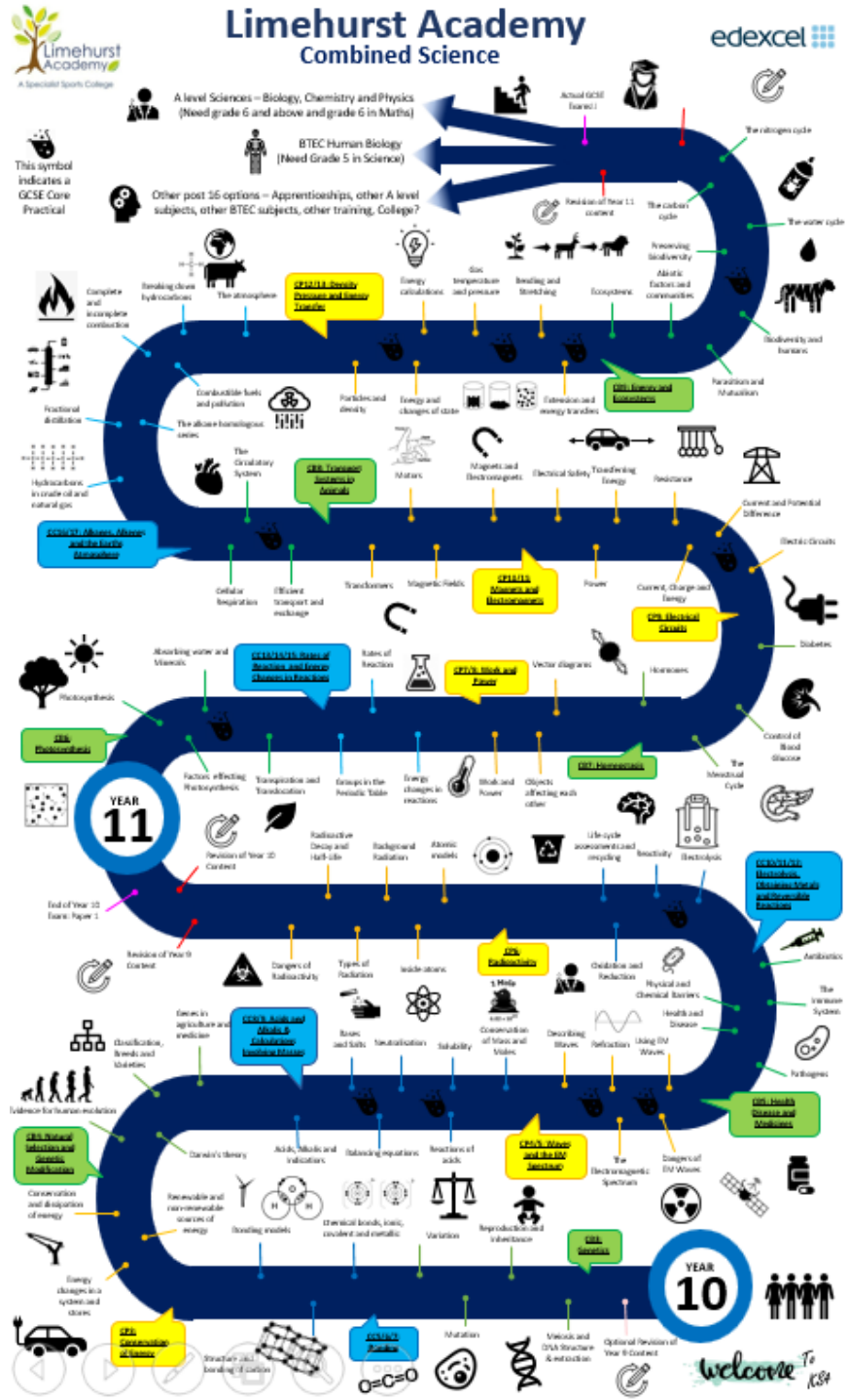
- Pearson Edexcel (9-1) Combined Science pages 177-194.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Chemistry Paper 1 and 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Combined Science

CC8/9 Acids and Alkalis Calculations Involving Masses

Knowledge acquired:

In this topic you will explore the nature of acidic and alkaline solutions, and investigate their most important reactions, properties and uses. You will also learn how to calculate the amounts of substances produced in reactions.

Skills developed:

Maths Skills: Substitute numerical values for symbols in algebraic equations / Ratios, percentages, fractions / Change the subject of an equation / Use standard form / Use the appropriate amount of significant figures using physical quantities

Core Practical Skills: Preparing Copper sulphate / Investigating Neutralisation

Understanding (In this topic you will learn):

- About the ions in acids and alkalis, and how their concentrations are linked to pH.
- What happens in the reactions between acids and different types of bases.
- How different indicators can be used and how different soluble and insoluble salts can be prepared in the lab
- How to use relative atomic mass to calculate formula masses of elements and compounds and how to work out the empirical and molecular formula. Also you will learn how to work out the concentration of a solution.
- About the Avogadro constant and the quantity of 1 mol of a substance and use this to work out the number of particles.

Links to previous study (you previously learnt in KS3):

- How common international hazard symbols are used.
- About common acid, alkali and neutral solutions.
- About the use of common indicators and neutralisations reactions.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 11, A level Chemistry and many areas of employment e.g. chemist or pharmacist.

KS4 Combined Science

CC8/9 Acids and Alkalis Calculations Involving Masses

Number of lessons: 14

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Acids, alkalis and indicators	
2	Looking at acids	
3	Bases and salts	
4	Preparing copper sulphate	*
5	Alkalis and balancing equations	
6	Investigating neutralisation	*
7	Alkalis and neutralisation	
8	Reactions of acids and metals and carbonates	
9	Solubility	
10	Masses and empirical formula	
11	Conservation of mass	
12	Moles	
13	Preparing for assessment/exams	
14	End of Module Assessment	

Main resources:

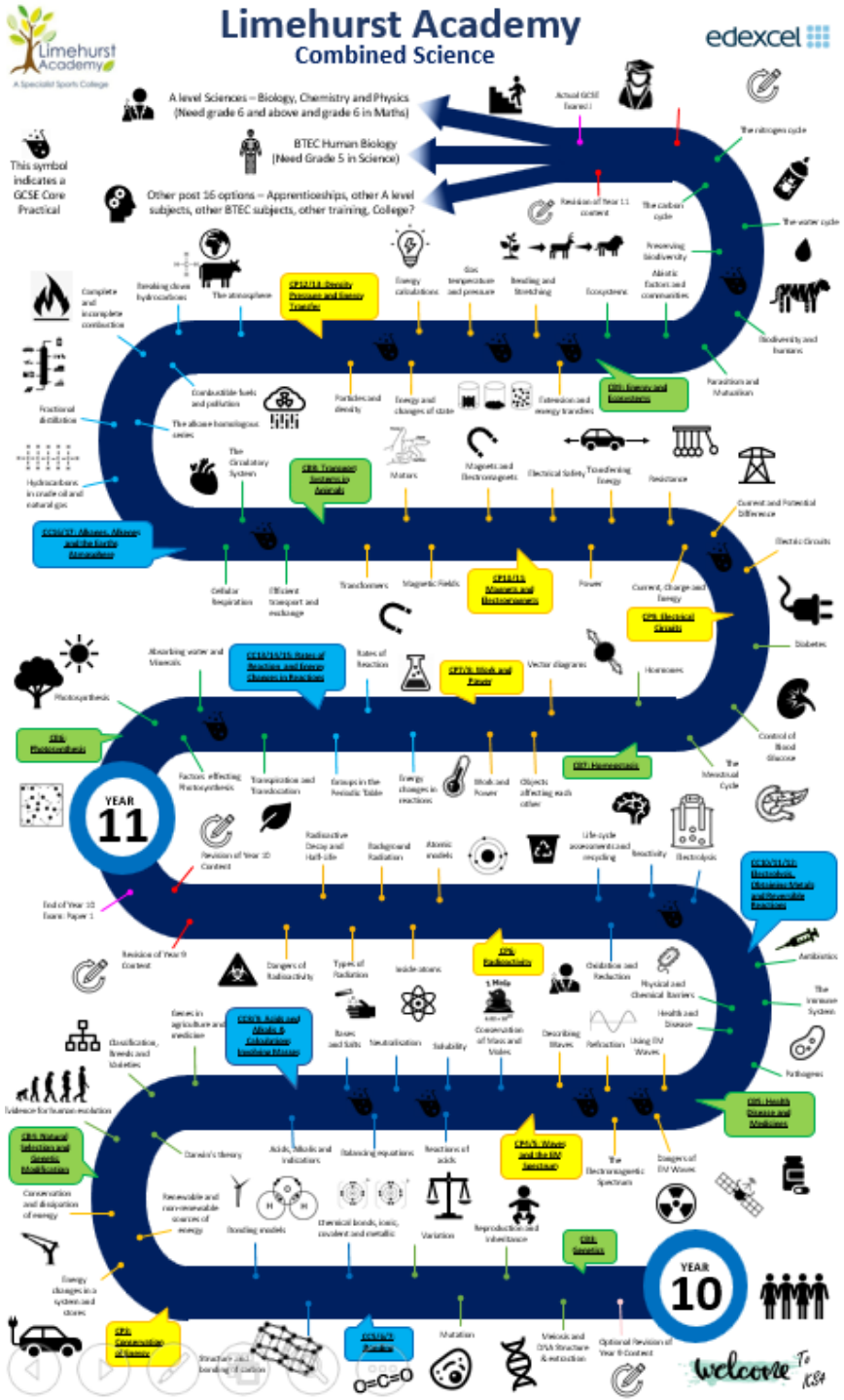
- Pearson Edexcel (9-1) Combined Science pages 177-194.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Chemistry Paper 1 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Combined Science

CC10/11/12 Electrolytic Processes, Metals and Reversible Reactions

Knowledge acquired:

In this unit you will learn more about reactions, including some of the reactions involved in the extraction and purification of metals from their ores.

Skills developed:

Maths Skills: Understand that y = mx + c represents a linear relationship / Use ratios, fractions and percentages / Determine the slope and intercept of a linear graph / Translate information between graphical and numeric form

Core Practical Skills: Electrolysis of copper sulphate solution

Understanding (In this topic you will learn):

- More about reactivity, oxidation and reduction and about how metals can be extracted.
- About the advantages of recycling metals and the factors involved in a life cycle assessment of a product.
- About what happens in electrolysis, equilibria in reactions, the Haber Process and half equations.

Links to previous study (you previously learnt in KS3):

- About oxidation and displacement reactions and the reactivity series.

Links to previous study (you previously learnt in CC4 / CC5 / CC6):

- About anions and cations in ionic compounds.
- To write balanced symbol equations with state symbols.
- How the elements are arranged in the Periodic Table.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 10, A level Chemistry and many areas of employment e.g. quarry industry.

KS4 Combined Science

CC10/11/12 Electrolytic Processes, Metals and Reversible Reactions

Number of lessons: 10

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Electrolysis	
2	Electrolysis of copper sulphate solution	*
3	Products from electrolysis	
4	Reactivity	
5	Ores	
6	Oxidation and reduction	
7	Life cycle assessment and recycling	
8	Dynamic Equilibrium	
9	Preparing for assessment/exams	
10	End of Module Assessment	

Main resources:

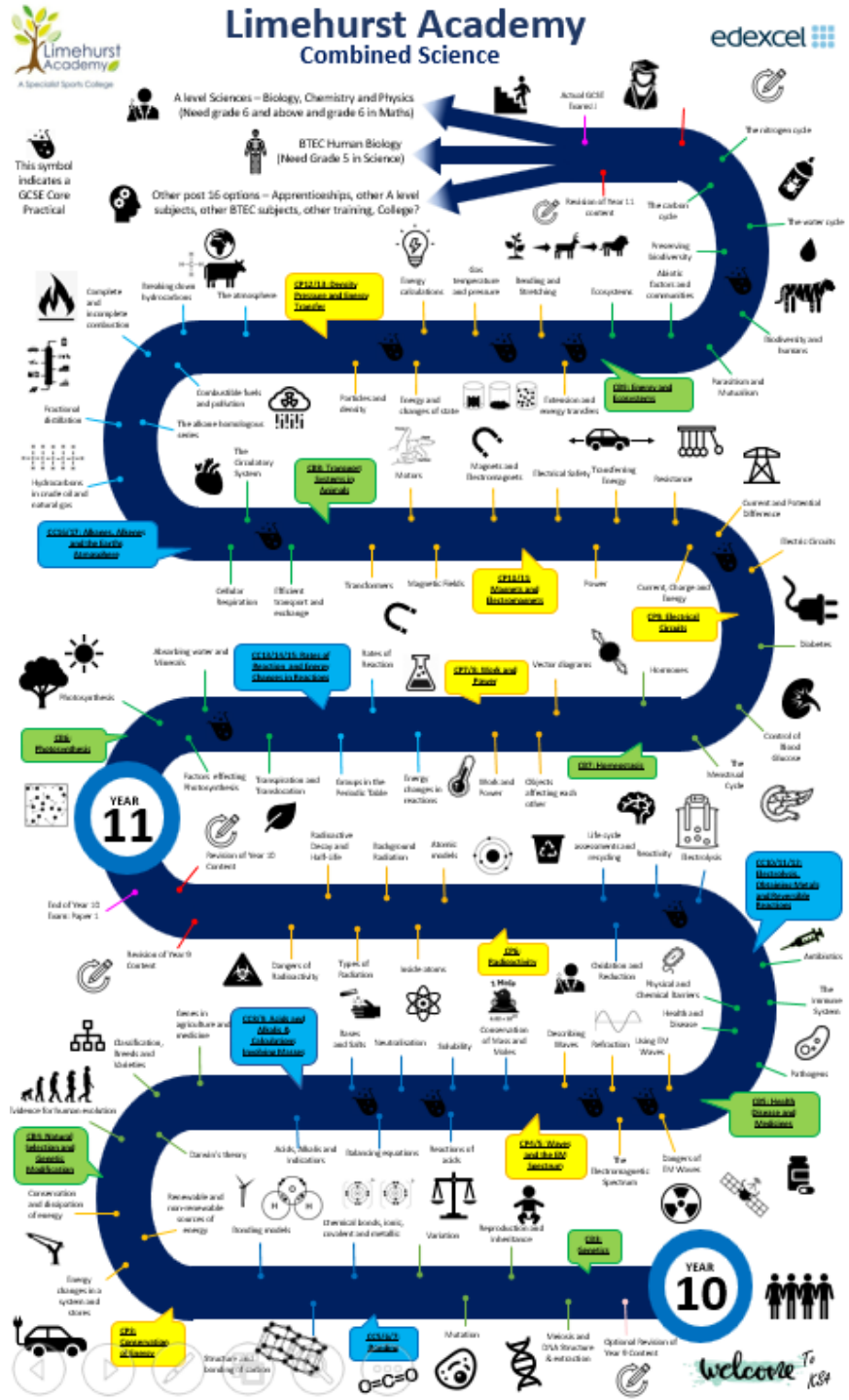
- Pearson Edexcel (9-1) Combined Science pages 177-194.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Chemistry Paper 1 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Combined Science

CC13/14/15 Groups in the Periodic Table, Rates and Energy Changes

Knowledge acquired:

This unit looks at some of the typical reactions of certain elements and general ideas about hoe chemical reactions can be controlled and used.

Skills developed:

Maths Skills: Use ratios, fractions and percentages / Make estimates of the results of simple calculations / Use a scatter diagram to identify a correlation between two variables**.**
Core Practical Skills: Investigating reaction rates

Understanding (In this topic you will learn):

- About the properties and reactions of the elements in groups 1, 7 and 0.
- How the changes in conditions can affect the rates of reactions.
- About the energy transfers that can occur during chemical reactions.

Links to previous study (you previously learnt in KS3):

- About elements, compounds and the periodic table plus what happens during chemical reactions.

Links to previous study (you previously learnt in CC3 / CC5 / CC8):

- About the nature of atoms and ions.
- How to write balanced chemical equations, including the state symbols.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Chemistry and many areas of employment e.g. quarry industry.

KS4 Combined Science

CC13/14/15 Groups in the Periodic Table, Rates and Energy Changes

Number of lessons: 12

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Group 1	
2	Group 7	
3	Halogen reactivity	
4	Group 0	
5	Rates of Reaction	
6	Factors affecting rates of reaction	
7	Investigating reaction rates	*
8	Catalysts and activation energy	
9	Exothermic and Endothermic reactions	
10	Energy changes in reactions	
11	Preparing for assessment/exams	
12	End of Module Assessment	

Main resources:

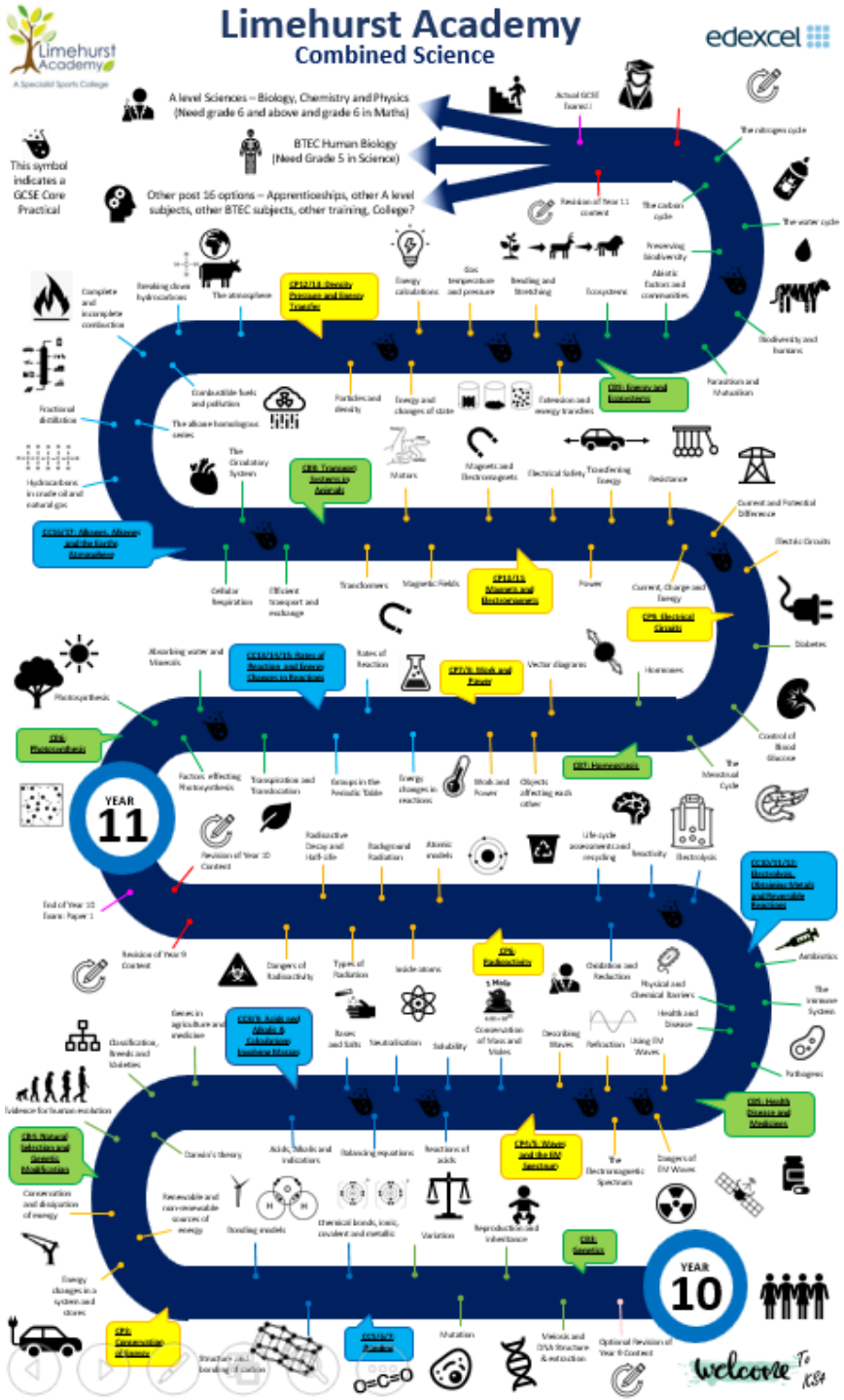
- Pearson Edexcel (9-1) Combined Science pages 177-194.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Winter Mock in Year 11.
- Final assessment: assessed within Chemistry Paper 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Combined Science

CC16/17 Fuels, Earth and Atmospheric Science

Knowledge acquired:

This unit looks at how the way we obtain and use fuels affects the planet and what we need to do to try and reverse the effects before it is too late.

Skills developed:

Maths Skills: Use ratios, fractions and percentages / Translate between graphical and numerical values / Use a scatter diagram to identify a correlation between two variables**.**

Understanding (In this topic you will learn):

- About hydrocarbons found in crude oil and natural gas and how these can be separated into useful fractions.
- About the alkanes as an homologous series.
- About the problems caused by atmospheric pollutions and the advantages and disadvantages of different fuels.
- About the Earths changing atmosphere and about the causes of climate change.

Links to previous study (you previously learnt in KS3):

- That mixtures can be separated using fractional distillation.
- About fuels and energy resources.
- About the acidity of non-metal oxides.
- About the production of carbon dioxide by human activity and the impact on climate.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Chemistry and many areas of employment e.g. Weather man.

KS4 Combined Science

CC16/17 Fuels, Earth and Atmospheric Science

Number of lessons: 12

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Hydrocarbons in crude oil and natural gas	
2	Fractional distillation of crude oil	
3	The alkane homologous series	
4	Complete and incomplete combustion	
5	Combustible fuels and pollution	
6	Breaking down hydrocarbons	
7	The early atmosphere	
8	The changing atmosphere	
9	The atmosphere today	
10	Climate change	
11	Preparing for assessment/exams	
12	End of Module Assessment	

Main resources:

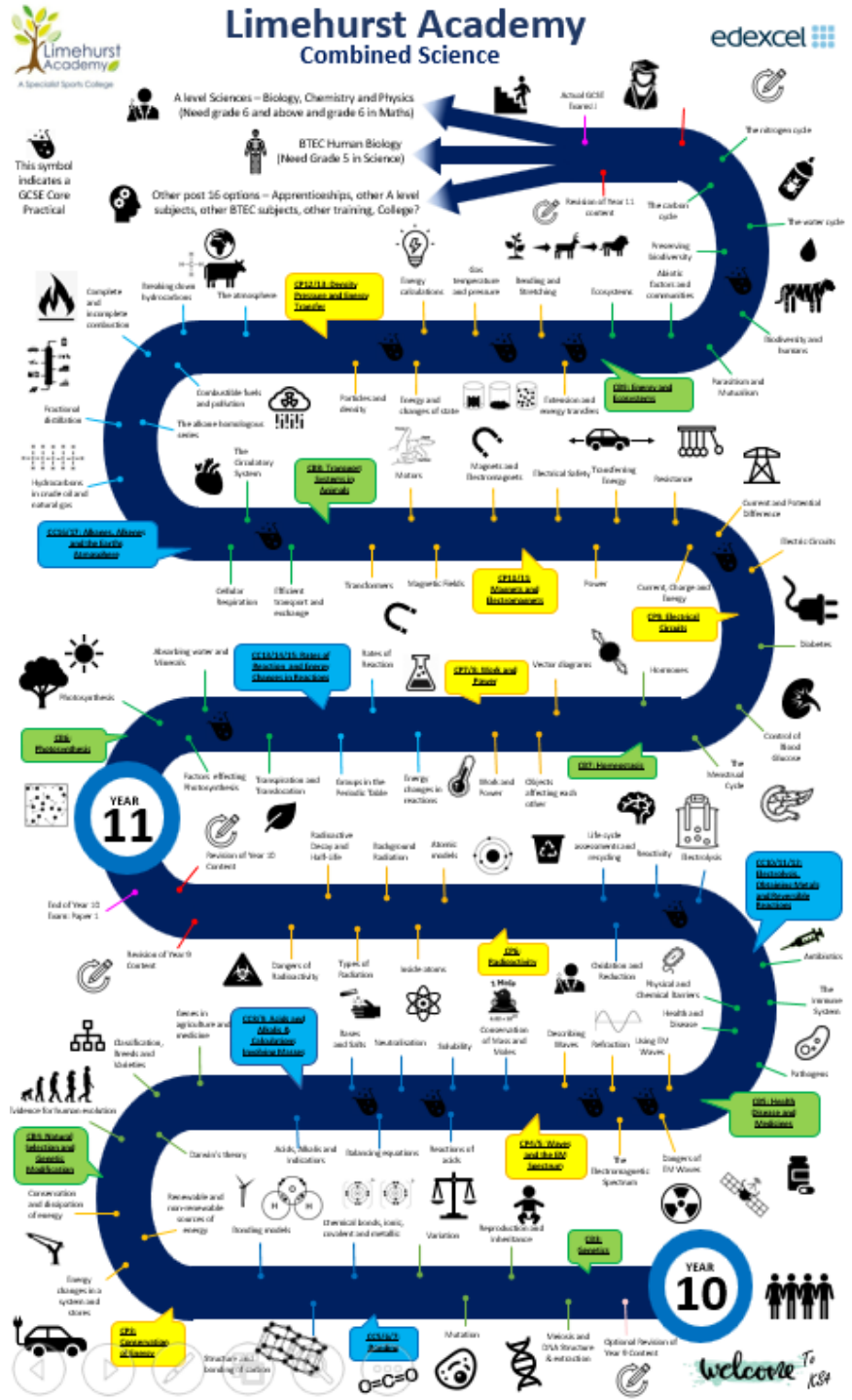
- Pearson Edexcel (9-1) Combined Science pages 177-194.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Winter Mock in Year 11.
- Final assessment: assessed within Chemistry Paper 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Combined Science

CP1 Motion

Knowledge acquired:

In this unit you will learn about quantities that have directions (such as forces). You will find out how to calculate speeds and accelerations, and how to represent changes in distances moved and speeds on graphs.

Skills developed:

Maths Skills: Understand and use the symbols: =, <, <<, >>, >, ∝, ~ / Change the subject of an equation / Substitute numerical values into algebraic equations using appropriate units for physical quantities / Solve simple algebraic equations / Translate information between graphical and numeric form / Plot two variables from experimental or other data / Determine the slope and intercept of a linear graph

Understanding (In this topic you will learn):

- The difference between vector and scalar quantities.
- How to calculate acceleration and speed.
- How to plot distance/time and velocity/time graphs and use them to make calculations.

Links to previous study (you previously learnt in KS3):

- What forces are and the effect of balanced and unbalanced forces.
- How average speed, distance and time are related.
- How to represent a journey on a distance-time graph.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 11, A level Physics and many areas of employment e.g. Sports design.

KS4 Combined Science

CP1 Motion

Number of lessons: 6

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Vectors and scalars	
2	Distance/time graphs	
3	Acceleration	
4	Velocity/time graphs	
5	Preparing for assessment/exams	
6	End of Module Assessment	

Main resources:

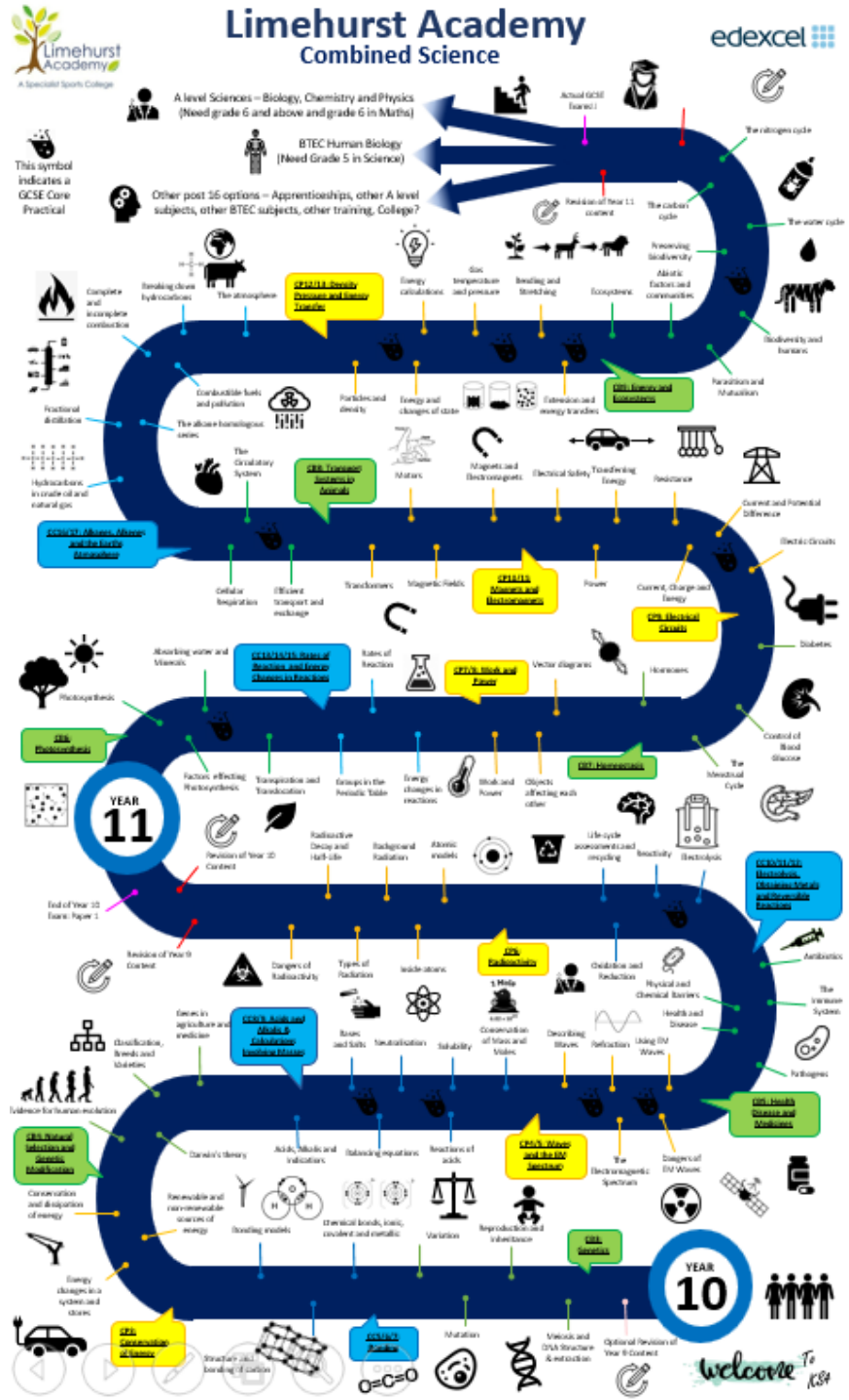
- Pearson Edexcel (9-1) Combined Science pages 177-194.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Physics Paper 1 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Combined Science

CP2 Forces and Motion

Knowledge acquired:

In this unit you will learn Newton's Laws of motion can be applied to real life situations and can be used to make the car industry safer.

Skills developed:

Maths Skills: Use a scatter diagram to identify a correlation between two variables / Change the subject of an equation / Substitute numerical values into algebraic equations using appropriate units for physical quantity / Plot two variables from experimental or other data / Determine the slope (and intercept) of a linear graph.
Core Practical Skills: Investigating acceleration

Understanding (In this topic you will learn):

- About Newton's Laws of Motion.
- How to calculate the weight of an object from its mass.
- About the factors that affect the stopping distance of a vehicle and the dangers of large decelerations.
- How to calculate momentum and apply these ideas to collisions.

Links to previous study (you previously learnt in KS3):

- What forces are and the effects of balanced and unbalanced forces.
- What a resultant force is.
- About gravity as a non-contact force.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 11, A level Physics and many areas of employment e.g. Automotive engineer.

KS4 Combined Science

CP2 Forces and Motion

Number of lessons: 11

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Resultant forces	
2	Newton's First Law	
3	Mass and Weight	
4	Newton's Second Law	
5	Investigating acceleration	*
6	Newton's Third Law	
7	Momentum	
8	Stopping distances	
9	Crash hazards	
10	Preparing for assessment/exams	
11	End of Module Assessment	

Main resources:

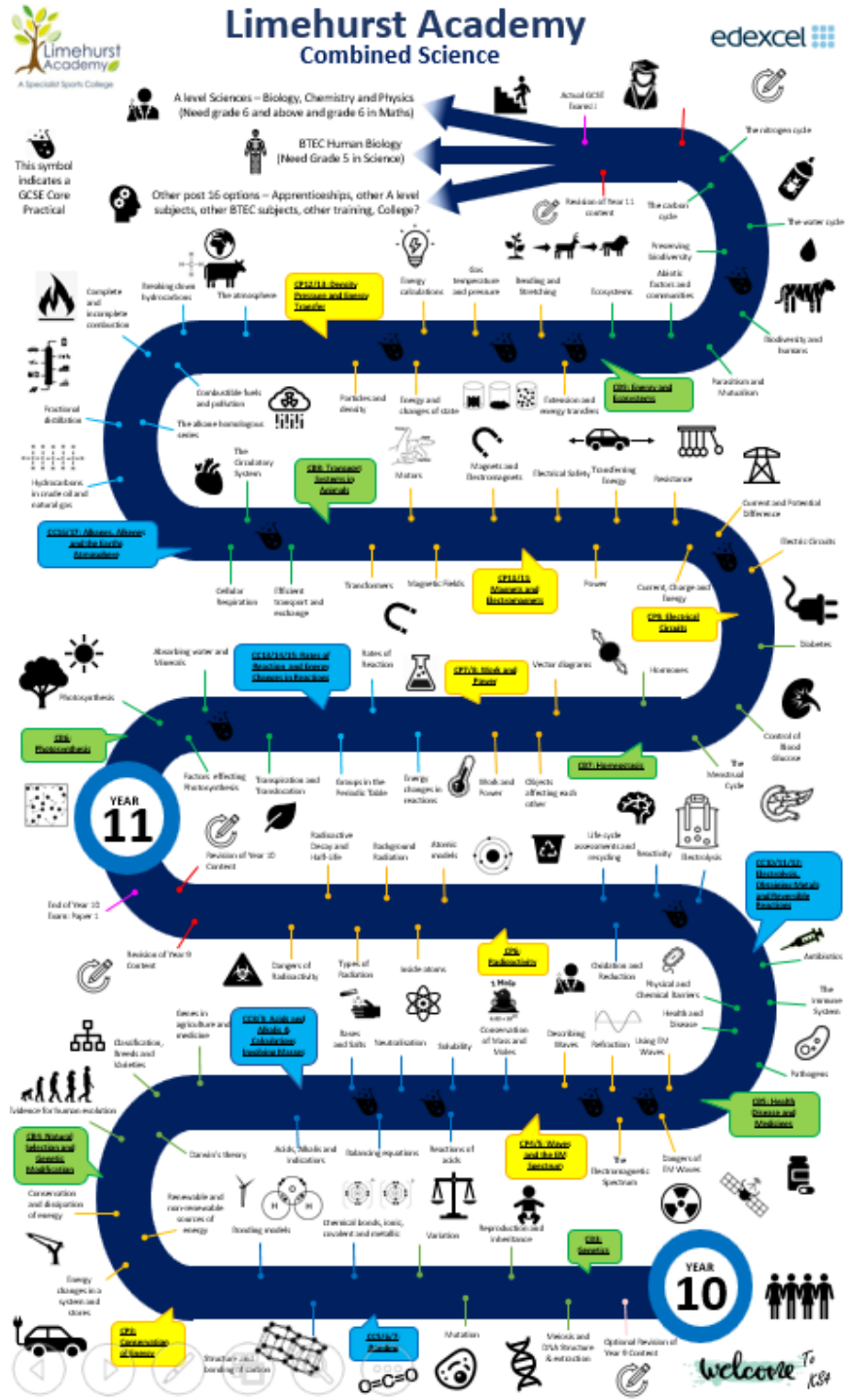
- Pearson Edexcel (9-1) Combined Science pages 177-194.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Physics Paper 1 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Combined Science

CP3 Conservation of Energy

Knowledge acquired:

In this unit you will learn about the ways in which energy can be transferred and stored, how to reduce energy transfers, and the renewable and non-renewable resources we use in everyday life.

Skills developed:

Maths Skills: Recognise and use expressions in decimal form/Use ratios, fractions and percentages/Make estimates of the results of simple calculations/Use an appropriate number of significant figures/Understand and use the symbols: =, <, <<, >>, >, ∝, ~/Change the subject of an equation/Substitute numerical values into algebraic equations using appropriate units for physical quantities/Solve simple algebraic equations

Understanding (In this topic you will learn):

- How energy is stored and transferred and how to represent these transfers using diagrams.
- How to calculate efficiency and reduce wasted energy.
- Hoe to calculate the amount of gravitational potential energy or kinetic energy in stored objects.
- About the different renewables and non-renewable sources of energy.

Links to previous study (you previously learnt in KS3):

- How energy can be transferred by conduction, convection and radiation, and about ways to reduce heat loss.
- That energy is conserved and can either be stored or transferred.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 11, A level Physics and many areas of employment e.g. Eco-scientist.

KS4 Combined Science

CP3 Conservation of Energy

Number of lessons: 8

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Energy stores and transfers	
2	Energy efficiency	
3	Keeping warm	
4	Stored energies	
5	Non-renewable resources	
6	Renewable resources	
7	Preparing for assessment/exams	
8	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 177-194.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
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Use of assessment result(s):

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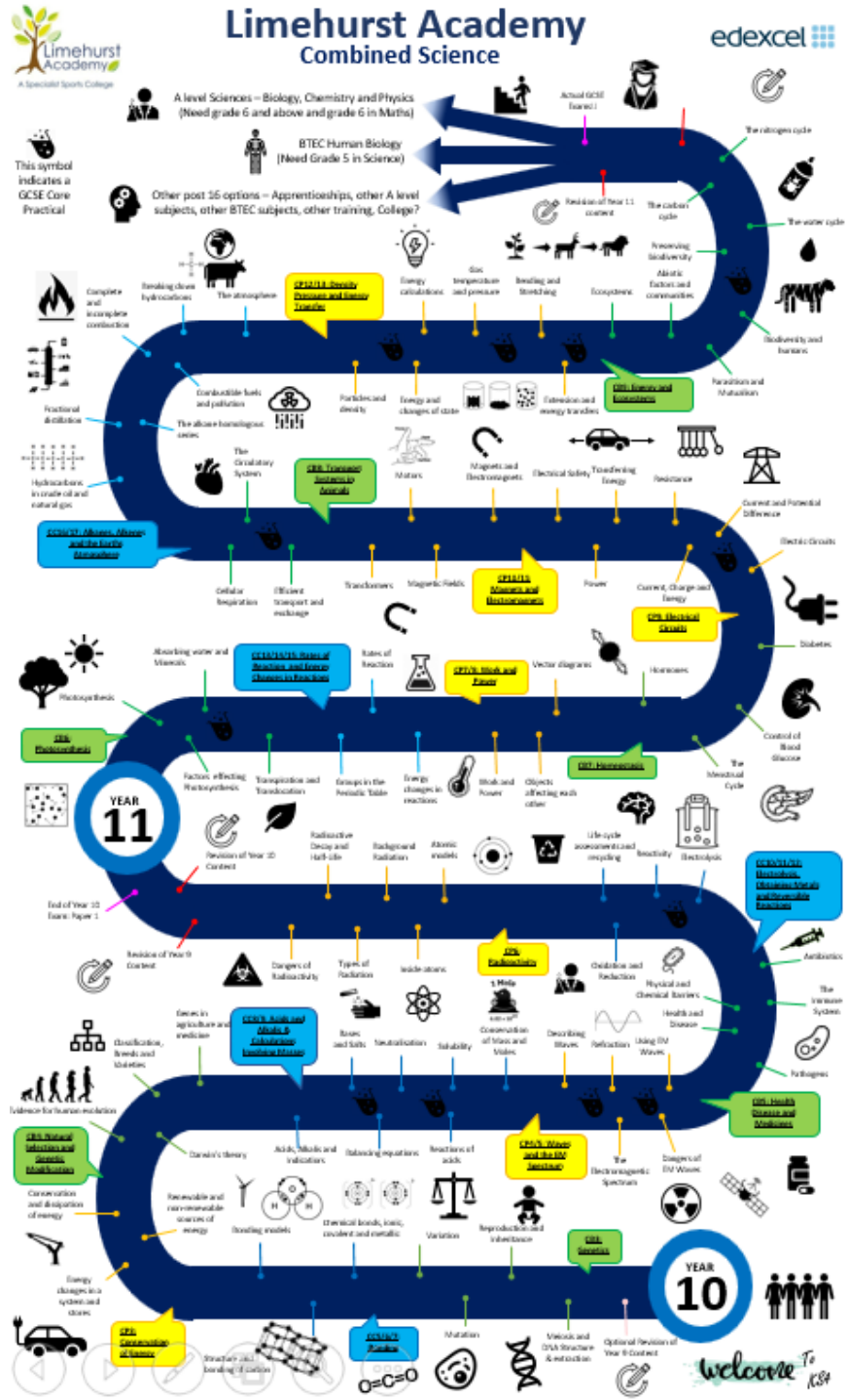

KS4 Combined Science

CP4/5 Waves, Light and the Electromagnetic Spectrum

Knowledge acquired:

In this unit you will learn about the ways in which light moves and behaves and about the different forms of radiation that we cannot see, their uses and dangers.

Skills developed:

Maths Skills: Recognise and use expressions in decimal form/Recognise and use expressions in standard form/Use an appropriate number of significant figures/Find arithmetic means/Understand and use the symbols: =, <, <<, >>, >, ∝, ~/Change the subject of an equation/Substitute numerical values into algebraic equations using appropriate units for physical quantities/Solve simple algebraic equations
Core Practical Skills: Investigating waves / Investigating refraction

Understanding (In this topic you will learn):

- That light is a part of a family of waves called the electromagnetic spectrum, which all have some properties in common.
- About some of the uses of the waves in the different parts of the electromagnetic spectrum.
- About some of the harmful effects of the waves in different parts of the electromagnetic spectrum.

Links to previous study (you previously learnt in KS3):

- That light transfers energy.
- About colours and how different colours are absorbed and reflected differently.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 11, A level Physics and many areas of employment e.g. Light designer.

KS4 Combined Science

CP4/5 Waves, Light and the Electromagnetic Spectrum

Number of lessons: 12

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Describing waves	
2	Wave speeds	
3	Investigating waves	*
4	Refraction	
5	Electromagnetic waves	
6	Investigating refraction	*
7	The electromagnetic spectrum	
8	Using the longer wavelengths	
9	Using the short wavelengths	
10	EM radiation dangers	
11	Preparing for assessment/exams	
12	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 177-194.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
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Use of assessment result(s):

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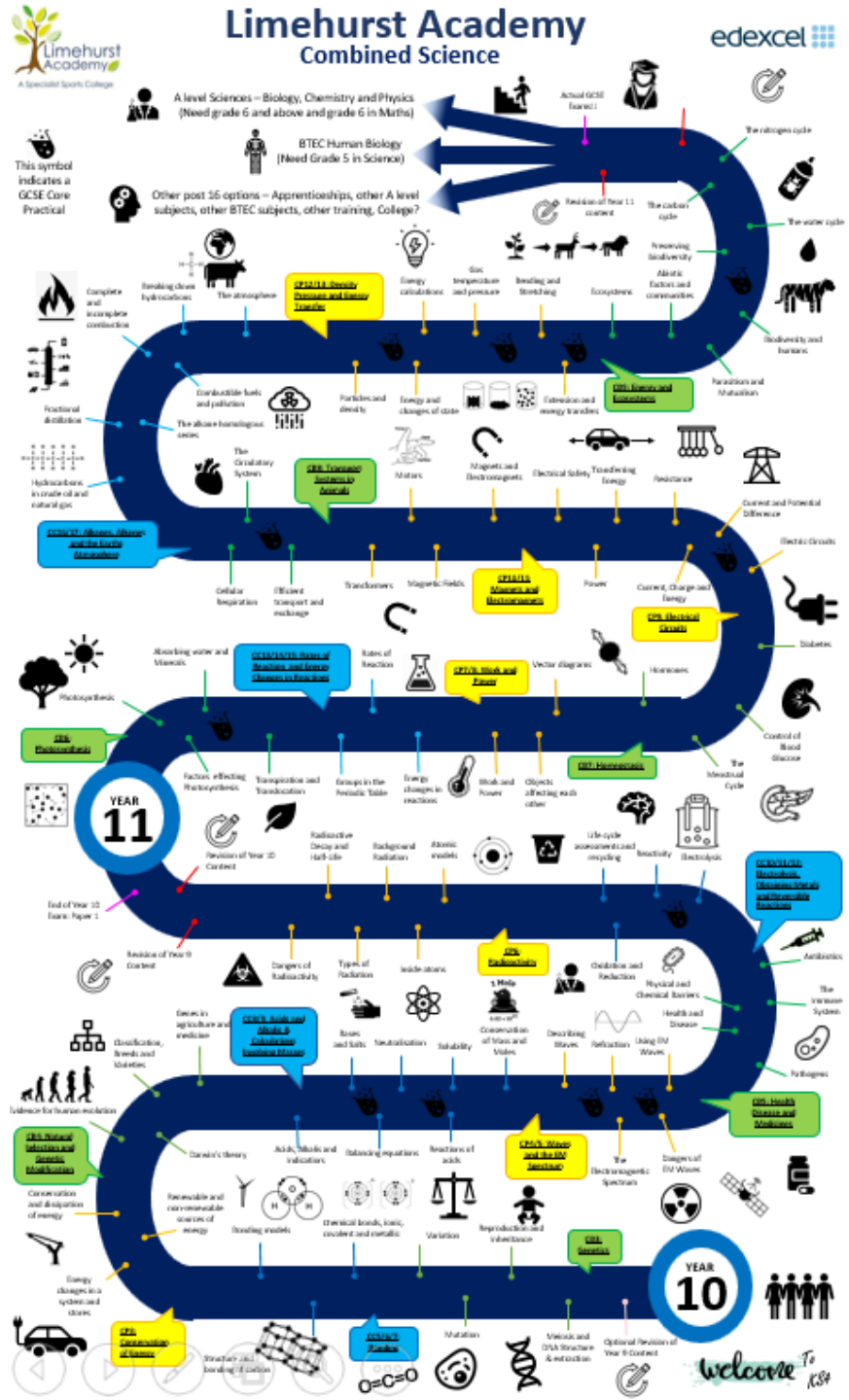

KS4 Combined Science

CP6 Radioactivity

Knowledge acquired:

In this unit you will find out more about atoms and their structure, and how atoms can produce radioactivity when they change.

Skills developed:

Maths Skills: Recognise and use expressions in decimal form/Recognise and use expressions in standard form/Use an appropriate number of significant figures/Find arithmetic means/Understand and use the symbols: =, <, <<, >>, >, ∝, ~/Change the subject of an equation/Substitute numerical values into algebraic equations using appropriate units for physical quantities/Solve simple algebraic equations.

Understanding (In this topic you will learn):

- How the particles inside an atom are arranged and how represent them using symbols.
- About the different types of radiation and how they affect atoms.
- About background radiation that is all around us.
- About the dangers of radiation and how we protect ourselves.

Links to previous study (you previously learnt in KS3):

- About the particle model of matter.
- That atoms contain smaller charged particles called electrons.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 11, A level Physics and many areas of employment e.g. British Nuclear Fuels.

KS4 Combined Science

CP6 Radioactivity

Number of lessons: 10

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Atomic models	
2	Inside atoms	
3	Electrons and orbits	
4	Background radiation	
5	Types of radiation	
6	Radioactive decay	
7	Half-life	
8	Dangers of radioactivity	
9	Preparing for assessment/exams	
10	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 177-194.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
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Use of assessment result(s):

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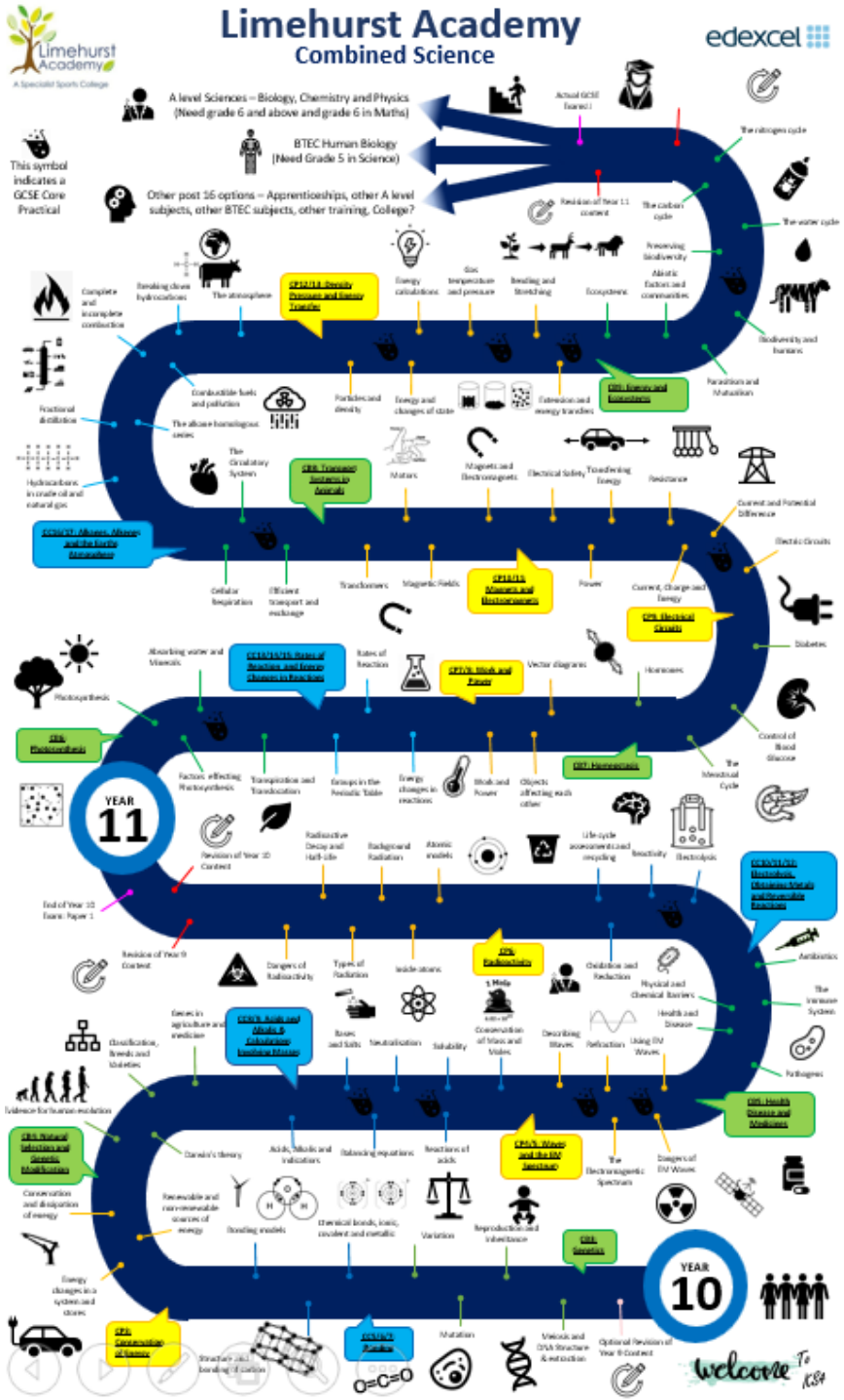

KS4 Combined Science

CP7/8 Energy, Forces Doing Work and their Effects

Knowledge acquired:

In this unit you will find out more about atoms and their structure, and how atoms can produce radioactivity when they change.

Skills developed:

Maths Skills: Recognise and use expressions in decimal form/Use ratios, fractions and percentages/Understand and use the symbols: =, <, <<, >>, >, ⍰, ~/Change the subject of an equation/Substitute numerical values into algebraic equations using appropriate units for physical quantities/Solve simple algebraic equations.

Understanding (In this topic you will learn):

- About how the energy in a system can be changed.
- How to calculate power and work done.
- How objects interact with each other, through force fields and contact forces.
- How to use vector diagrams to work out the effects of forces on an object.

Links to previous study (you previously learnt in KS3):

- The ways that energy can be stored and transferred, about balanced and unbalanced forces and diagrams to represent them.

Links to previous study (you previously learnt in CP1 and CP3):

- About scalar and vector quantities, how to calculate potential energies and represent them in diagrams.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Physics and many areas of employment e.g. Engineering.

KS4 Combined Science

CP7/8 Energy, Forces Doing Work and their Effects

Number of lessons: 5

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Work and power	
2	Objects affecting each other	
3	Vector diagrams	
4	Preparing for assessment/exams	
5	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 177-194.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

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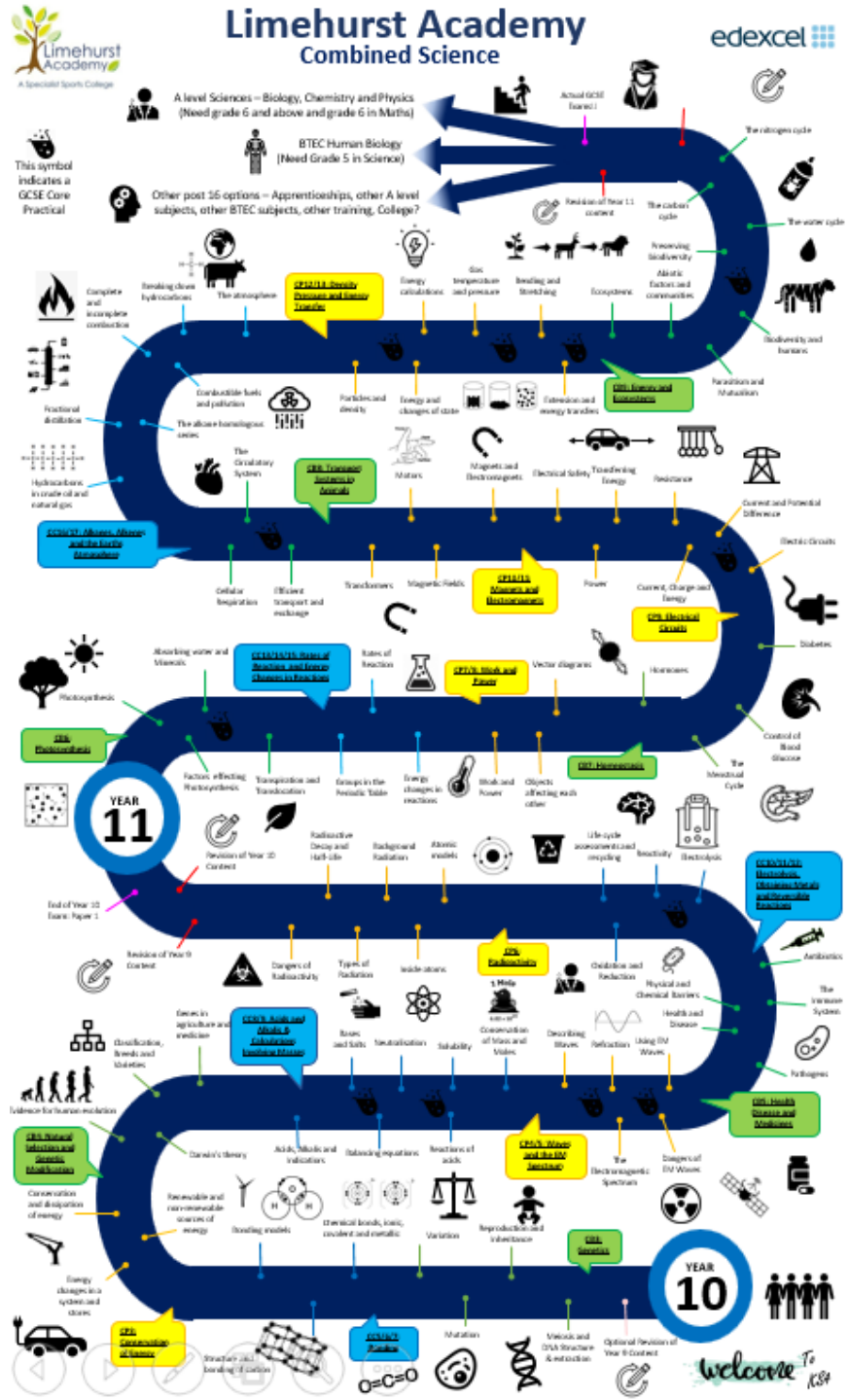

KS4 Combined Science

CP9 Electricity and Circuits

Knowledge acquired:

In this unit you will learn how electricity is supplied to hospitals, homes and factories, and about its effects and uses in many different types of circuits.

Skills developed:

Maths Skills: Recognise and use expressions in decimal form/Recognise and use expressions in standard form/Use an appropriate number of significant figures/Understand and use the symbols:=, <, <<, >>, >,∝, ~/Change the subject of an equation/Substitute numerical values into algebraic equations using appropriate units for physical quantities/Solve simple algebraic equations/Visualise and represent 2D and 3D forms, including two dimensional representations of 3D objects
Core Practical Skills: Investigating resistance

Understanding (In this topic you will learn):

- About current, charge, and potential difference and how to calculate resistance, power and energy transferred.
- About components with changing resistance.
- About the UK domestic electricity supply and electrical safety features in homes.

Links to previous study (you previously learnt in KS3):

- That electrical current is measured in amps and voltage is measured in volts.
- That circuits can be connected in series and parallel, and conductors have high resistance and insulators low.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Physics and many areas of employment e.g. Light designer.

KS4 Combined Science

CP9 Electricity and Circuits

Number of lessons: 11

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Electric circuits	
2	Current and potential difference	
3	Current, charge and energy	
4	Resistance	
5	More about resistance	
6	Investigating resistance	*
7	Transferring energy	
8	Power	
9	Transferring energy by electricity	
10	Electrical safety	
11	Preparing for assessment/exams	
12	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 177-194.
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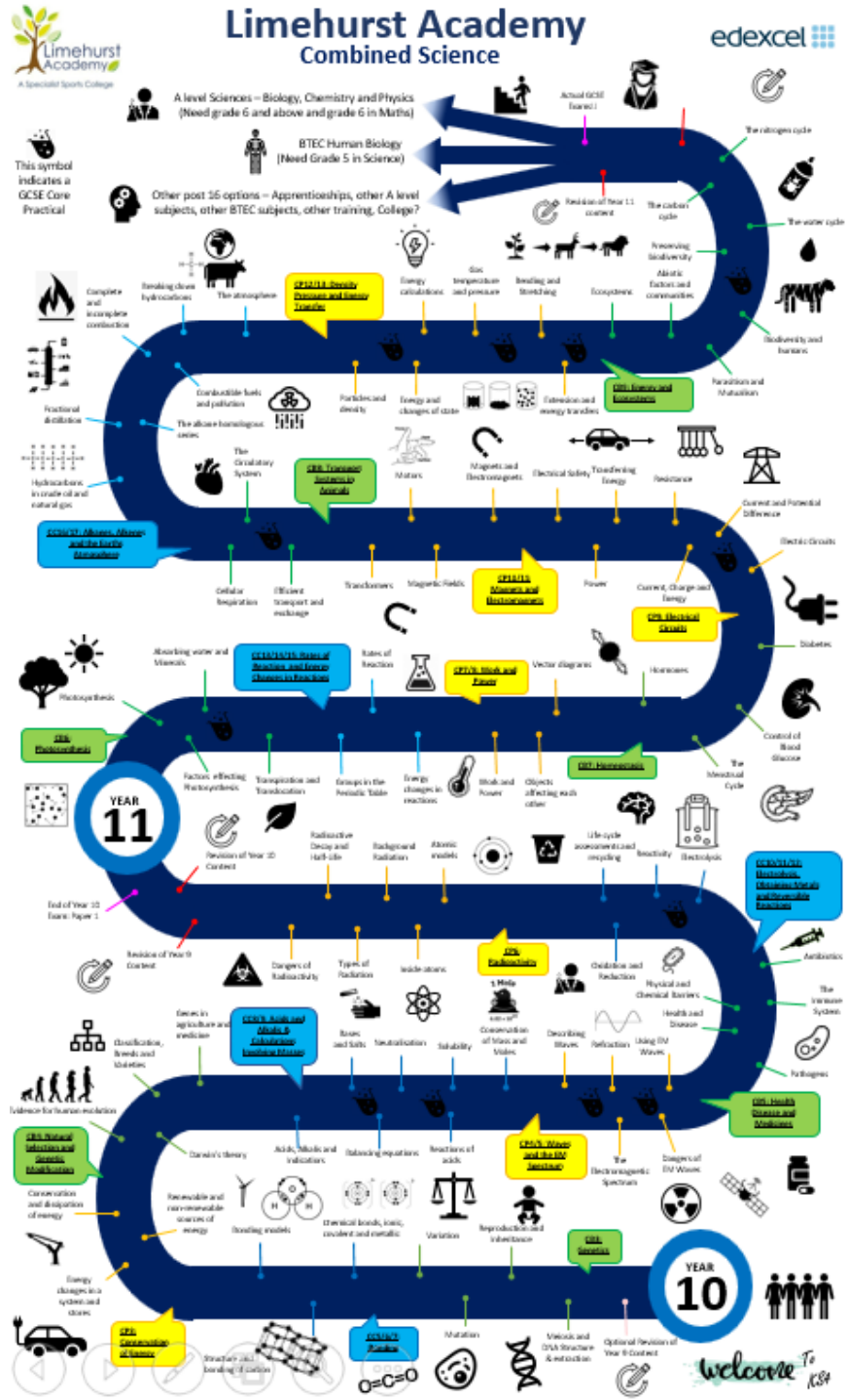

KS4 Combined Science

CP10/11 Magnetism and Electromagnetic Induction

Knowledge acquired:

In this unit you will learn about magnetic fields and how they are used to produce forces and to change the voltage of electricity supplies.

Skills developed:

Maths Skills: Recognise and use expressions in decimal form/Use an appropriate number of significant figures/Understand and use the symbols:=, <, <<, >>, >,∝, ~/Change the subject of an equation/Substitute numerical values into algebraic equations using appropriate units for physical quantities/Solve simple algebraic equations

Understanding (In this topic you will learn):

- About permanent and induced magnets and how to represent a magnetic field.
- About the magnetic field around a current in a wire and the factors that effect it and how the fields interact.
- How to use the power equation for transformers and how transformers are used in the National Grid.
- How current can be induced in a wire and the factors that effect it.
- How to calculate the size of the force on a wire carrying a current in a magnetic field.
- How to work out the direction of the force on a wire carrying a current in a magnetic field.

Links to previous study (you previously learnt in KS3):

- How to plot the shape of a magnetic field and that electric currents cause magnetic fields.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Physics and many areas of employment e.g. Electrical engineer.

KS4 Combined Science

CP10/11 Magnetism and Electromagnetic Induction

Number of lessons: 7

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Magnets and magnetic fields	
2	Electromagnetism	
3	Magnetic forces	
4	Transformers	
5	Transformers and energy	
6	Preparing for assessment/exams	
7	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 177-194.
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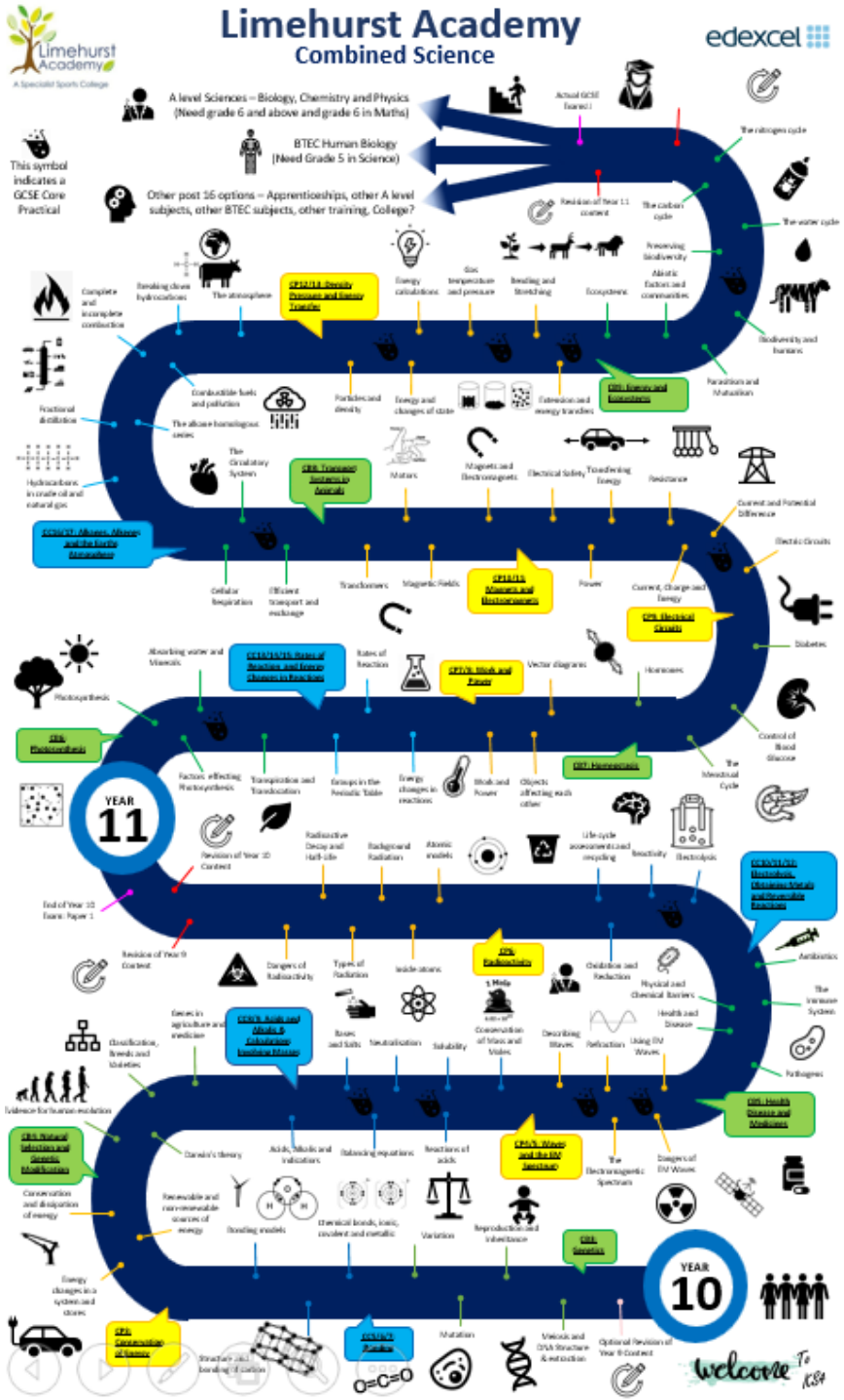

KS4 Combined Science

CP12/13 Particle Model and, Forces and Matter

Knowledge acquired:

In this unit you will how the particle model explains the properties of matter and what happens when energy is transferred to or from a substance. You will also learn about springs and the energy transfers in stretching them.

Skills developed:

Maths Skills: Make estimates of the results of simple calculations/Change the subject of an equation/Substitute numerical values into algebraic equations using appropriate units for physical quantities/Solve simple algebraic equations

Core Practical Skills: Investigating densities / Investigating water / Investigating springs

Understanding (In this topic you will learn):

- How to explain and calculate different densities.
- About specific heat capacity and specific latent heat and how to calculate them.
- How changing the temperature of a gas effects its pressure and about the Kelvin and Celsius scales.
- About elastic and inelastic distortions and how to calculate the extensions of springs and their constants.

Links to previous study (you previously learnt in KS3):

- That mass is conserved during changes of state, about the properties of solids, liquids and gases, and how those particles are arranged.

Links to previous study (you previously learnt in CP2):

- Some of the effects that forces have on objects.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Physics and many areas of employment e.g. Structural engineer.

KS4 Combined Science

CP12/13 Particle Model and, Forces and Matter

Number of lessons: 11

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Particles and density	
2	Investigating densities	*
3	Energy and changes of state	
4	Energy calculations	
5	Investigating water	*
6	Gas temperature and pressure	
7	Bending and stretching	
8	Investigating springs	*
9	Extension and energy transfers	
10	Preparing for assessment/exams	
11	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 177-194.
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- Students receive regular verbal feedback as they complete tasks.
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- Final assessment: assessed within Physics Paper 2 (sat in June of Year 11).

Use of assessment result(s):

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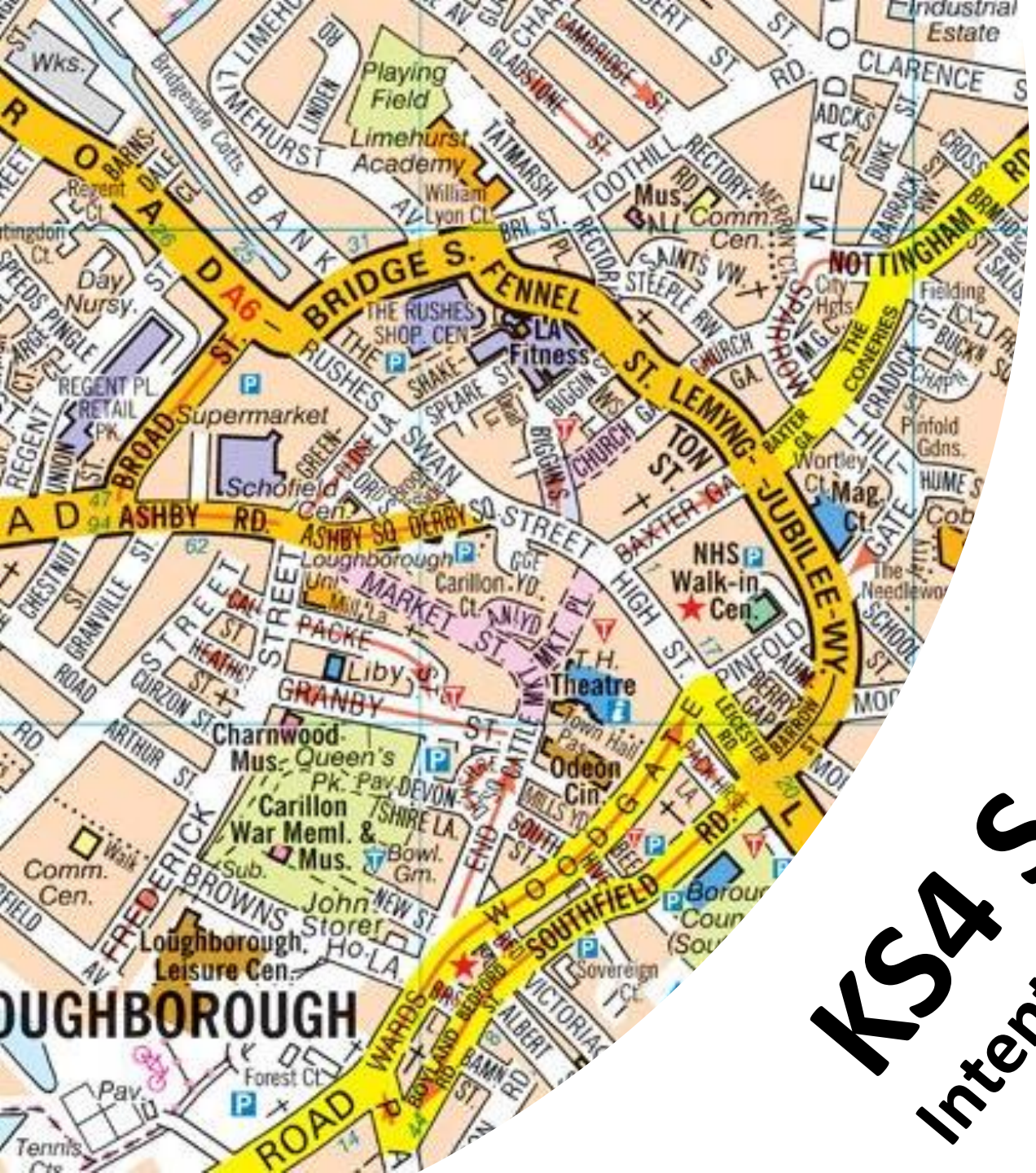
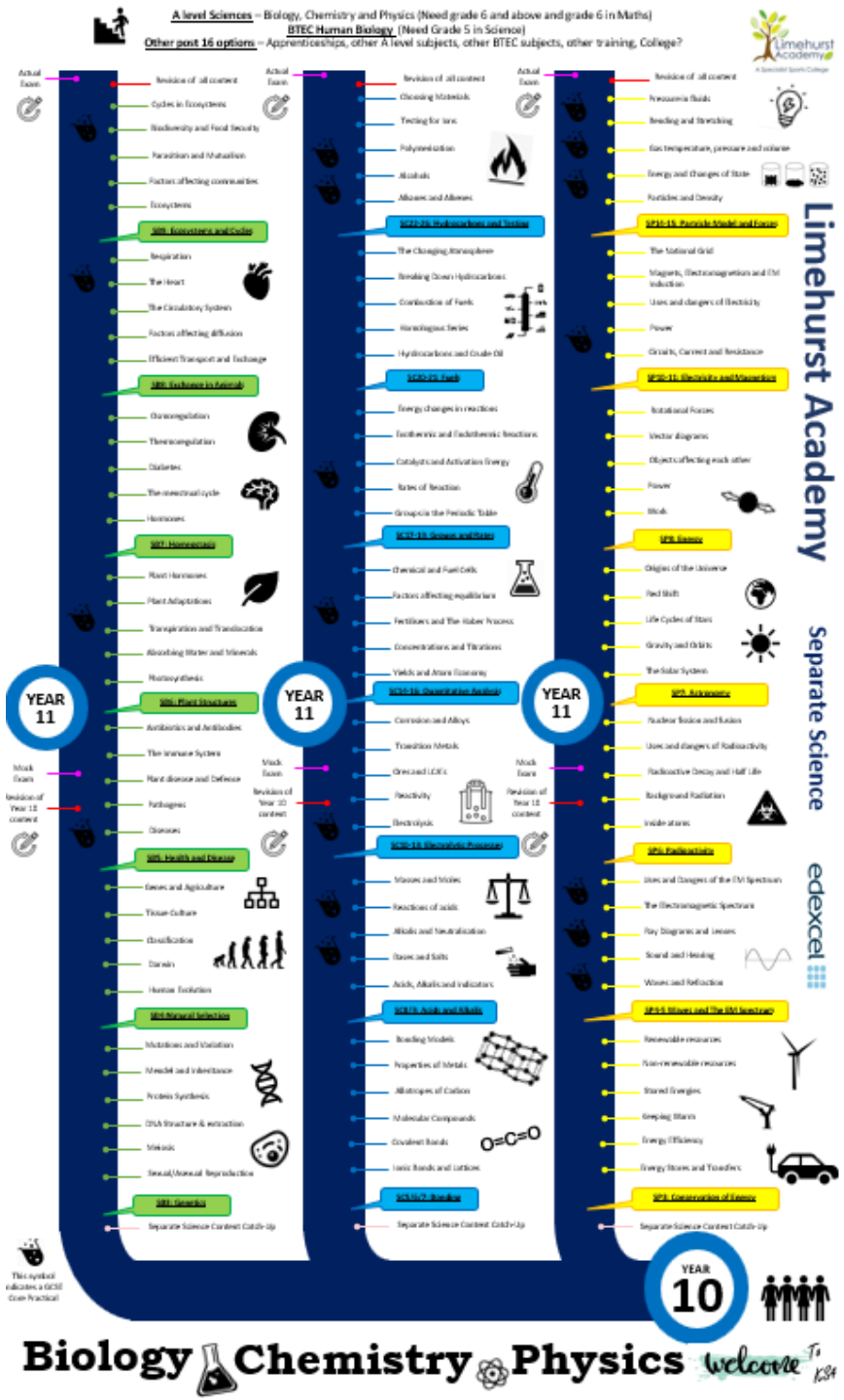


KS4 Separate Science

Intent & Implementation

Limehurst Science Department



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SB1 Key Concepts in Biology

Knowledge acquired:

In this unit you will learn about some of the central ideas in biology, including ideas about cells, microscopy, enzymes, nutrition, diffusion, osmosis and active transport.

Skills developed:

Maths Skills: orders of magnitude / magnification calculations / making estimates / size and scale / standard form

Core Practical Skills: Using Microscopes / pH and Enzymes / Osmosis in potato slices / Testing foods

Understanding (In this topic you will learn):

- How developments in microscopy have allowed us to find out more about the sub-cellular structures found in plant, animal and bacterial cells.
- About the importance of enzymes in nutrition, growth and development and how to test foods for these.
- How enzymes are effected by pH and temperature and why each enzyme only works on a certain type of molecule
- How substances are carried by diffusion, osmosis and active transport.

Links to previous study (you previously learned in KS3):

- How to use a microscope
- About the differences between cells from different organisms
- How some cells are specialised and adapted to their functions
- How enzymes help to digest food in the digestive system.

Links to future study / the wider world (where applicable):

Links to Paper 1 and 2 in year 11, A level Biology/Human Biology and many areas of employment e.g. detergents.

KS4 Combined Science

SB1 Key Concepts in Biology

Number of lessons: 15

Sequence of Lessons

Lesson	Lesson title	Core Practical
1	Microscopes	
2	Plant and Animal Cells	
3	Using Microscopes	*
4	Specialised cells	
5	Inside bacteria	
6	Enzymes and nutrition	
7	Testing foods	
8	Testing foods	*
9	Enzyme action	
10	Enzyme activity	
11	pH and enzymes	*
12	Transporting substances	
12	Osmosis in potato slices	*
14	Preparing for assessment/exams	
15	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Biology pages 2-28.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

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- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
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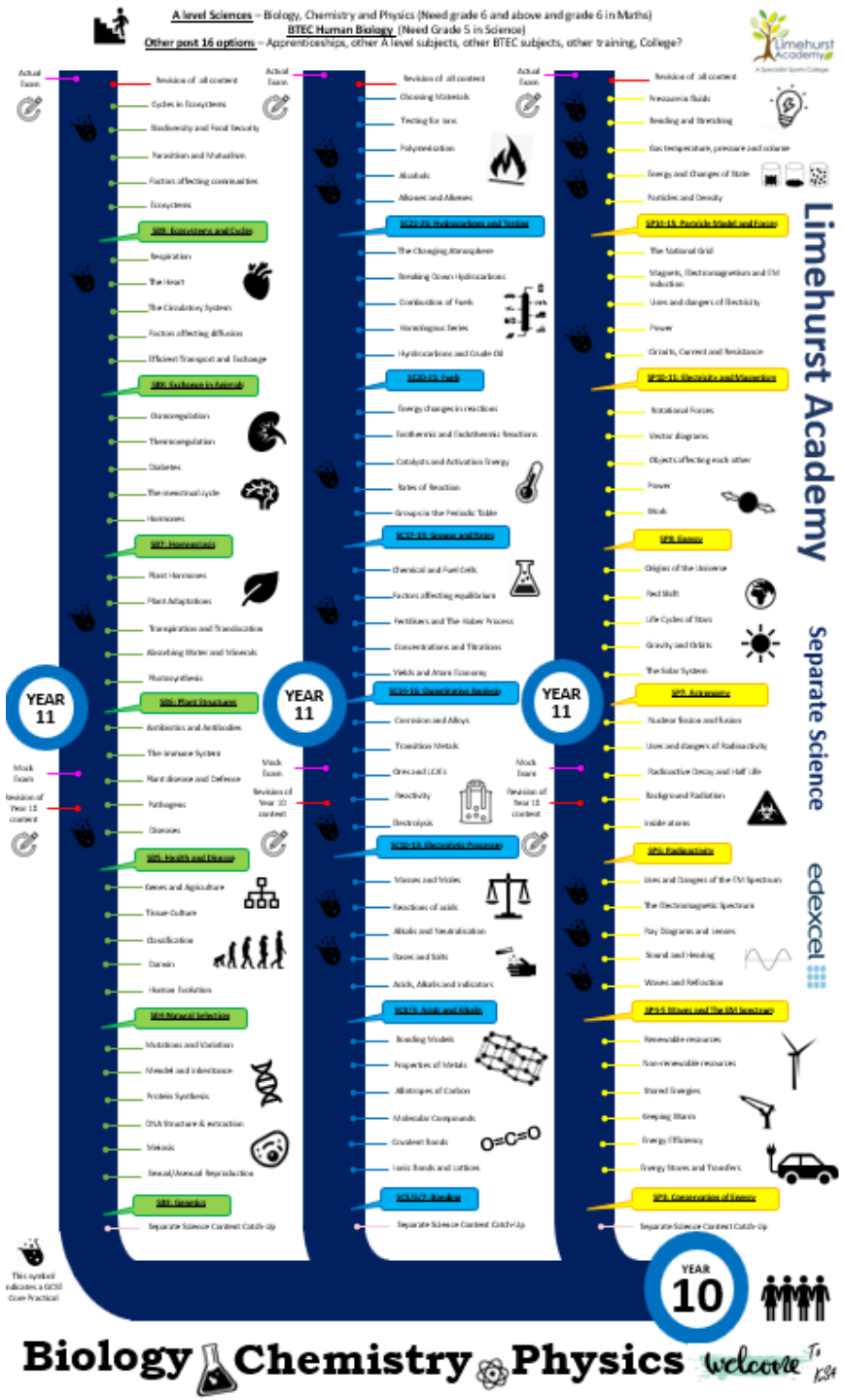
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Biology Paper 1 and 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SB2 Cells and Control

Knowledge acquired:

In this unit you will discover how plants and animals develop from single cells the size of full stops to become complex organisms made of many different types of cells, which all need to be controlled and coordinated.

Skills developed:

Maths Skills: Using ratios, fractions and percentages / averages / transferring data between graphs and numbers

Core Practical Skills: N/A

Understanding (In this topic you will learn):

- About mitosis and its importance in growth, repair and asexual reproduction.
- How cells become specialised, and the importance of stem cells.
- To identify different specialised cells in the nervous system and explain how the system works.
- About the structure and function of the brain.

Links to previous study (you previously learnt at KS3):

- That cells divide.
- About the structure of plant and animal cells.
- That your nervous system helps to coordinate your actions.

Links to future study / the wider world (where applicable):

Links to Paper 1 and 2 in year 11, A level Biology/Human Biology/Genetics and many areas of employment e.g. development of gene therapy.

KS4 Combined Science

SB2 Cells and Control

Number of lessons: 11

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Mitosis	
2	Growth in Animals	
3	Growth in Plants	
4	Stem cells	
5	The brain	
6	Brain and spinal cord problems	
7	The nervous system	
8	The eye	
9	Neurotransmission speeds	
10	Preparing for assessment/exams	
11	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Biology pages 30-48.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

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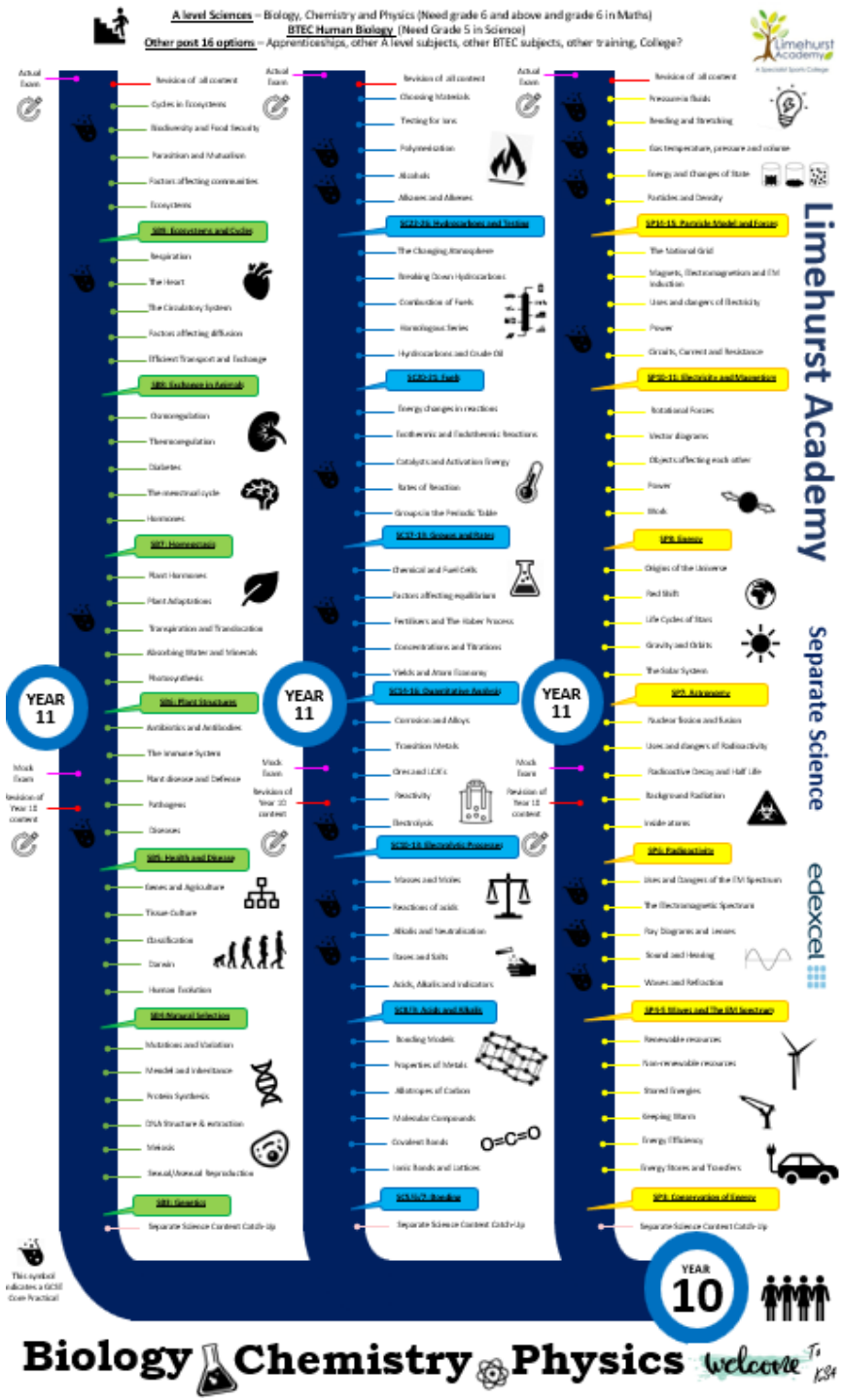
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Biology Paper 1 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SB3 Genetics

Knowledge acquired:

In this unit you will learn about the DNA code that produces our features and the processes that allow features to be passed on from parents to there offspring.

Skills developed:

Maths Skills: Using ratios, fractions and percentages / Construction frequency charts, bar charts and histograms

Core Practical Skills: Extracting DNA

Understanding (In this topic you will learn):

- How gametes are produced by meiosis.
- About the structure of DNA and how this helps to synthesise protein.
- About mutations and how genes cause genetic variation and how Mendel helped form these ideas.
- Why certain characteristics are passed down through families.

Links to previous study (you previously learnt in KS3):

- About the differences between environmental and inherited variation.
- How two gametes fuse during fertilisation to produce a single zygote.
- How the nuclei of eukaryotic cells contain chromosomes that contain DNA.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 10, A level Biology/Human Biology and many areas of employment e.g. geneticist.

KS4 Combined Science

SB3 Genetics

Number of lessons: 13

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Sexual and asexual reproduction	
2	Meiosis	
3	DNA	
4	DNA extraction	*
5	Protein synthesis	
6	Genetic variation and phenotypes	
7	Mendel	
8	Alleles	
9	Inheritance	
10	Gene mutation	
11	Variation	
12	Preparing for assessment/exams	
13	End of Module Assessment	

Main resources:

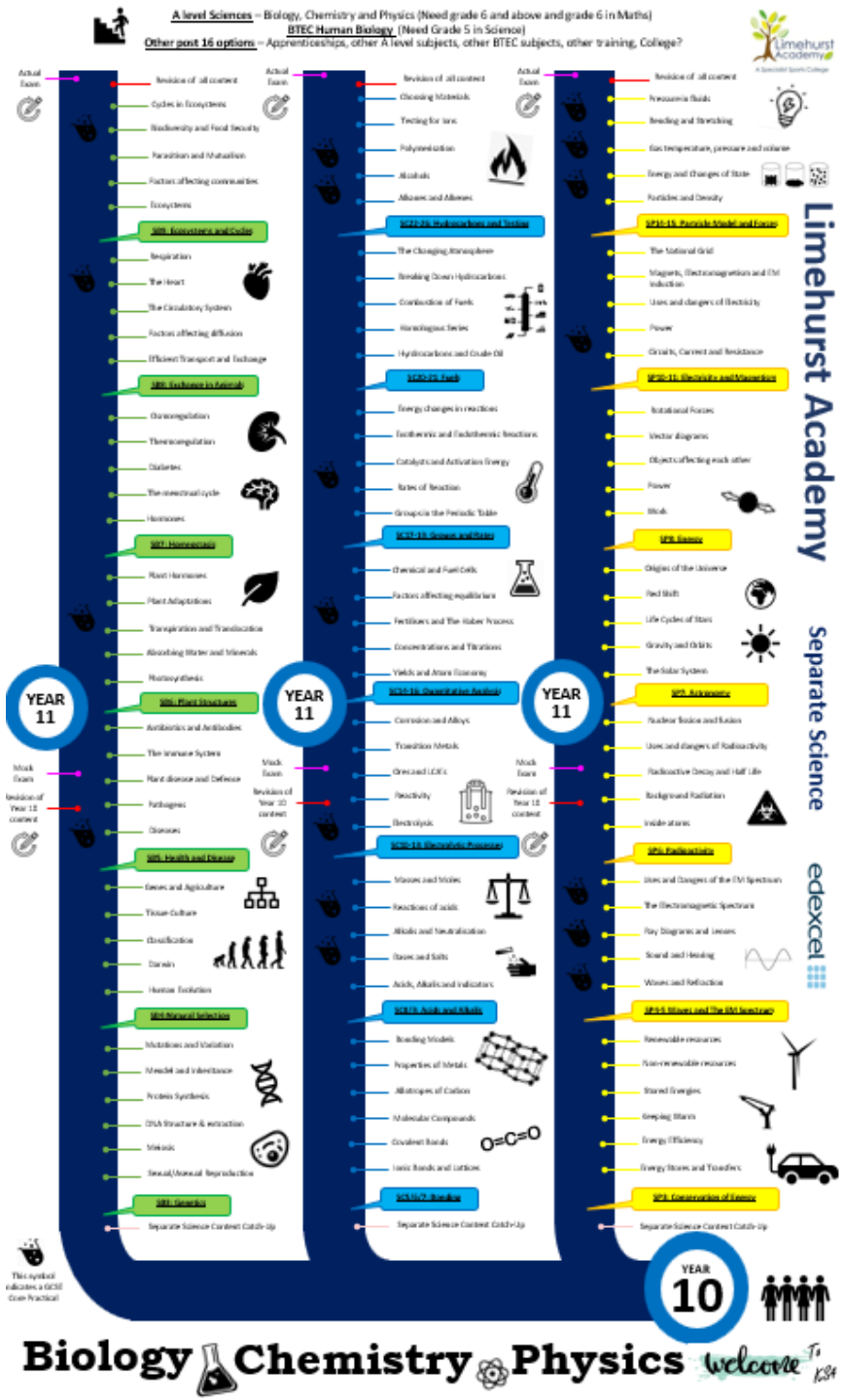
- Pearson Edexcel (9-1) Combined Science pages 50-74.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Biology Paper 1 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SB4 Natural Selection and Genetic Modification

Knowledge acquired:

In this unit you will find out more about how organisms are changed genetically by natural selection and by humans.

Skills developed:

Maths Skills: Decimal numbers / Understanding ratios, fractions and percentages / Constructing charts and graphs

Core Practical Skills: N/A

Understanding (In this topic you will learn):

- About Darwin's theory of evolution by natural selection.
- How different methods, including genetic analysis, are being used to investigate evolution.
- How organisms are classified.
- About selective breeding and how tissue culture is carried out..
- How gene modification is done and how these ideas are utilised in agriculture.

Links to previous study (you previously learnt at KS3):

- That organisms change over time (evolution).
- That Charles Darwin came up with a theory to explain this.
- About how DNA contains instructions for the characteristics of organisms.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 10, A level Biology/Human Biology and many areas of employment e.g. medicine.

KS4 Combined Science

SB4 Natural Selection and Genetic Modification

Number of lessons: 11

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Evidence for human evolution	
2	Darwin's theory	
3	Development of Darwin's theory	
4	Classification	
5	Breeds and varieties	
6	Tissue culture	
7	Genes in agriculture and medicine	
8	GM and agriculture	
9	Fertilisers and biological control	
10	Preparing for assessment/exams	
11	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 76-94.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
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- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Biology Paper 1 (sat in June of Year 11).

Use of assessment result(s):

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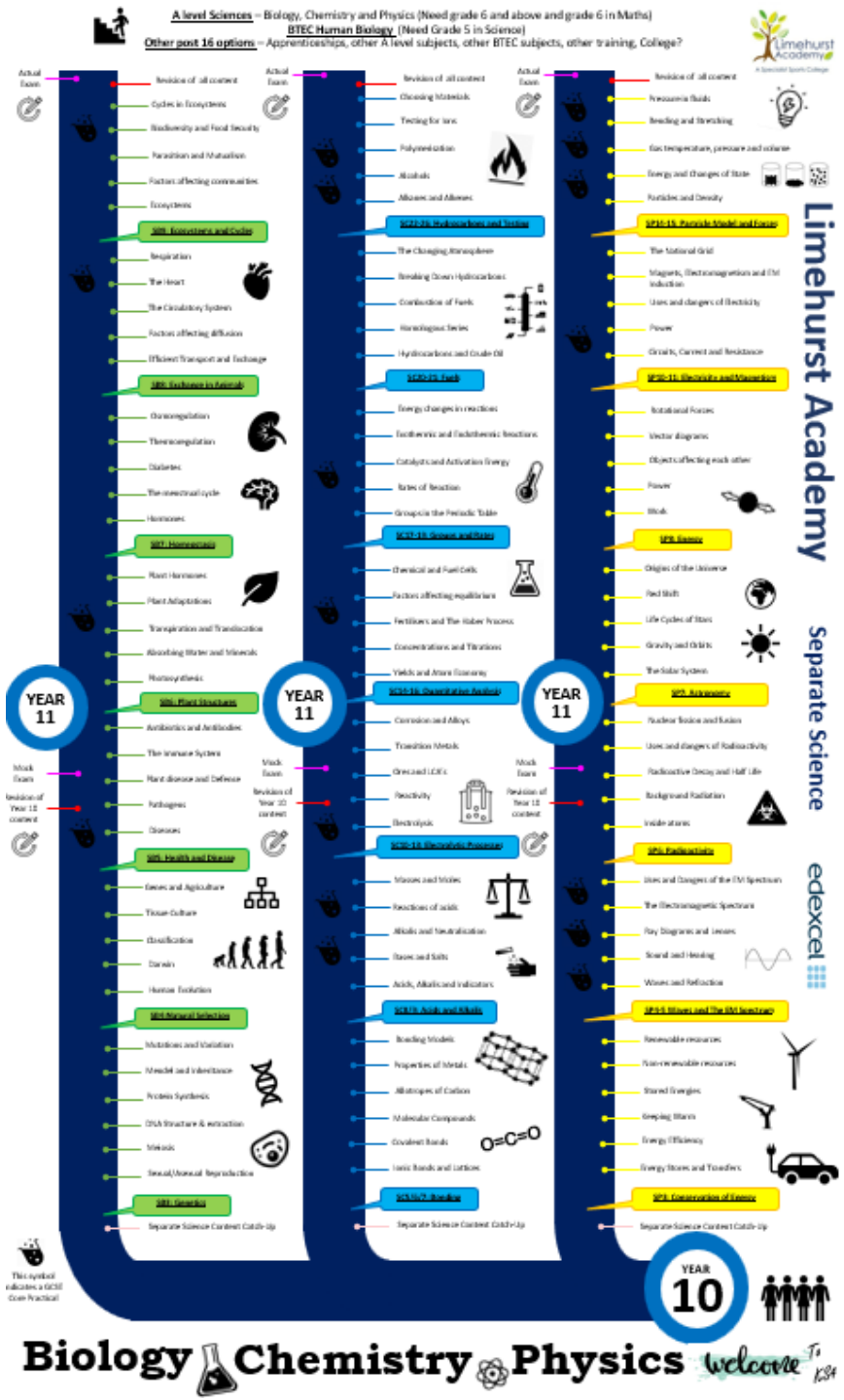


KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SB5 Health, Disease and the Development of Medicines

Knowledge acquired:

In this unit you will find out about how we define health and how we can use science to keep people healthy.

Skills developed:

Maths Skills: Construction and interpret frequency charts, bar charts and histograms / Understand sampling

Core Practical Skills: Antibiotics

Understanding (In this topic you will learn):

- About we define health.
- About how pathogens cause disease in animals and plants, and how they spread.
- How the body is protected against infection and how the immune system works.
- How antibiotics work, how monoclonal antibodies are made and how medicines are developed and tested.

Links to previous study (you previously learned in KS3):

- That imbalances in diet can lead to obesity and deficiency diseases.
- That recreational drugs can affect behaviour, health and life processes.

Links to previous study (you previously learned in CB1):

- About the structure of bacteria.
- About the use of microscopes to study cells.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 10, A level Biology/Human Biology and many areas of employment e.g. geneticist.

KS4 Combined Science

SB5 Health, Disease and the Development of Medicines

Number of lessons: 15

Sequence of Lessons

Lesson	Lesson title	Core Practical
1	Health and disease	
2	Non-communicable disease	
3	Cardiovascular disease	
4	Pathogens	
5	Spreading pathogens	
6	Virus life cycles	
7	Plant defences	
8	Plant diseases	
9	Physical and chemical barriers	
10	The immune system	
11	Antibiotics	
12	Testing Antibiotics	*
13	Monoclonal antibodies	
14	Preparing for assessment/exams	
15	End of Module Assessment	

Main resources:

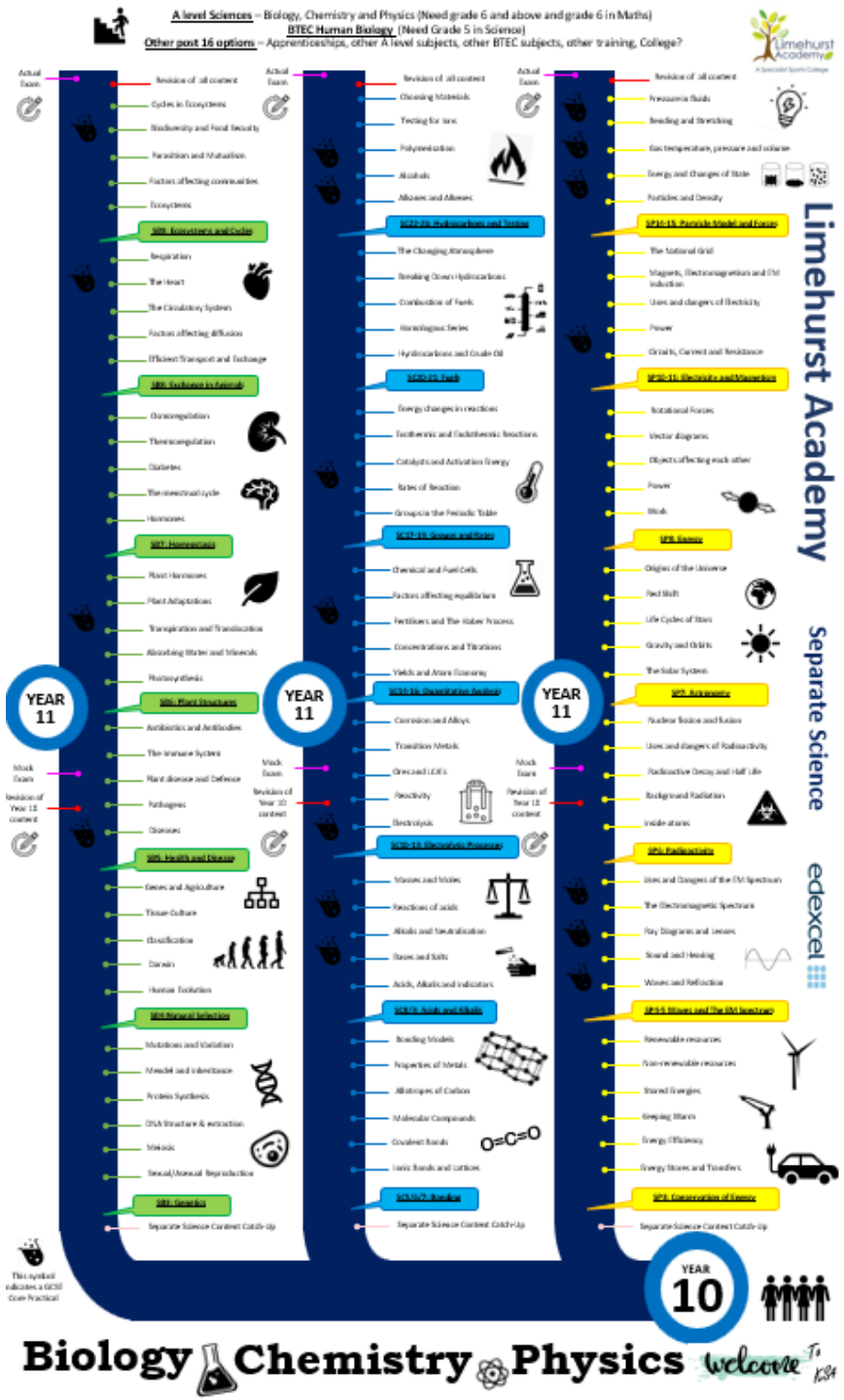
- Pearson Edexcel (9-1) Combined Science pages 96-122.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Biology Paper 1 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SB6 Plant Structures and their Functions

Knowledge acquired:

In this unit you will learn how plants are adapted to exploit the natural environment.

Skills developed:

Maths Skills: Sampling / Averages / Constructing tables and graphs / Modify equations / Work out the slope

Core Practical Skills: Light intensity and photosynthesis.

Understanding (In this topic you will learn):

- More about photosynthesis and how different factors affect its rate.
- How the rate of water uptake by a plant is affected by different factors.
- How the reactants for and products of photosynthesis are transported.
- More about specialised cells (including palisade, root hair, xylem and phloem cells).
- About how plants are adapted to their function, how plant hormones work and how we can utilise them.

Links to previous study (you previously learnt at KS3):

- That plants make their own food using photosynthesis.
- How light and chlorophyll are necessary for photosynthesis.
- Links to previous study (you previously learnt in CB1):
- About certain plant cells being specialised and adapted to their functions.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Biology and Botany and many areas of employment e.g. horticulture.

KS4 Combined Science

SB6 Plant Structures and their Functions

Number of lessons: 10

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Photosynthesis	
2	Factors that affect photosynthesis	
3	Light intensity and photosynthesis	*
4	Absorbing water and mineral ions	
5	Transpiration and translocation	
6	Plant adaptations	
7	Plant hormones	
8	Uses of plant hormones	
9	Preparing for assessment/exams	
10	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 124-140.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
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- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of December Mock in Year 11.
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Use of assessment result(s):

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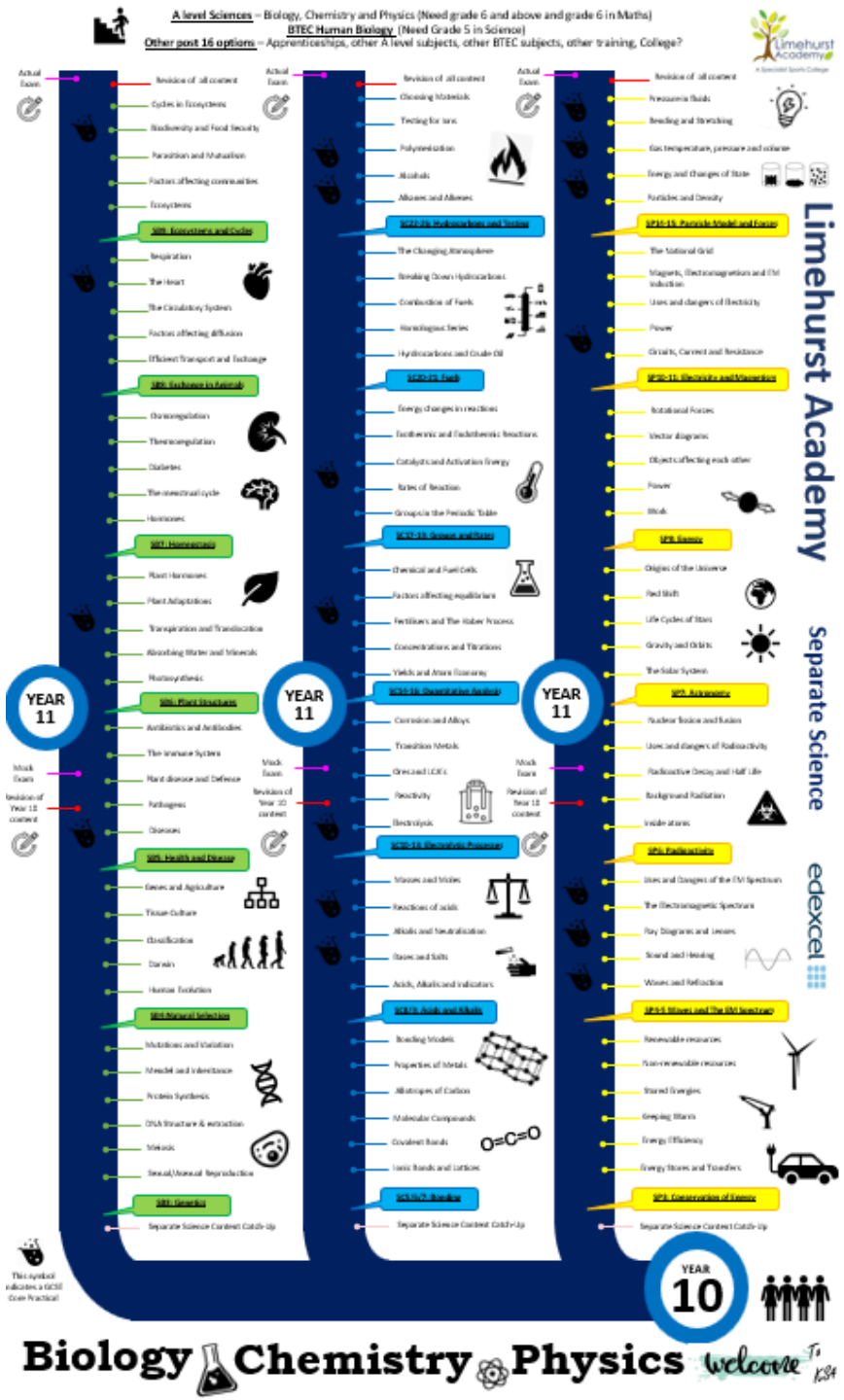

KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SB7 Animal Coordination, Control and Homeostasis

Knowledge acquired:

In this unit you will learn how the human body maintains control of its internal environment.

Skills developed:

Maths Skills: Construction graphs / Understand probability / Use ration, fractions and decimals

Understanding (In this topic you will learn):

- About endocrine glands and how their products are transported to the target organs.
- How the menstrual cycle is controlled and how these hormones are used in contraception.
- How blood sugar is controlled and how thyroxine and adrenaline affect the body.
- What negative feedback is.
- How the body regulates temperature and water content by using the kidney.

Links to previous study (you previously learnt at KS3):

- How obesity is caused.
- About how the human reproductive system works and the menstrual cycle.
- Links to previous study (you previously learnt in CB1):
- About the structure of sperm and egg cells.
- How enzymes help to digest food molecules.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Biology and Human Biology and many areas of employment e.g. dietician.

KS4 Combined Science

CB7 Animal Coordination, Control and Homeostasis

Number of lessons: 11

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Hormones	
2	Hormonal control of metabolic rate	
3	The menstrual cycle	
4	Hormones and the menstrual cycle	
5	Control of blood glucose	
6	Type 2 diabetes	
7	Thermoregulation	
8	Osmoregulation	
9	The kidneys	
10	Preparing for assessment/exams	
11	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 142-160.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
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Use of assessment result(s):

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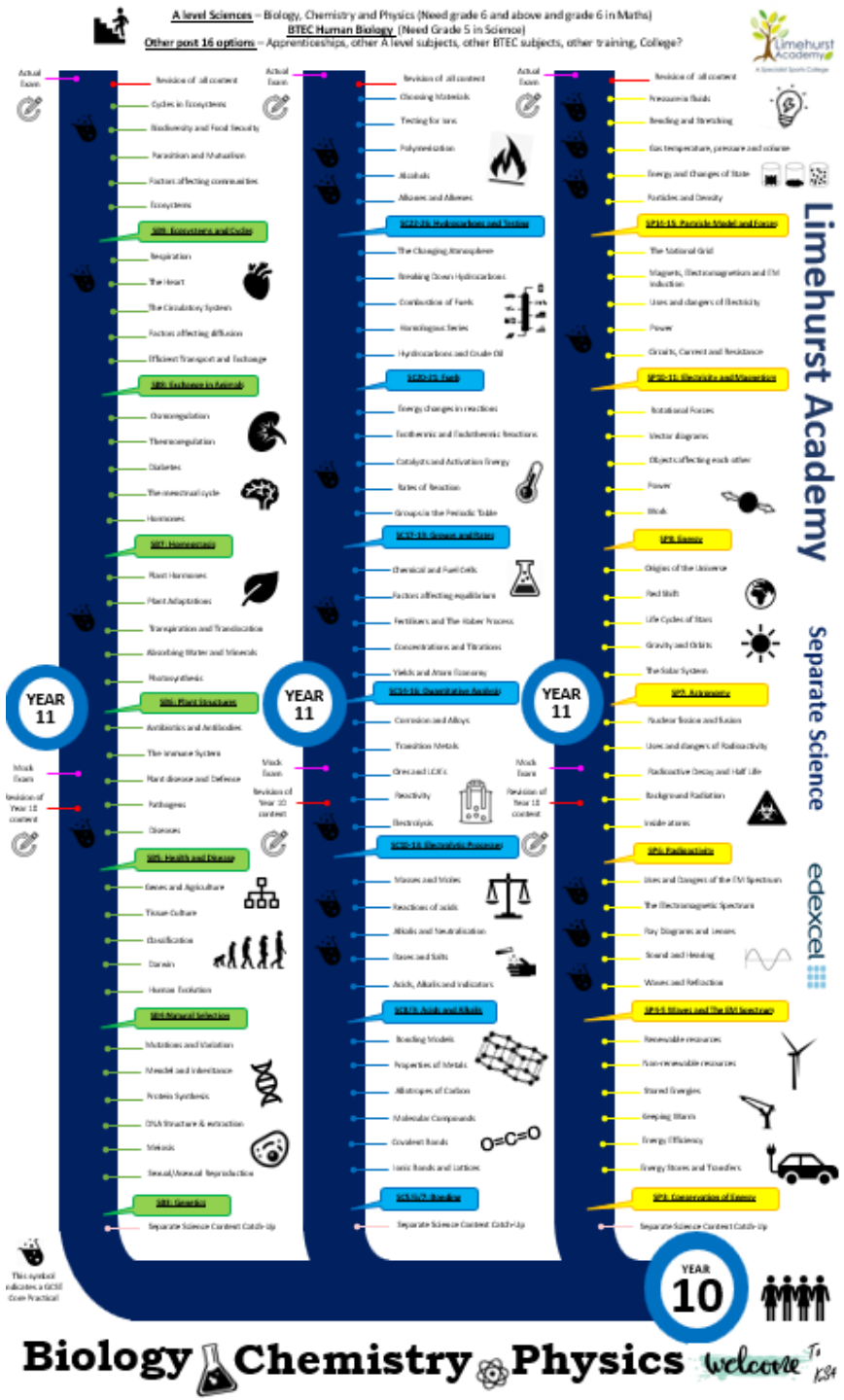

KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SB8 Exchange and Transport in Animals

Knowledge acquired:

In this unit you will find out about the importance of the circulatory system and how it works.

Skills developed:

Maths Skills: Use ratios, fractions & decimals / Areas of triangles, rectangles and the area of a cube / Use equations

Core Practical Skills: Respiration rates.

Understanding (In this topic you will learn):

- More about diffusion, gas exchange, and the surface area:volume ratio.
- How diffusion rates are changed.
- More about the different types of respiration.
- How the circulatory system is adapted and how you calculate cardiac output.

Links to previous study (you previously learnt at KS3):

- How glucose and oxygen are transported around the body.
- About aerobic and anaerobic respiration.
- Links to previous study (you previously learnt in CB1):
- About diffusion.
- About different animal cells and their adaptations.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Biology and Human Biology and many areas of employment e.g. sports coach.

KS4 Combined Science

SB8 Exchange and Transport in Animals

Number of lessons: 8

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Efficient transport and exchange	
2	Factors affecting diffusion	
3	The circulatory system	
4	The heart	
5	Cellular respiration	
6	Respiration rates	*
7	Preparing for assessment/exams	
8	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 162-174.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
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Method(s) of assessment:

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Use of assessment result(s):

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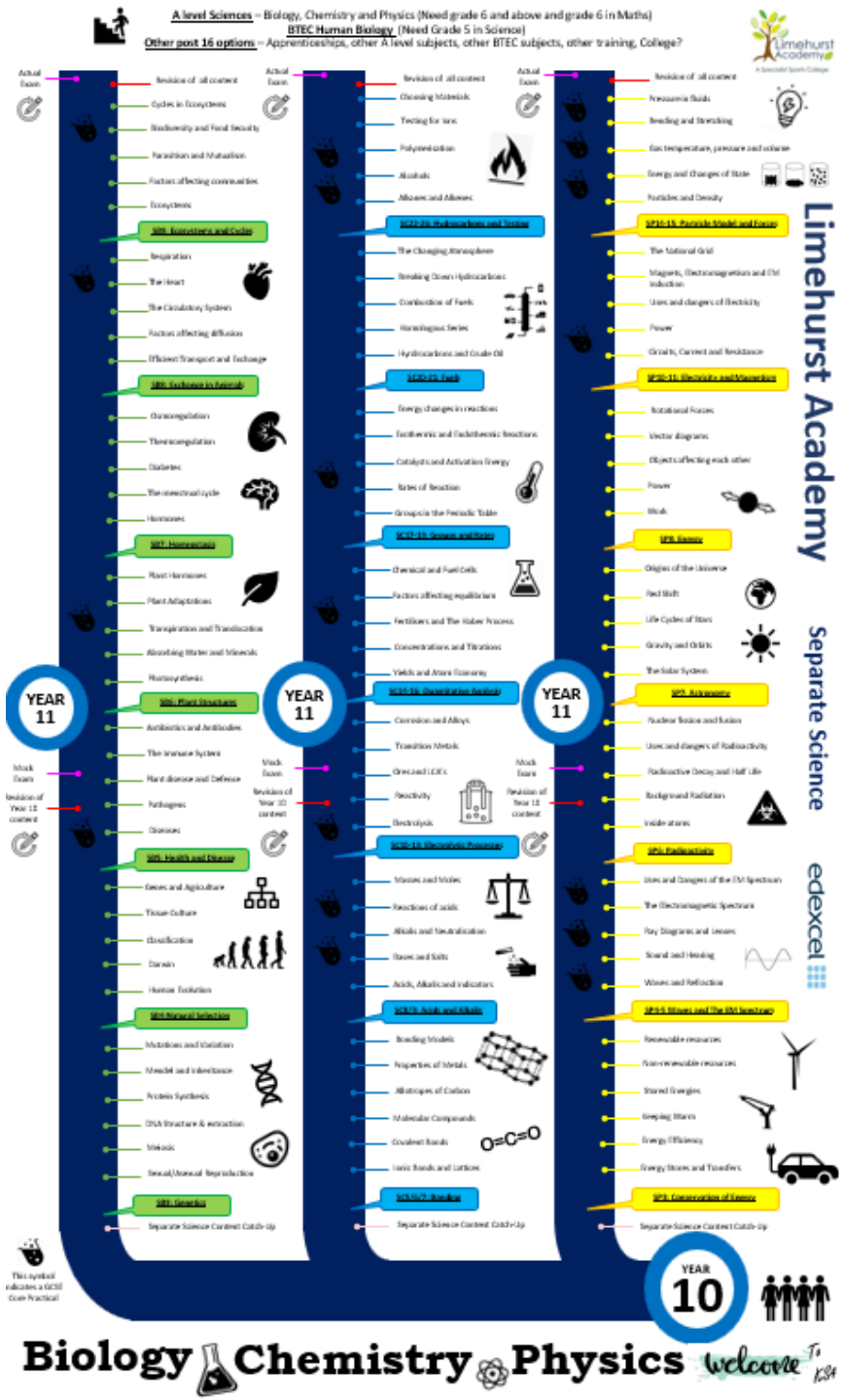

KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SB9 Ecosystems and Material Cycles

Knowledge acquired:

In this unit you will find out about how the organisms in a ecosystem interact and how we can measure them effectively. You will also study how mans effects on these systems can be assessed.

Skills developed:

Maths Skills: Use ratios, fractions & decimals / Areas of triangles, rectangles and the area of a cube / Using equations

Core Practical Skills: Quadrats and transects.

Understanding (In this topic you will learn):

- How ecosystems are organised and how communities are affected by abiotic and biotic factors.
- How the abundance and distribution of organisms are measured.
- About how energy is transferred through trophic levels.
- About parasitism and mutualism.
- About how humans can affect ecosystems and how indictor species can be used to assess pollution levels.
- About the importance of the carbon, water and nitrogen cycles.
- Why the rate of decomposition of food and compost can vary.

Links to previous study (you previously learnt at KS3):

- How almost all life on Earth depends on photosynthesis in plants and algae.
- About the interdependence of organisms and how they are affected by their environments.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Biology and Environmental Science and many areas of employment e.g. Ecologist.

KS4 Combined Science

SB9 Ecosystems and Material Cycles

Number of lessons: 15

Sequence of Lessons

Lesson	Lesson title	Core Practical
1	Ecosystems	
2	Abiotic factors and communities	
3	Quadrats and transects	*
4	Biotic factors and communities	
5	Assessing pollution	
6	Parasitism and mutualism	
7	Biodiversity and humans	
8	Preserving biodiversity	
9	Food security	
10	The water cycle	
11	The carbon cycle	
12	The nitrogen cycle	
13	Rates of decomposition	
14	Preparing for assessment/exams	
15	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 176-204.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
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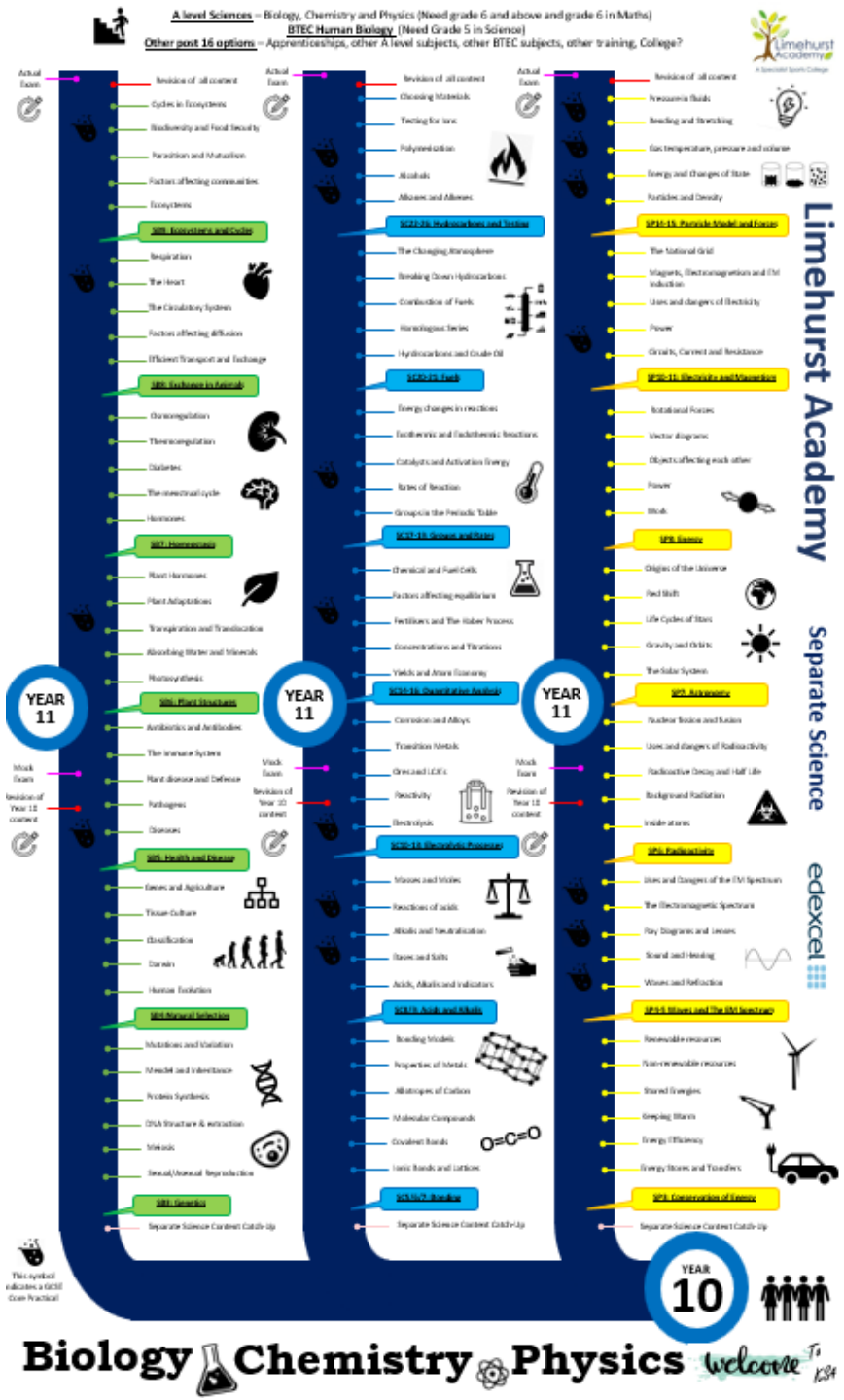
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of December Mock in Year 11.
- Final assessment: assessed within Biology Paper 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SC1/2 States of Matter & Methods of Separating and Purifying Substances

Knowledge acquired:

In this unit you will learn about how materials can be separated from one another using their properties.

Skills developed:

Maths Skills: Translate information between graphs and numbers / Use decimals / Use ratios, fractions, percentages

Core Practical Skills: Investigating inks

Understanding (In this topic you will learn):

- How the arrangement, movement and energy of particles change during a state change.
- How to tell the difference between pure substances and mixtures.
- How different methods of separation work.
- How to choose a separation technique based on the properties of the substance.
- How to identify substances using melting points and chromatography.

Links to previous study (you previously learnt in KS3):

- How particles are arranged in solids, liquids and gases and how their energy changes with changes of state.
- How mixtures differ from pure substances.
- How to separate some mixtures using filtration, distillation and chromatography.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 10, A level Chemistry and many areas of employment e.g. Severn Trent Water.

KS4 Combined Science

SC1/2 States of Matter & Methods of Separating and Purifying Substances

Number of lessons: 9

Sequence of lessons

Lesson	Lesson title	Core Practical
1	States of matter	
2	Mixtures	
3	Filtration and crystallisation	
4	Paper chromatography	
5	Distillation	
6	Investigating inks	*
7	Drinking water	
8	Preparing for assessment/exams	
9	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 2-16.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

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- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
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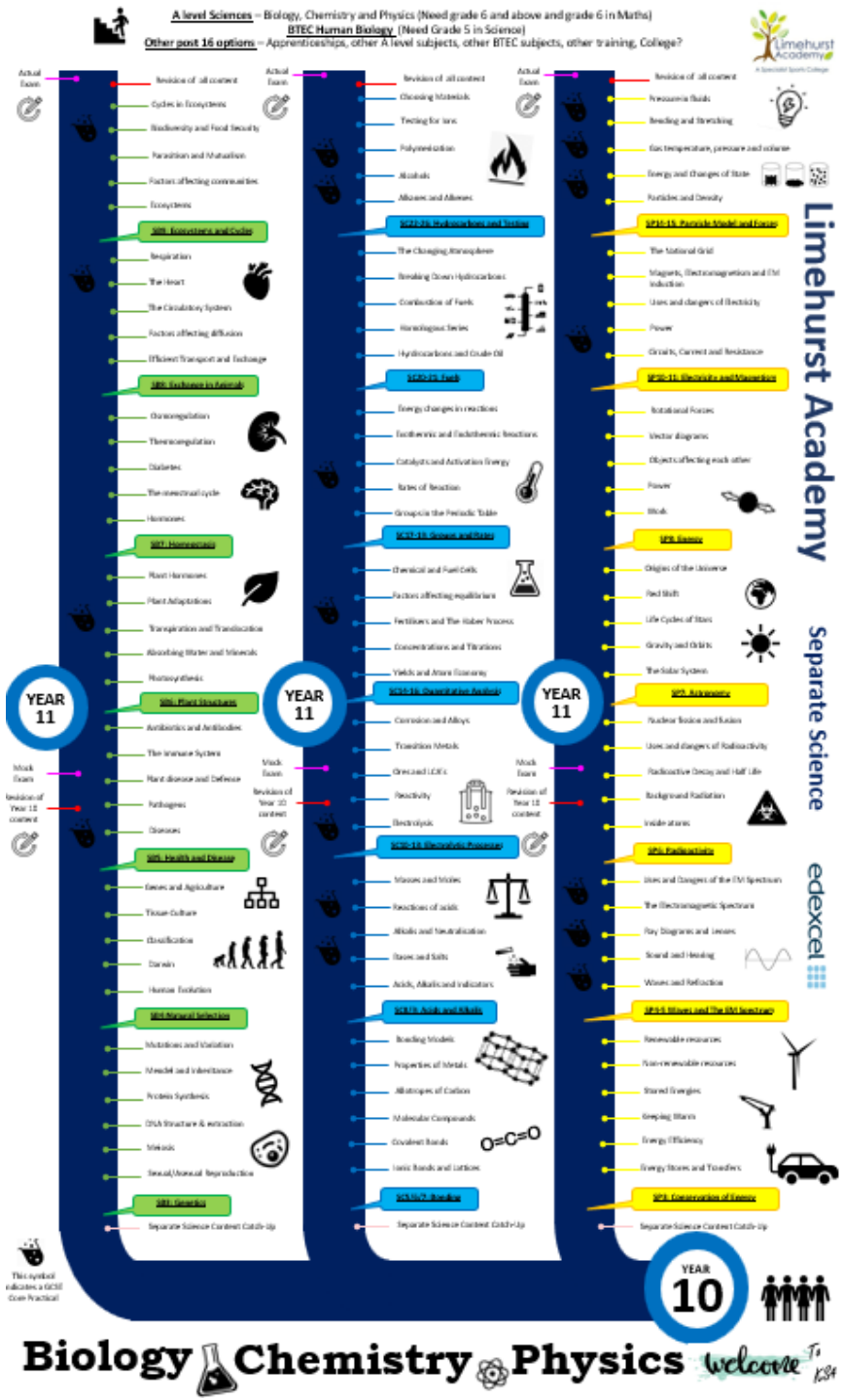
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Chemistry Paper 1 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SC3/4 Atomic Structure & The Periodic Table

Knowledge acquired:

In this unit you will find out more about atoms and their structure and how this relates to the periodic table.

Skills developed:

Maths Skills: Solve simple algebraic equations / Ratios, percentages, fractions / calculate averages

Understanding (In this topic you will learn):

- About the particle model.
- What relative atomic mass is and how to calculate it for an element
- How Mendeleev arranged the elements in his table and predicted the existence of undiscovered elements.
- How ideas, by scientists like Dalton developed the periodic table.
- How to use the periodic table to predict and model the arrangement of electrons in an atom.

Links to previous study (you previously learnt in KS3):

- About the particle model of matter.
- About how elements are arranged in the periodic table.
- About chemical symbols for elements
- About metals and non-metals, their properties and their positions in the periodic table.

Links to future study / the wider world (where applicable):

Links to Paper 1 and 2 in year 10/11, A level Chemistry and many areas of employment e.g. Chemist.

KS4 Combined Science

SC3/4 Atomic Structure & The Periodic Table

Number of lessons: 8

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Structure of an atom	
2	Atomic number and mass number	
3	Isotopes	
4	Elements and the periodic table	
5	Atomic number and the periodic table	
6	Electronic configurations and the periodic table	
7	Preparing for assessment/exams	
8	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 18-32.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
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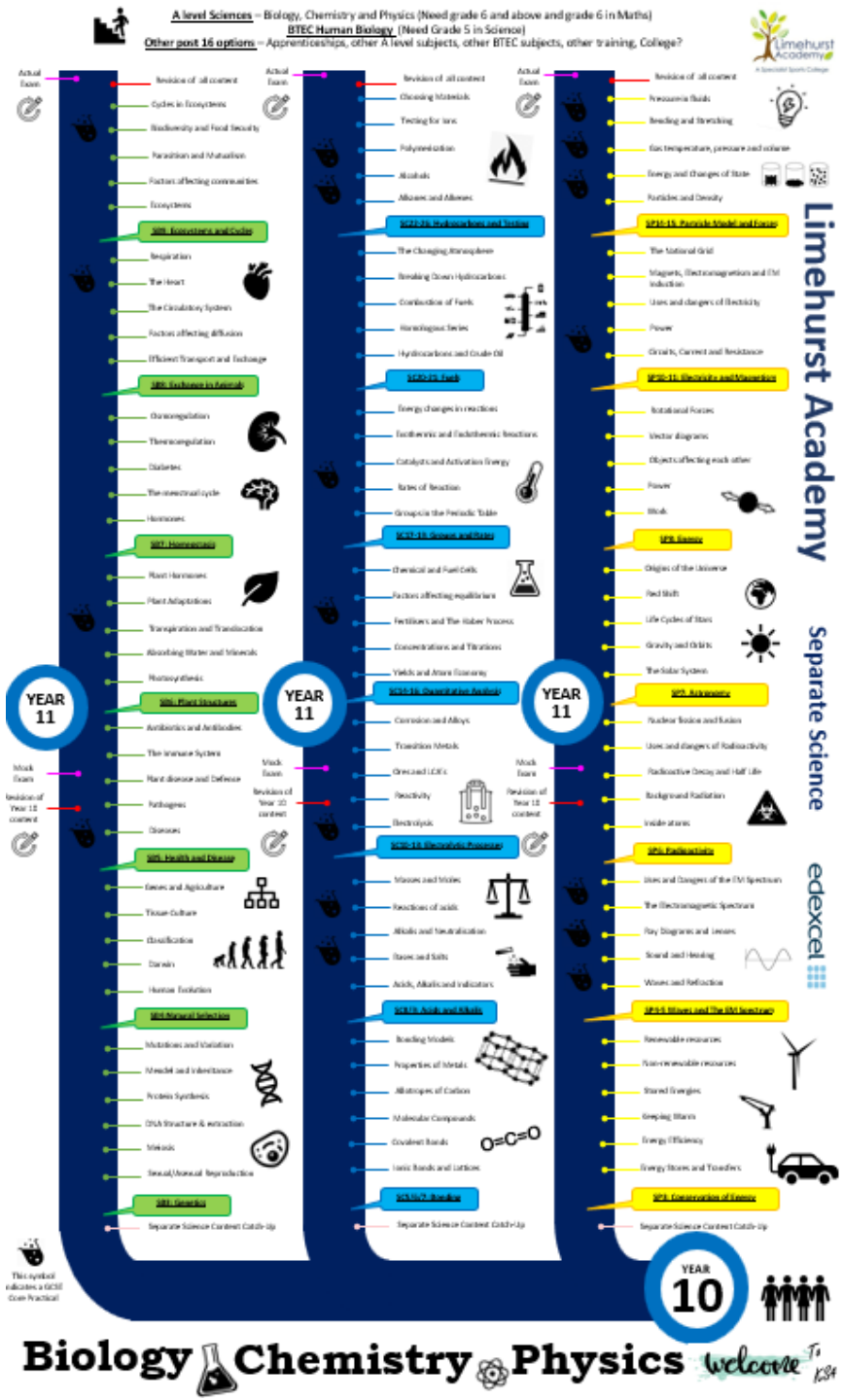
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Chemistry Paper 1 and 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SC5/6/7 Ionic Boning, Covalent Bonding & Types of Substance

Knowledge acquired:

In this unit you will learn how bonds are formed and broken and use these ideas to explain physical/chemical reactions.

Skills developed:

Maths Skills: Solve simple algebraic equations / Ratios, percentages, fractions / Visualise and explain 2D and 3D shapes

Understanding (In this topic you will learn):

- How ionic, covalent and metallic bonds are formed.
- About the formation of lattice and molecular structures.
- How the physical properties of a substance are linked to its bonding structure.

Links to previous study (you previously learnt in KS3):

- About the particle model of matter.
- How Dalton's ideas about atoms and molecules helped to explain the properties of matter.
- How elements are arranged in the periodic table.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 10, A level Chemistry and many areas of employment e.g. metal worker.

KS4 Combined Science

SC5/6/7 Ionic Boning, Covalent Bonding & Types of Substance

Number of lessons: 10

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Ionic bonds	
2	Ionic lattices	
3	Properties of ionic compounds	
4	Covalent bonds	
5	Molecular compounds	
6	Allotropes of carbon	
7	Properties of metals	
8	Bonding models	
9	Preparing for assessment/exams	
10	End of Module Assessment	

Main resources:

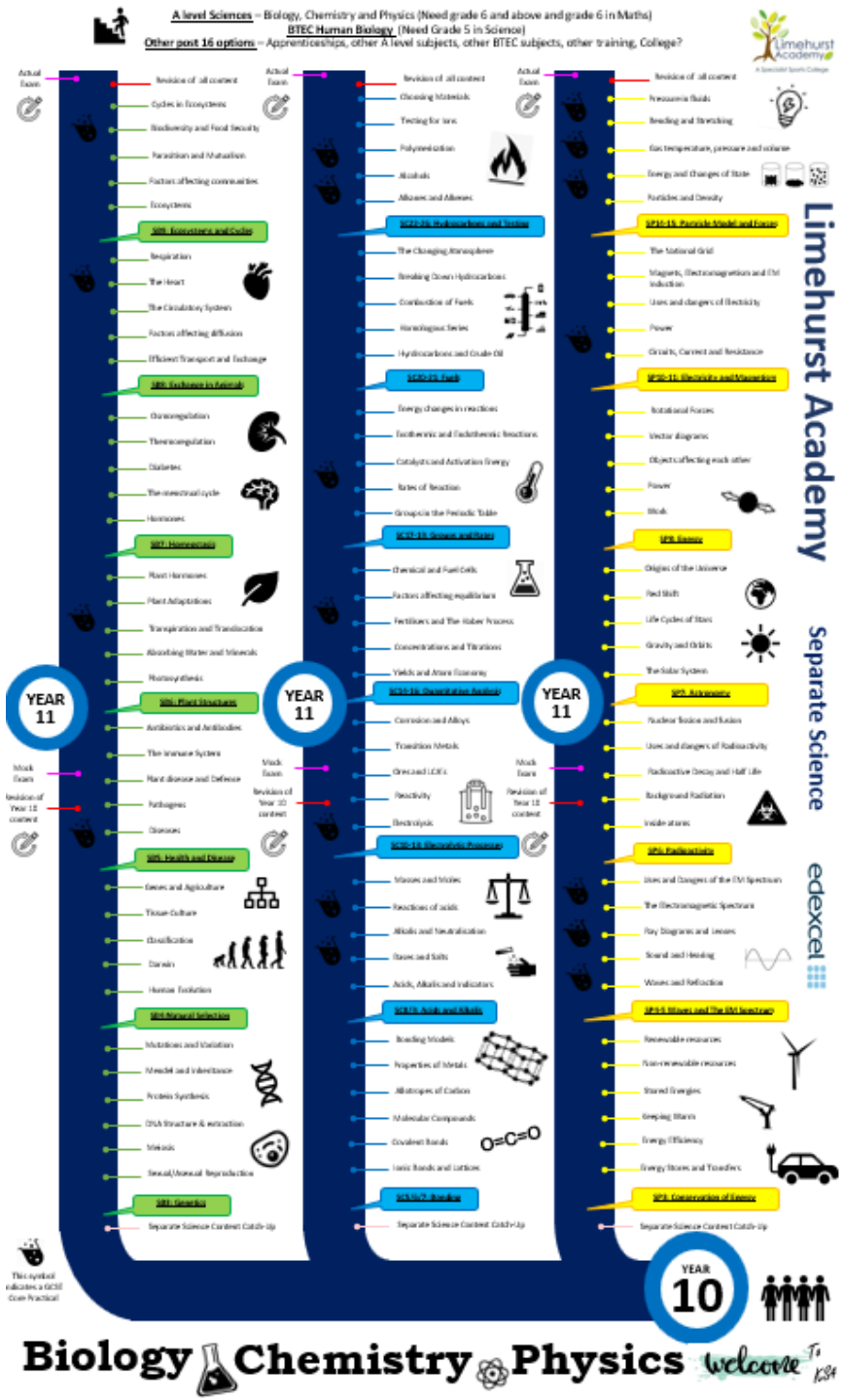
- Pearson Edexcel (9-1) Combined Science pages 34-50.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Chemistry Paper 1 and 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SC8/9 Acids and Alkalis Calculations Involving Masses

Knowledge acquired:

In this topic you will explore the nature of acidic and alkaline solutions, and investigate their most important reactions, properties and uses. You will also learn how to calculate the amounts of substances produced in reactions.

Skills developed:

Maths Skills: Substitute numerical values for symbols in algebraic equations / Ratios, percentages, fractions / Change the subject of an equation / Use standard form / Use the appropriate amount of significant figures using physical quantities

Core Practical Skills: Preparing Copper sulphate / Investigating Neutralisation

Understanding (In this topic you will learn):

- About the ions in acids and alkalis, and how their concentrations are linked to pH.
- What happens in the reactions between acids and different types of bases.
- How different indicators can be used and how different soluble and insoluble salts can be prepared in the lab
- How to use relative atomic mass to calculate formula masses of elements and compounds and how to work out the empirical and molecular formula. Also you will learn how to work out the concentration of a solution.
- About the Avogadro constant and the quantity of 1 mol of a substance and use this to work out the number of particles.

Links to previous study (you previously learnt in KS3):

- How common international hazard symbols are used.
- About common acid, alkali and neutral solutions.
- About the use of common indicators and neutralisations reactions.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 11, A level Chemistry and many areas of employment e.g. chemist or pharmacist.

KS4 Combined Science

SC8/9 Acids and Alkalis Calculations Involving Masses

Number of lessons: 14

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Acids, alkalis and indicators	
2	Looking at acids	
3	Bases and salts	
4	Preparing copper sulphate	*
5	Alkalis and balancing equations	
6	Investigating neutralisation	*
7	Alkalis and neutralisation	
8	Reactions of acids and metals and carbonates	
9	Solubility	
10	Masses and empirical formula	
11	Conservation of mass	
12	Moles	
13	Preparing for assessment/exams	
14	End of Module Assessment	

Main resources:

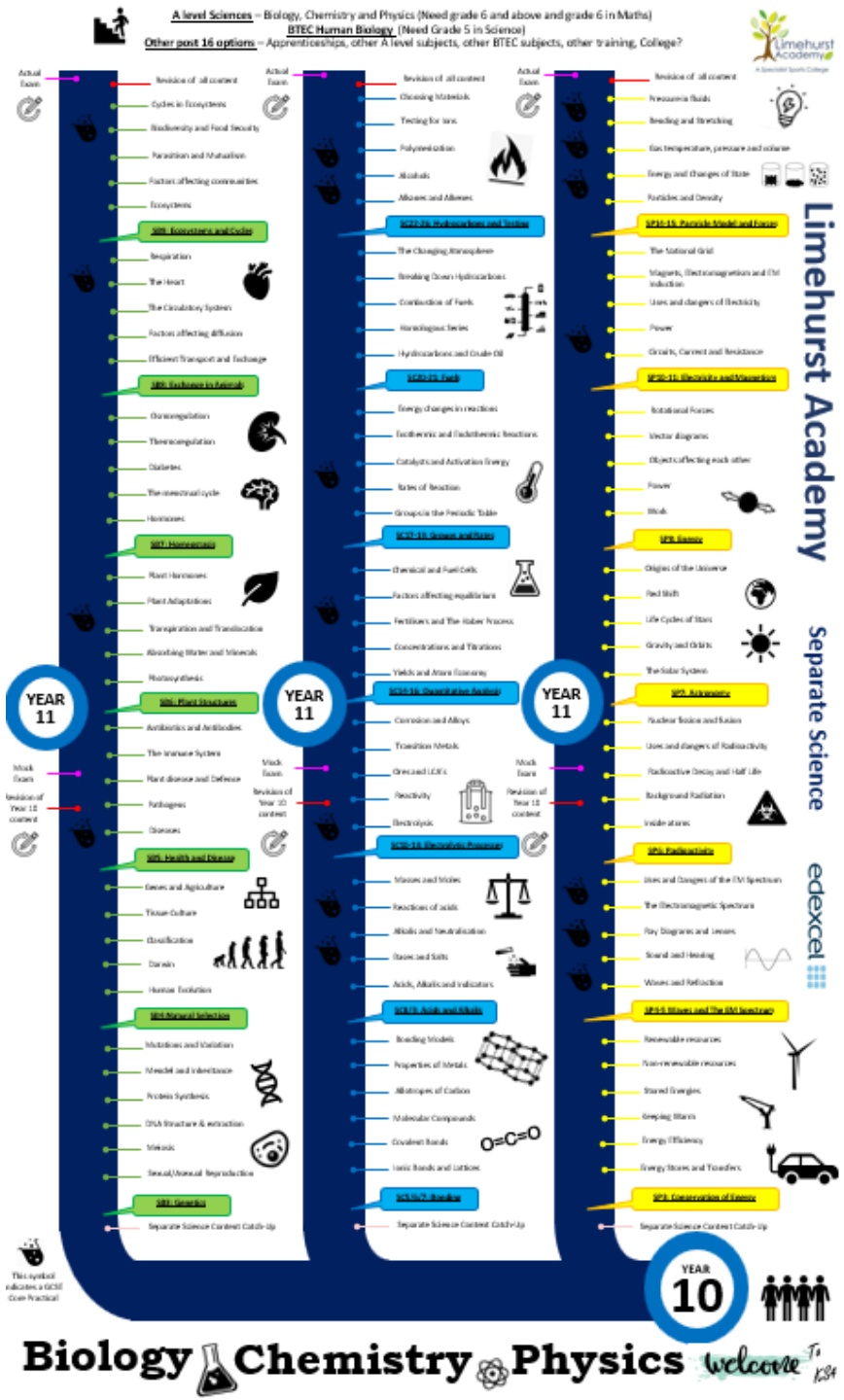
- Pearson Edexcel (9-1) Combined Science pages 52-78.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Chemistry Paper 1 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SC10/11/12/13 Electrolytic Processes, Metals, Reversible Reactions & Metals and Alloys

Knowledge acquired:

In this unit you will learn more about reactions, including some of the reactions involved in the extraction and purification of metals from their ores.

Skills developed:

Maths Skills: Understand that y = mx + c represents a linear relationship / Use ratios, fractions and percentages / Determine the slope and intercept of a linear graph / Translate information between graphical and numeric form

Core Practical Skills: Electrolysis of copper sulphate solution

Understanding (In this topic you will learn):

- More about reactivity, oxidation and reduction and about how metals can be extracted.
- About the advantages of recycling metals and the factors involved in a life cycle assessment of a product.
- About what happens in electrolysis, equilibria in reactions, the Haber Process and half equations.
- About the properties of transition metals and their alloys.

Links to previous study (you previously learnt in KS3):

- About oxidation and displacement reactions and the reactivity series.

Links to previous study (you previously learnt in CC4 / CC5 / CC6):

- About anions and cations in ionic compounds and how to write balanced symbol equations with state symbols.
- How the elements are arranged in the Periodic Table.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 10, A level Chemistry and many areas of employment e.g. quarry industry.

KS4 Combined Science

SC10/11/12/13 Electrolytic Processes, Metals, Reversible Reactions & Metals and Alloys

Number of lessons: 15

Sequence of Lessons

Lesson	Lesson title	Core Practical
1	Electrolysis	
2	Electrolysis of copper sulphate solution	*
3	Products from electrolysis	
4	Reactivity	
5	Ores	
6	Oxidation and reduction	
7	Life cycle assessment and recycling	
8	Dynamic Equilibrium	
9	Transition metals	
10	Corrosion	
11	Electroplating	
12	Alloying	
13	Uses of metals and their alloys	
14	Preparing for assessment/exams	
15	End of Module Assessment	

Main resources:

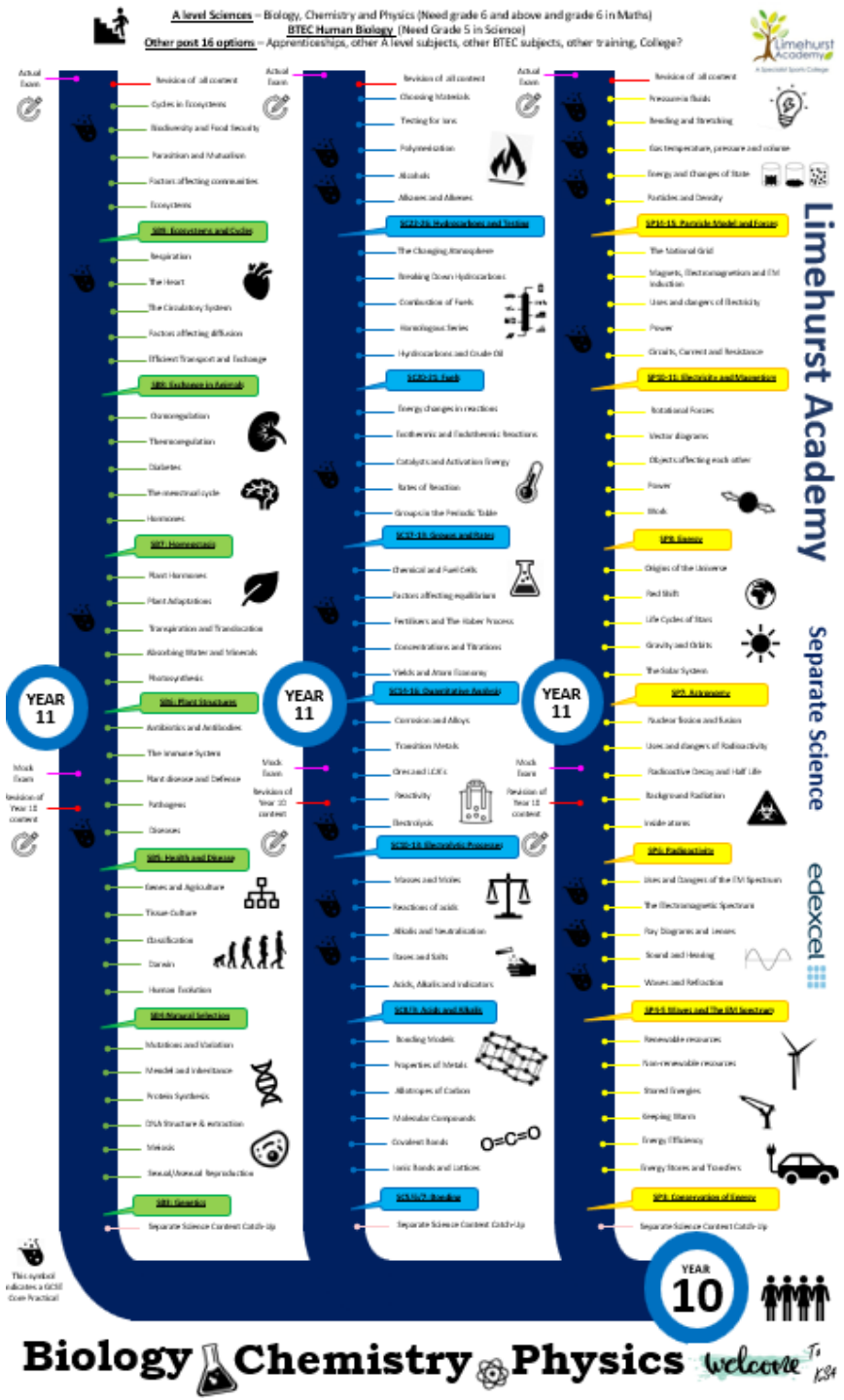
- Pearson Edexcel (9-1) Combined Science pages 80-106.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Chemistry Paper 1 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SC14/15/16 Quantitative Analysis, Calculations and Chemical and Fuel Cells

Knowledge acquired:

In this unit you will learn how scientists decide on the best method to produce chemicals.

Skills developed:

Maths Skills: Solve simple algebraic equations / Ratios, percentages, fractions / Visualise and explain 2D and 3D shapes

Core Practical Skills: Acid-Alkali Titrations

Understanding (In this topic you will learn):

- How to calculate the yield of a reaction and why the actual yield is less than the theoretical yield.
- What is meant by atom economy and how to calculate it.
- How to carry out an acid-alkali titration.
- How to calculate an unknown concentration or volume of a solution using titration.
- About the factors that are considered when selecting a manufacturing method.
- How to interconvert between g dm^3 and mol dm^{-3}.

Links to previous study (you previously learnt in SC9):

- About the law of conservation of mass and how to calculate the mass of a product and a reactant.
- About how to calculate the concentration of a solution in g dm^3 and the number of moles in a substance.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 10, A level Chemistry and many areas of employment e.g. Pharmaceutical research.

KS4 Combined Science

SC14/15/16 Quantitative Analysis, Calculations and Chemical and Fuel Cells

Number of lessons: 11

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Yields	
2	Atom Economy	
3	Concentrations	
4	Titrations and calculations	
5	Acid-Alkali Titration	*
6	Molar volume of gas	
7	Fertilisers and the Haber process	
8	Factors affecting equilibrium	
9	Chemical and fuel cells	
10	Preparing for assessment/exams	
11	End of Module Assessment	

Main resources:

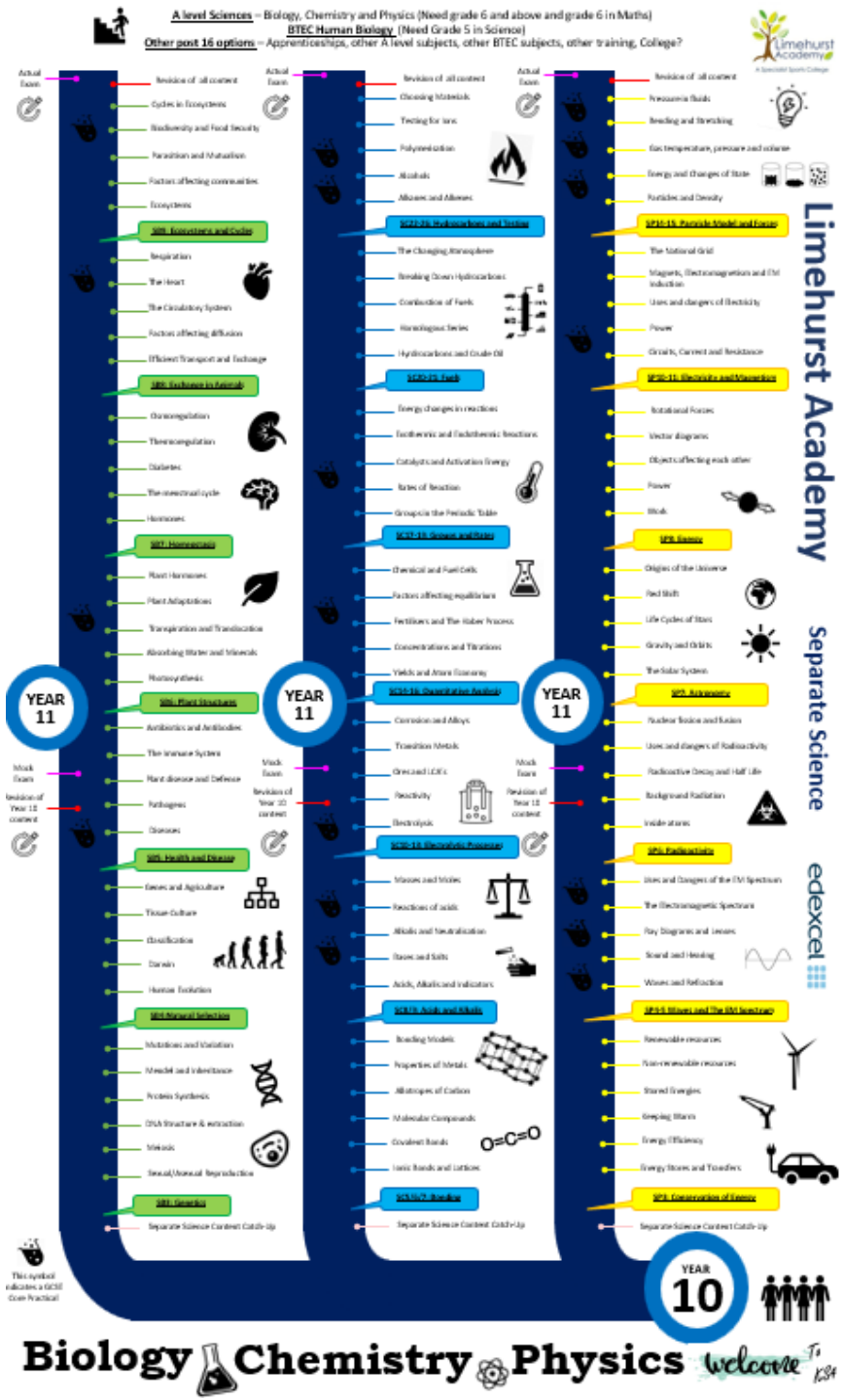
- Pearson Edexcel (9-1) Combined Science pages 108-126.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Chemistry Paper 1 and 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SC17/18/19 Groups in the Periodic Table, Rates and Energy Changes

Knowledge acquired:

This unit looks at some of the typical reactions of certain elements and general ideas about hoe chemical reactions can be controlled and used.

Skills developed:

Maths Skills: Use ratios, fractions and percentages / Make estimates of the results of simple calculations / Use a scatter diagram to identify a correlation between two variables**.**
Core Practical Skills: Investigating reaction rates

Understanding (In this topic you will learn):

- About the properties and reactions of the elements in groups 1, 7 and 0.
- How the changes in conditions can affect the rates of reactions.
- About the energy transfers that can occur during chemical reactions.

Links to previous study (you previously learnt in KS3):

- About elements, compounds and the periodic table plus what happens during chemical reactions.

Links to previous study (you previously learnt in CC3 / CC5 / CC8):

- About the nature of atoms and ions.
- How to write balanced chemical equations, including the state symbols.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Chemistry and many areas of employment e.g. quarry industry.

KS4 Combined Science

SC17/18/19 Groups in the Periodic Table, Rates and Energy Changes

Number of lessons: 12

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Group 1	
2	Group 7	
3	Halogen reactivity	
4	Group 0	
5	Rates of Reaction	
6	Factors affecting rates of reaction	
7	Investigating reaction rates	*
8	Catalysts and activation energy	
9	Exothermic and Endothermic reactions	
10	Energy changes in reactions	
11	Preparing for assessment/exams	
12	End of Module Assessment	

Main resources:

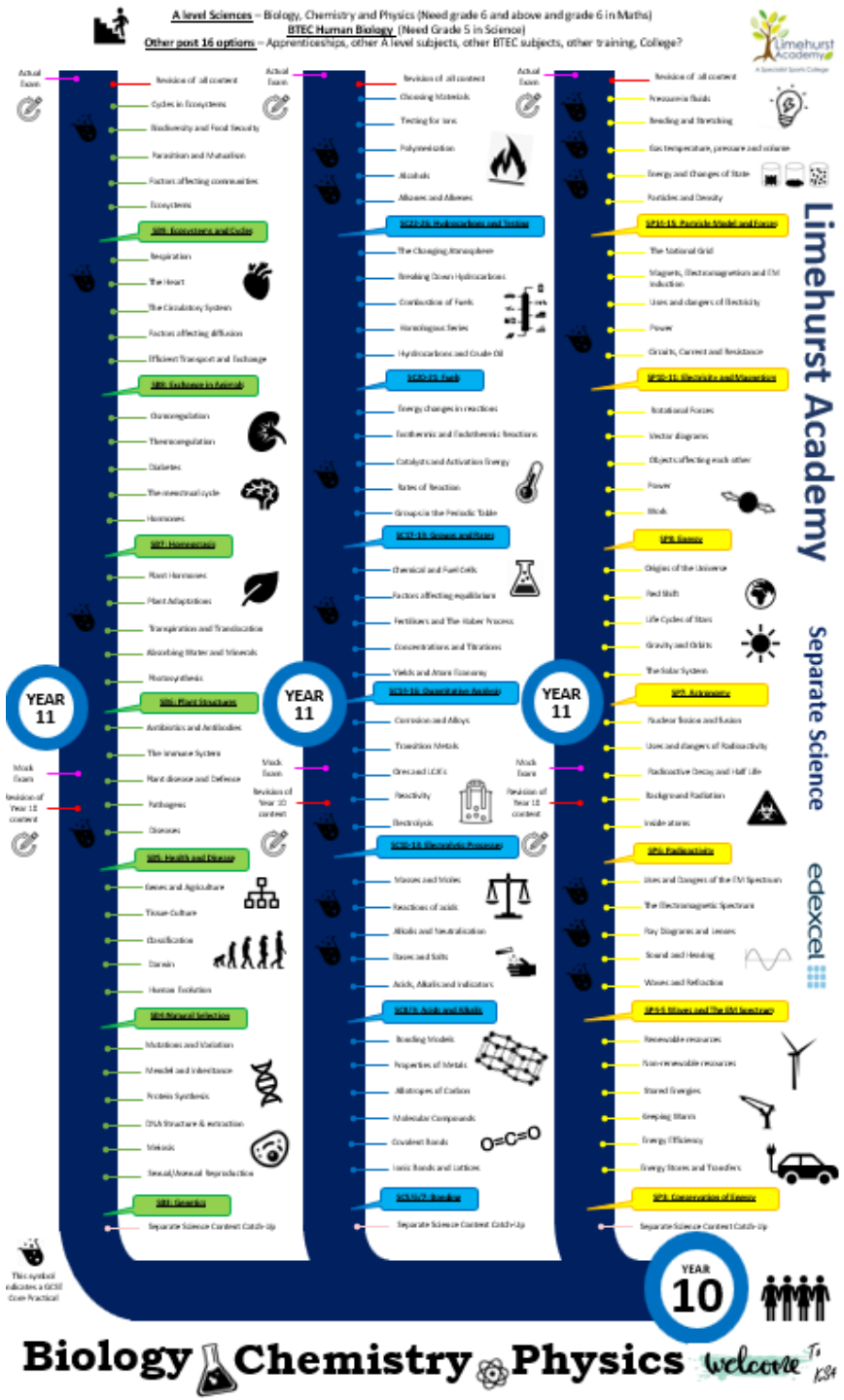
- Pearson Edexcel (9-1) Combined Science pages 128-148.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Winter Mock in Year 11.
- Final assessment: assessed within Chemistry Paper 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SC20/21 Fuels, Earth and Atmospheric Science

Knowledge acquired:

This unit looks at how the way we obtain and use fuels affects the planet and what we need to do to try and reverse the effects before it is too late.

Skills developed:

Maths Skills: Use ratios, fractions and percentages / Translate between graphical and numerical values / Use a scatter diagram to identify a correlation between two variables**.**

Understanding (In this topic you will learn):

- About hydrocarbons found in crude oil and natural gas and how these can be separated into useful fractions.
- About the alkanes as an homologous series.
- About the problems caused by atmospheric pollutions and the advantages and disadvantages of different fuels.
- About the Earths changing atmosphere and about the causes of climate change.

Links to previous study (you previously learnt in KS3):

- That mixtures can be separated using fractional distillation.
- About fuels and energy resources.
- About the acidity of non-metal oxides.
- About the production of carbon dioxide by human activity and the impact on climate.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Chemistry and many areas of employment e.g. Weather man.

KS4 Combined Science

SC20/21 Fuels, Earth and Atmospheric Science

Number of lessons: 12

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Hydrocarbons in crude oil and natural gas	
2	Fractional distillation of crude oil	
3	The alkane homologous series	
4	Complete and incomplete combustion	
5	Combustible fuels and pollution	
6	Breaking down hydrocarbons	
7	The early atmosphere	
8	The changing atmosphere	
9	The atmosphere today	
10	Climate change	
11	Preparing for assessment/exams	
12	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 150-170.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
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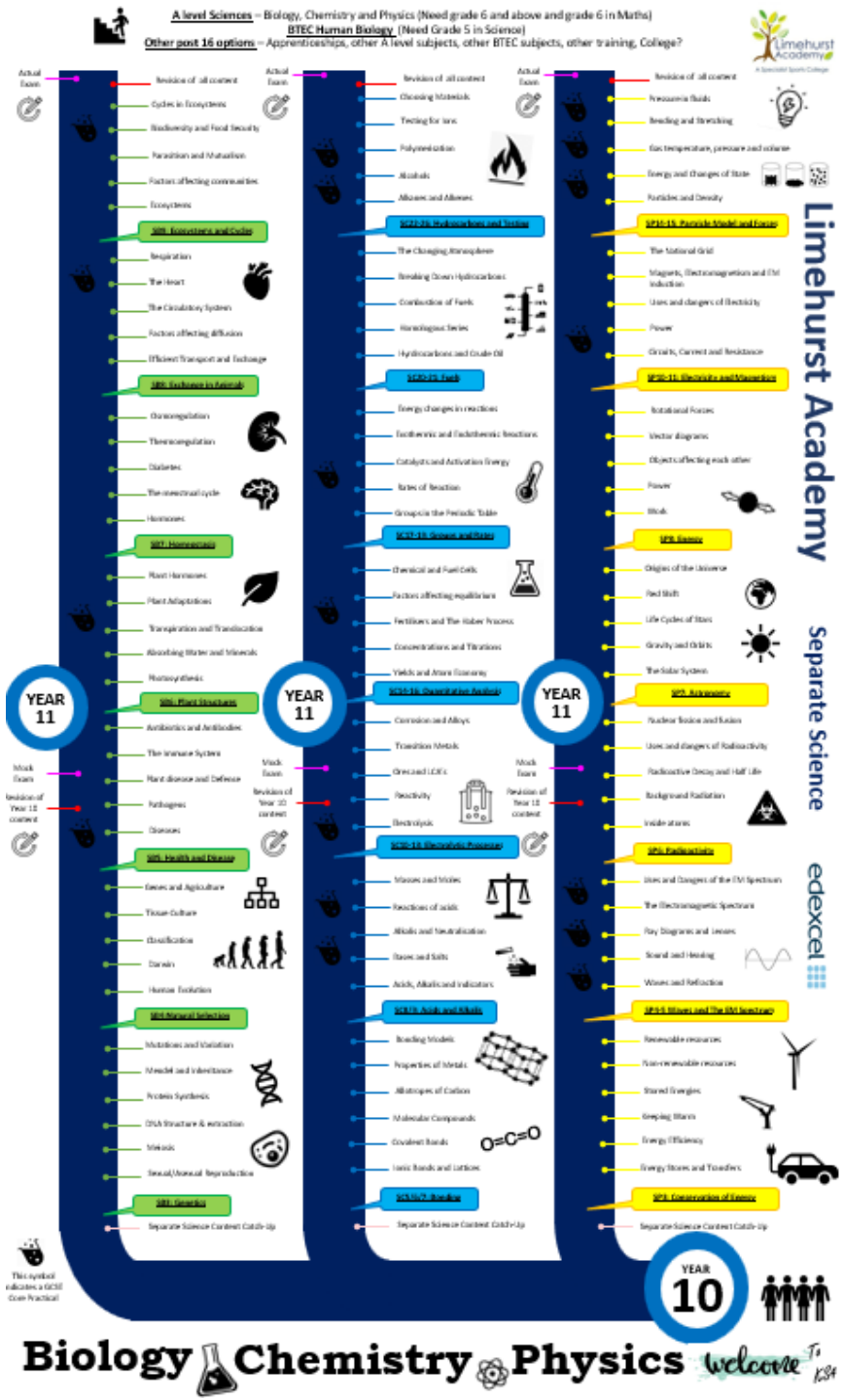
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Winter Mock in Year 11.
- Final assessment: assessed within Chemistry Paper 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SC22/23/24 Hydrocarbons, Alcohols, Carboxylic Acids & Polymers

Knowledge acquired:

This unit looks at how the way we create, analyse and utilise alcohols, carboxylic acids and polymers. We will also tackle the issues of dealing with polymers in the future.

Skills developed:

Maths Skills: Use ratios, fractions and percentages / Translate between graphical and numerical values / Use a scatter diagram to identify a correlation between two variables**.**
Core Practical Skills : The combustion of alcohols.

Understanding (In this topic you will learn):

- About the structure and properties of alkanes, alkenes, alcohols and carboxylic acids.
- About how concentrated solutions of ethanol are produced from carbohydrates.
- About the chemical properties and uses of alcohols and carboxylic acids.
- About the composition of biological polymers.
- How poly(ethene) and other polymers are made.
- About the disposal and recycling of polymers.

Links to previous study (you previously learnt in KS3):

- About the combustion of fuels and the properties of polymers.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Chemistry and many areas of employment e.g. Brewer.

KS4 Combined Science

SC22/23/24 Hydrocarbons, Alcohols, Carboxylic Acids & Polymers

Number of lessons: 12

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Alkanes and alkenes	
2	Reactions of alkanes and alkenes	
3	Ethanol production	
4	Alcohols	
5	The combustion of alcohols	*
6	Carboxylic acids	
7	Addition polymerisation	
8	Polymer properties and uses	
9	Condensation polymerisation	
10	Problems with polymers	
11	Preparing for assessment/exams	
12	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 172-192.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

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- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
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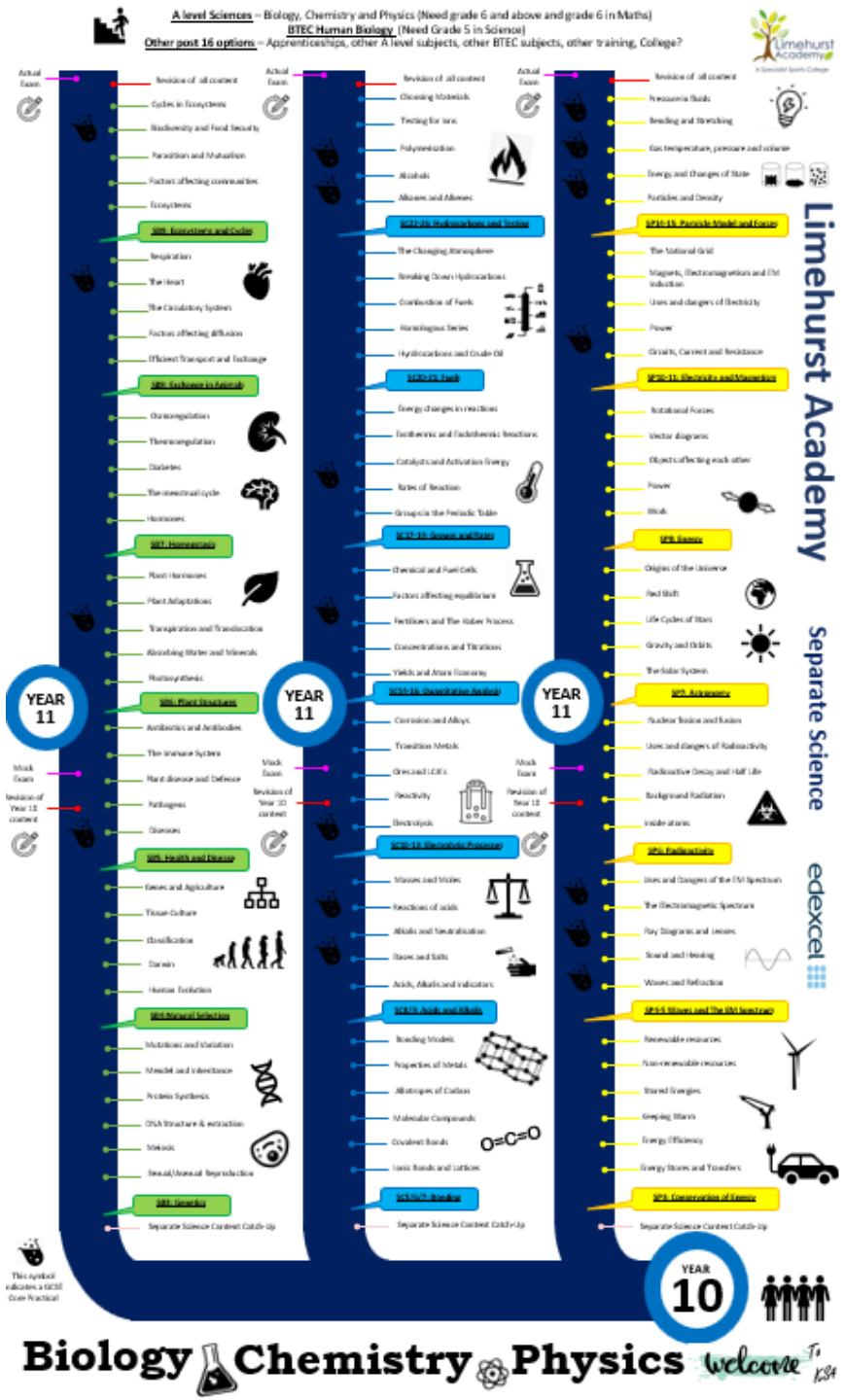
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Winter Mock in Year 11.
- Final assessment: assessed within Chemistry Paper 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SC25/26 Qualitative Analysis, Bulk and Surface Properties of Matter

Knowledge acquired:

This unit looks at how modern materials are tested to ensure that they meet the required specifications for modern industries.

Skills developed:

Maths Skills: Use ratios, fractions and percentages / Translate between graphical and numerical values / Use a scatter diagram to identify a correlation between two variables**.**
Core Practical Skills : Identifying ions.

Understanding (In this topic you will learn):

- How to identify metal ions and know chemical tests for various non-metal ions and ammonia gas.
- About instrumental methods of analysis and their advantages.
- How to compare physical properties of different materials.
- What composite materials are.
- How and why materials are chosen for particular uses.
- About nanoparticles and their properties, uses and possible risks.

Links to previous study (you previously learnt in KS3):

- Some properties of ceramics, polymers, metals and composite materials.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Chemistry and many areas of employment e.g. Materials scientist.

KS4 Separate Science

SC25/26 Qualitative Analysis, Bulk and Surface Properties of Matter

Number of lessons: 9

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Flames and photometry	
2	Tests for positive ions	
3	Tests for negative ions	
4	Identifying ions	*
5	Choosing materials	
6	Composite materials	
7	Nanoparticles	
8	Preparing for assessment/exams	
9	End of Module Assessment	

Main resources:

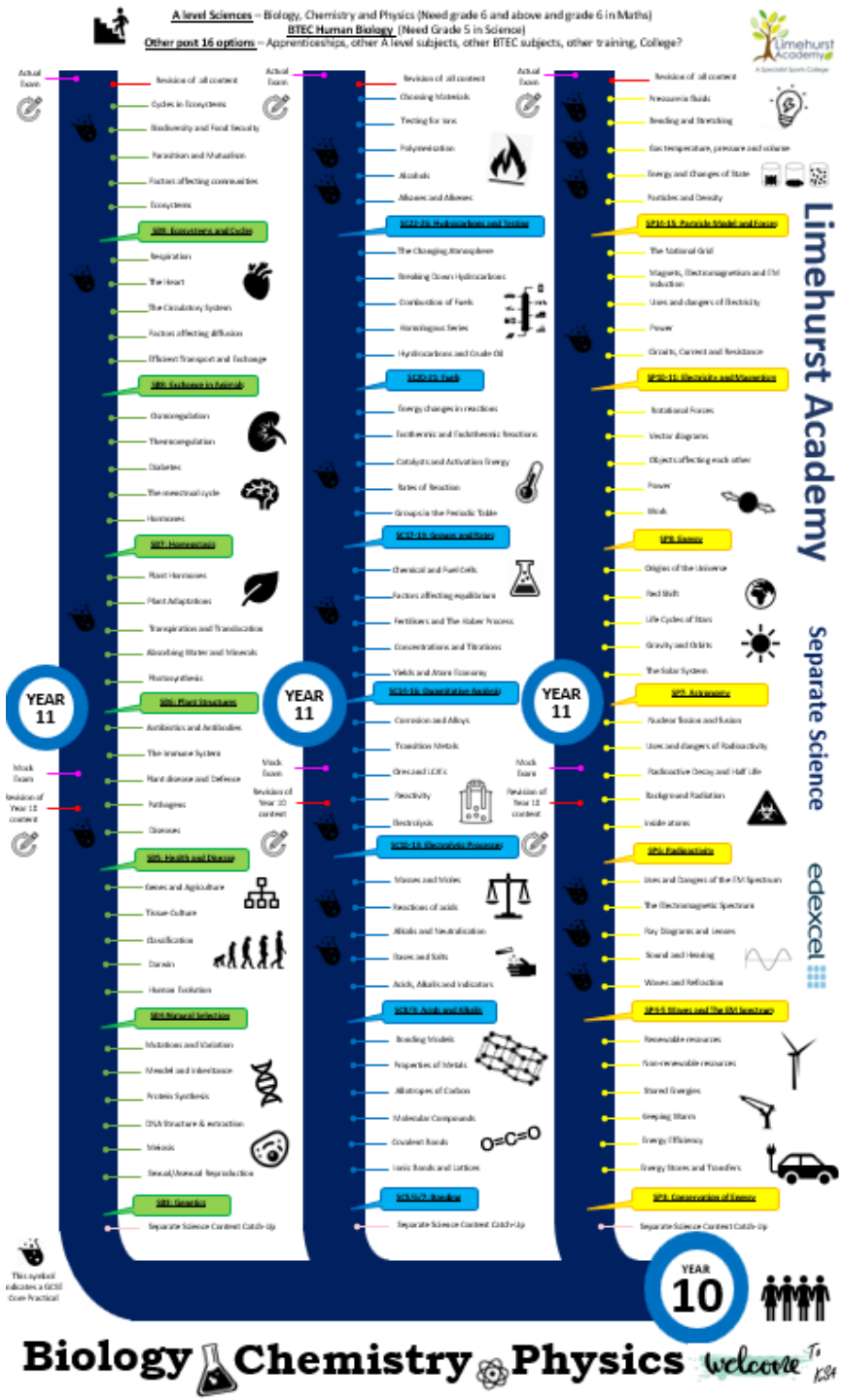
- Pearson Edexcel (9-1) Combined Science pages 194-208.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Winter Mock in Year 11.
- Final assessment: assessed within Chemistry Paper 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SP1 Motion

Knowledge acquired:

In this unit you will learn about quantities that have directions (such as forces). You will find out how to calculate speeds and accelerations, and how to represent changes in distances moved and speeds on graphs.

Skills developed:

Maths Skills: Understand and use the symbols: =, <, <<, >>, >, ∝, ~ / Change the subject of an equation / Substitute numerical values into algebraic equations using appropriate units for physical quantities / Solve simple algebraic equations / Translate information between graphical and numeric form / Plot two variables from experimental or other data / Determine the slope and intercept of a linear graph

Understanding (In this topic you will learn):

- The difference between vector and scalar quantities.
- How to calculate acceleration and speed.
- How to plot distance/time and velocity/time graphs and use them to make calculations.

Links to previous study (you previously learnt in KS3):

- What forces are and the effect of balanced and unbalanced forces.
- How average speed, distance and time are related.
- How to represent a journey on a distance-time graph.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 11, A level Physics and many areas of employment e.g. Sports design.

KS4 Combined Science

SP1 Motion

Number of lessons: 6

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Vectors and scalars	
2	Distance/time graphs	
3	Acceleration	
4	Velocity/time graphs	
5	Preparing for assessment/exams	
6	End of Module Assessment	

Main resources:

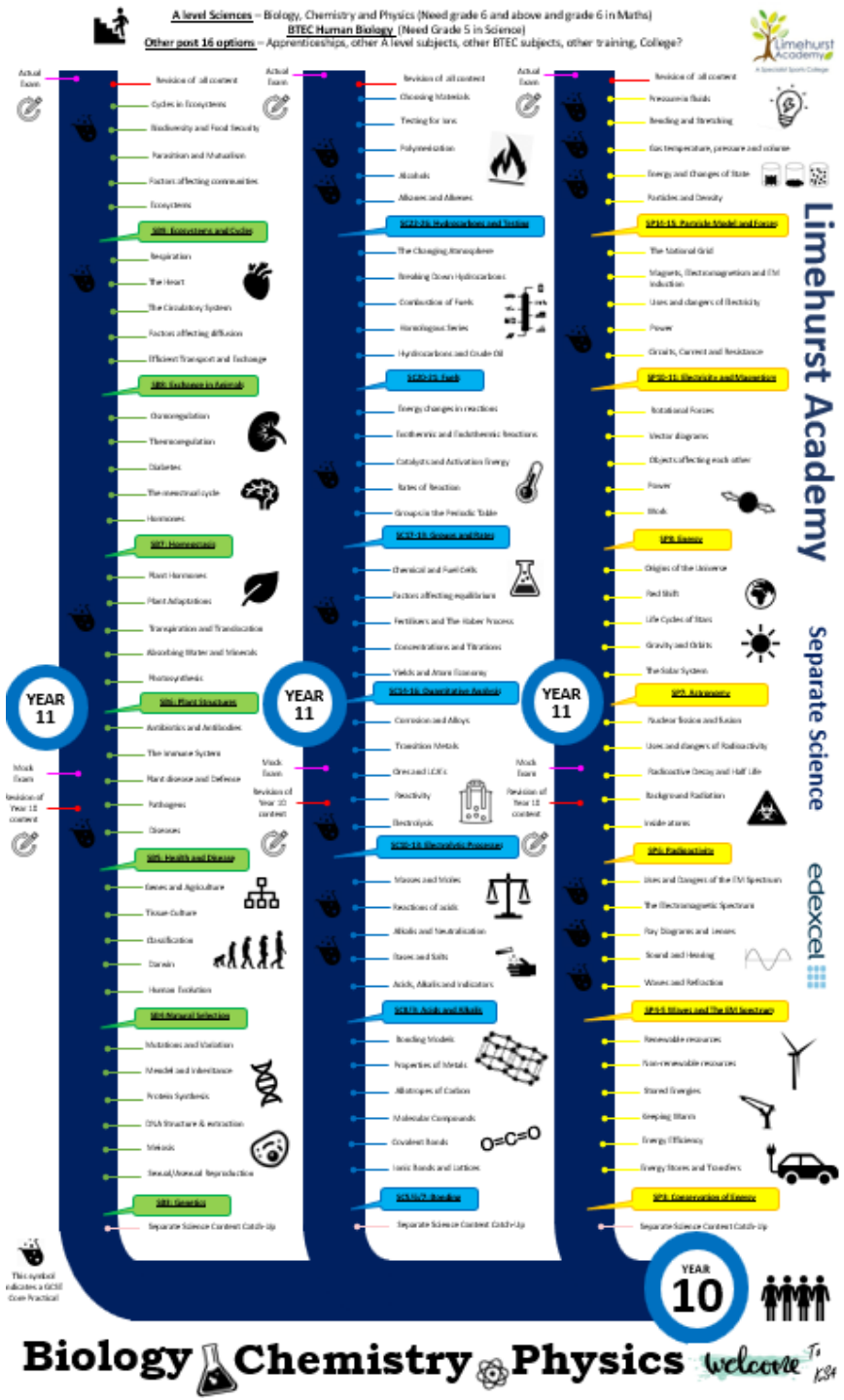
- Pearson Edexcel (9-1) Combined Science pages 2-10.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Physics Paper 1 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SP2 Forces and Motion

Knowledge acquired:

In this unit you will learn Newton's Laws of motion can be applied to real life situations and can be used to make the car industry safer.

Skills developed:

Maths Skills: Use a scatter diagram to identify a correlation between two variables / Change the subject of an equation / Substitute numerical values into algebraic equations using appropriate units for physical quantity / Plot two variables from experimental or other data / Determine the slope (and intercept) of a linear graph.
Core Practical Skills: Investigating acceleration

Understanding (In this topic you will learn):

- About Newton's Laws of Motion.
- How to calculate the weight of an object from its mass.
- About the factors that affect the stopping distance of a vehicle and the dangers of large decelerations.
- How to calculate momentum and apply these ideas to collisions.

Links to previous study (you previously learnt in KS3):

- What forces are and the effects of balanced and unbalanced forces.
- What a resultant force is.
- About gravity as a non-contact force.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 11, A level Physics and many areas of employment e.g. Automotive engineer.

KS4 Combined Science

CP2 Forces and Motion

Number of lessons: 12

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Resultant forces	
2	Newton's First Law	
3	Mass and Weight	
4	Newton's Second Law	
5	Investigating acceleration	*
6	Newton's Third Law	
7	Momentum	
8	Stopping distances	
9	Breaking hazards and energy	
10	Crash hazards	
11	Preparing for assessment/exams	
12	End of Module Assessment	

Main resources:

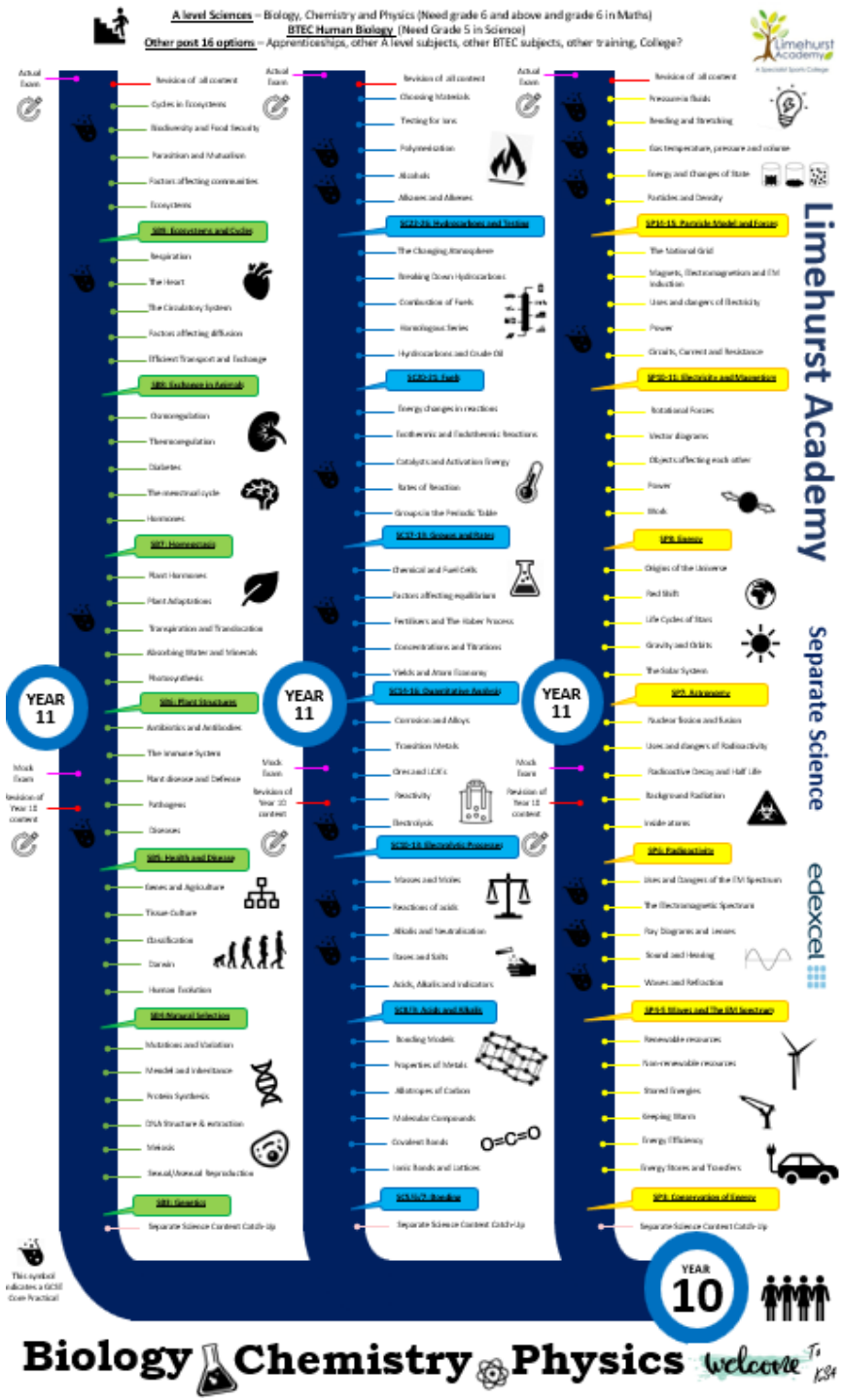
- Pearson Edexcel (9-1) Combined Science pages 12-32.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Physics Paper 1 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SP3 Conservation of Energy

Knowledge acquired:

In this unit you will learn about the ways in which energy can be transferred and stored, how to reduce energy transfers, and the renewable and non-renewable resources we use in everyday life.

Skills developed:

Maths Skills: Recognise and use expressions in decimal form/Use ratios, fractions and percentages/Make estimates of the results of simple calculations/Use an appropriate number of significant figures/Understand and use the symbols: =, <, <<, >>, >, ∝, ~/Change the subject of an equation/Substitute numerical values into algebraic equations using appropriate units for physical quantities/Solve simple algebraic equations

Understanding (In this topic you will learn):

- How energy is stored and transferred and how to represent these transfers using diagrams.
- How to calculate efficiency and reduce wasted energy.
- Hoe to calculate the amount of gravitational potential energy or kinetic energy in stored objects.
- About the different renewables and non-renewable sources of energy.

Links to previous study (you previously learnt in KS3):

- How energy can be transferred by conduction, convection and radiation, and about ways to reduce heat loss.
- That energy is conserved and can either be stored or transferred.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 11, A level Physics and many areas of employment e.g. Eco-scientist.

KS4 Combined Science

SP3 Conservation of Energy

Number of lessons: 8

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Energy stores and transfers	
2	Energy efficiency	
3	Keeping warm	
4	Stored energies	
5	Non-renewable resources	
6	Renewable resources	
7	Preparing for assessment/exams	
8	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 34-46.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
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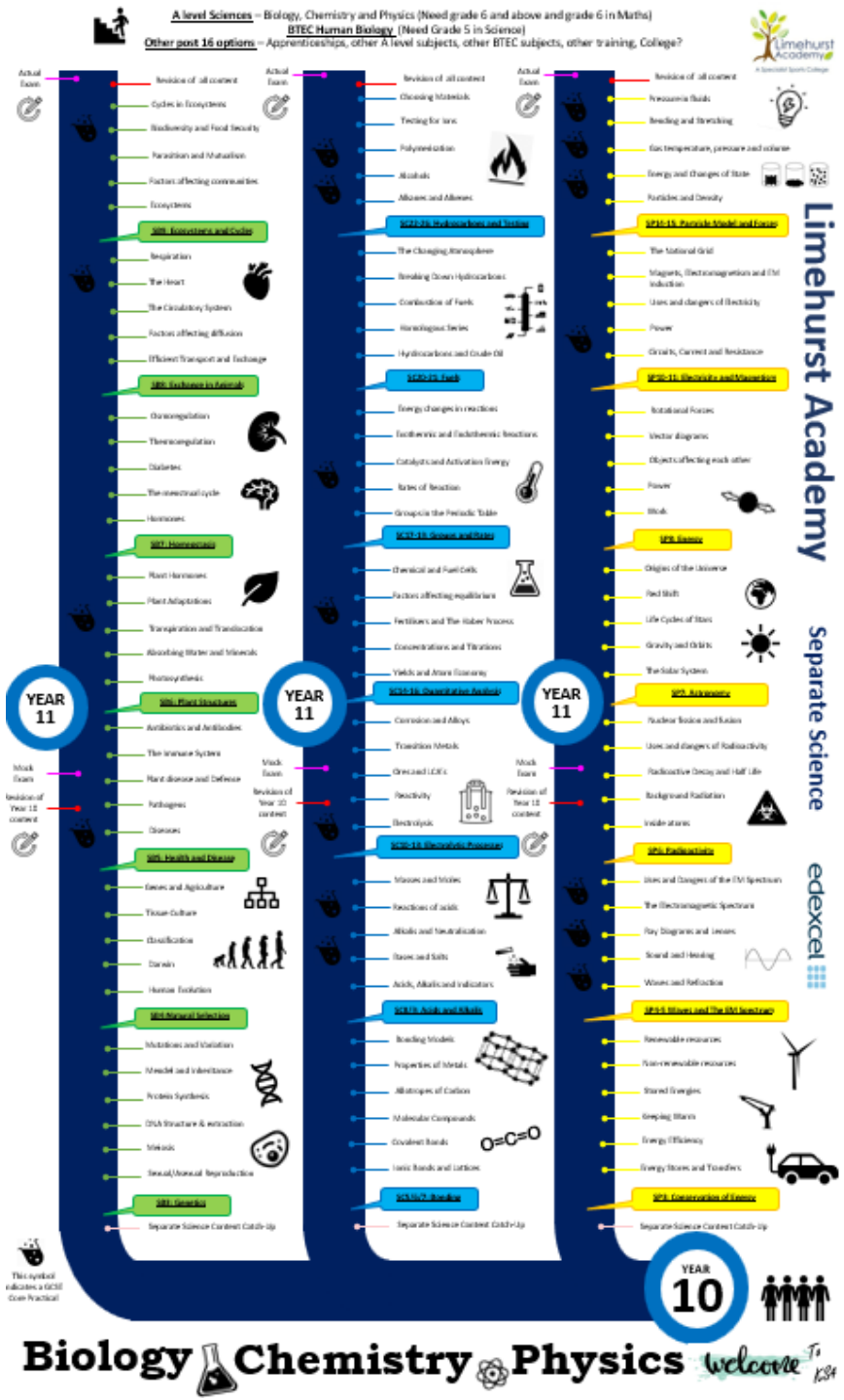
Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SP4 Waves

Knowledge acquired:

In this unit you will learn about the ways in which light moves and behaves and about the different types of sound and how we perceive them.

Skills developed:

Maths Skills: Recognise and use expressions in decimal form/Recognise and use expressions in standard form/Use an appropriate number of significant figures/Find arithmetic means/Understand and use the symbols: =, <, <<, >>, >, ∝, ~/Change the subject of an equation/Substitute numerical values into algebraic equations using appropriate units for physical quantities/Solve simple algebraic equations
Core Practical Skills: Investigating waves

Understanding (In this topic you will learn):

- How to characterise waves and that they transfer energy and information.
- How the speed of a wave is related to its frequency and wavelength and to the time it takes to travel a certain distance.
- How and why waves are reflected, refracted, transmitted or absorbed by different materials.
- More about how our ears work and about the uses of ultrasound and infrasound.

Links to previous study (you previously learnt in KS3):

- That light transfers energy and can be absorbed, scattered and reflected.
- How sound waves are produced and detected by our ears.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 11, A level Physics and many areas of employment e.g. Light designer.

KS4 Combined Science

SP4 Waves

Number of lessons: 10

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Describing waves	
2	Wave speeds	
3	Investigating waves	*
4	Refraction	
5	Waves crossing boundaries	
6	Ears and hearing	
7	Ultrasound	
8	Infrasound	
9	Preparing for assessment/exams	
10	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 48-64.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Physics Paper 1 (sat in June of Year 11).

Use of assessment result(s):

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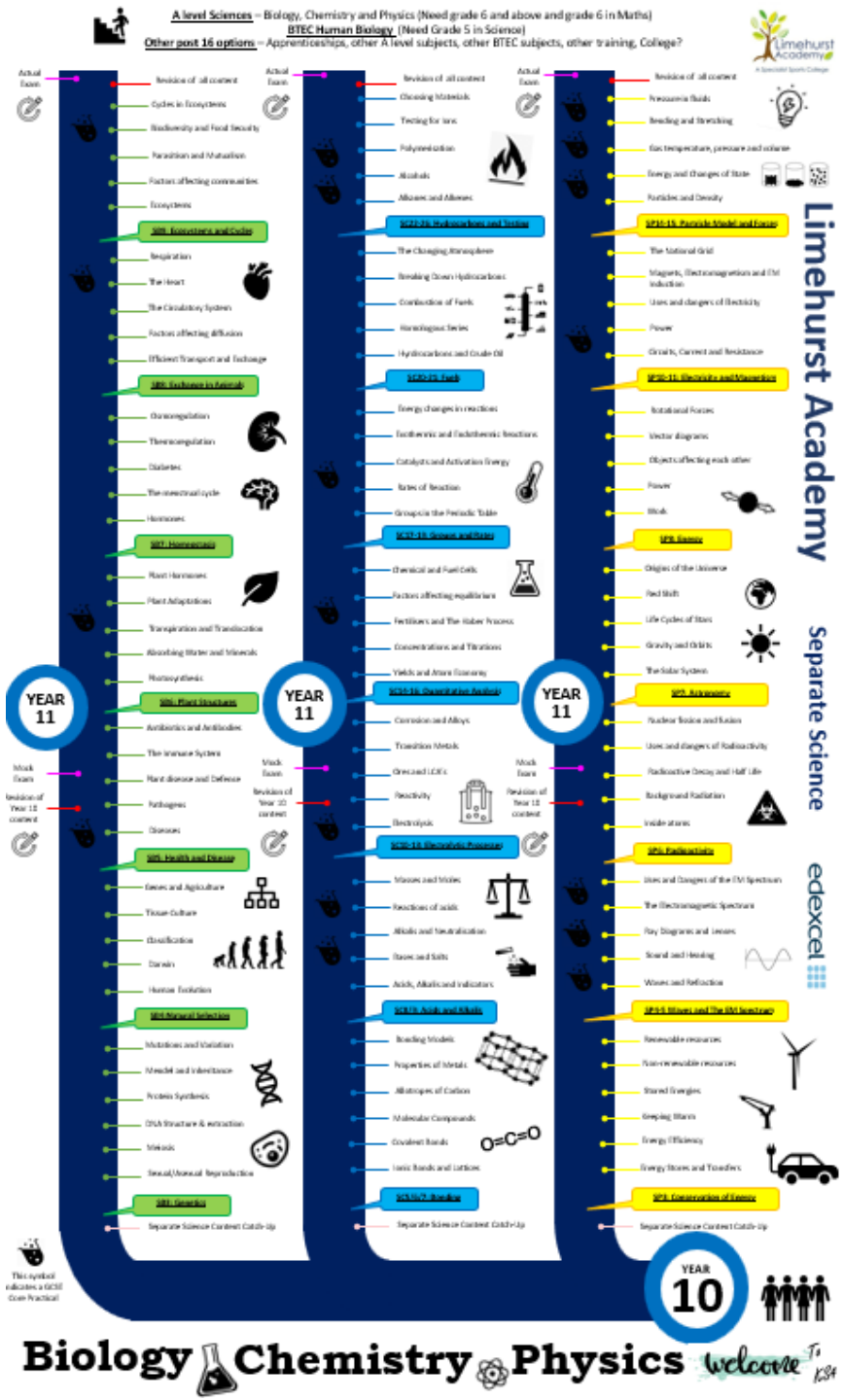

KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SP5 Light and the Electromagnetic Spectrum

Knowledge acquired:

In this unit you will learn about different forms of radiation that we cannot see their uses and dangers.

Skills developed:

Maths Skills: Recognise and use expressions in decimal form/Recognise and use expressions in standard form/Use an appropriate number of significant figures/Find arithmetic means/Understand and use the symbols: =, <, <<, >>, >, ∝, ~/Change the subject of an equation/Substitute numerical values into algebraic equations using appropriate units for physical quantities/Solve simple algebraic equations
Core Practical Skills: Investigating radiation / Investigating refraction

Understanding (In this topic you will learn):

- How to use ray diagrams to explain reflection, refraction and total internal, reflection.
- How lenses work and some things they can be used for.
- That light is part of the electromagnetic spectrum and that all parts have some properties in common.
- About some of the uses and dangers of different parts of the electromagnetic spectrum.
- About some of the factors that affect the temperature of the Earth.

Links to previous study (you previously learnt in KS3):

- That light transfers energy and about colours and how different colours are absorbed and reflected differently.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 11, A level Physics and many areas of employment e.g. Light designer.

KS4 Combined Science

SP5 Light and the Electromagnetic Spectrum

Number of lessons: 13

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Ray diagrams	
2	Investigating refraction	*
3	Colour	
4	Lenses	
5	Electromagnetic waves	
6	The electromagnetic spectrum	
7	Using the longer wavelengths	
8	Radiation and temperature	
9	Investigating radiation	*
10	Using the short wavelengths	
11	EM radiation dangers	
12	Preparing for assessment/exams	
13	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 66-88.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
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Use of assessment result(s):

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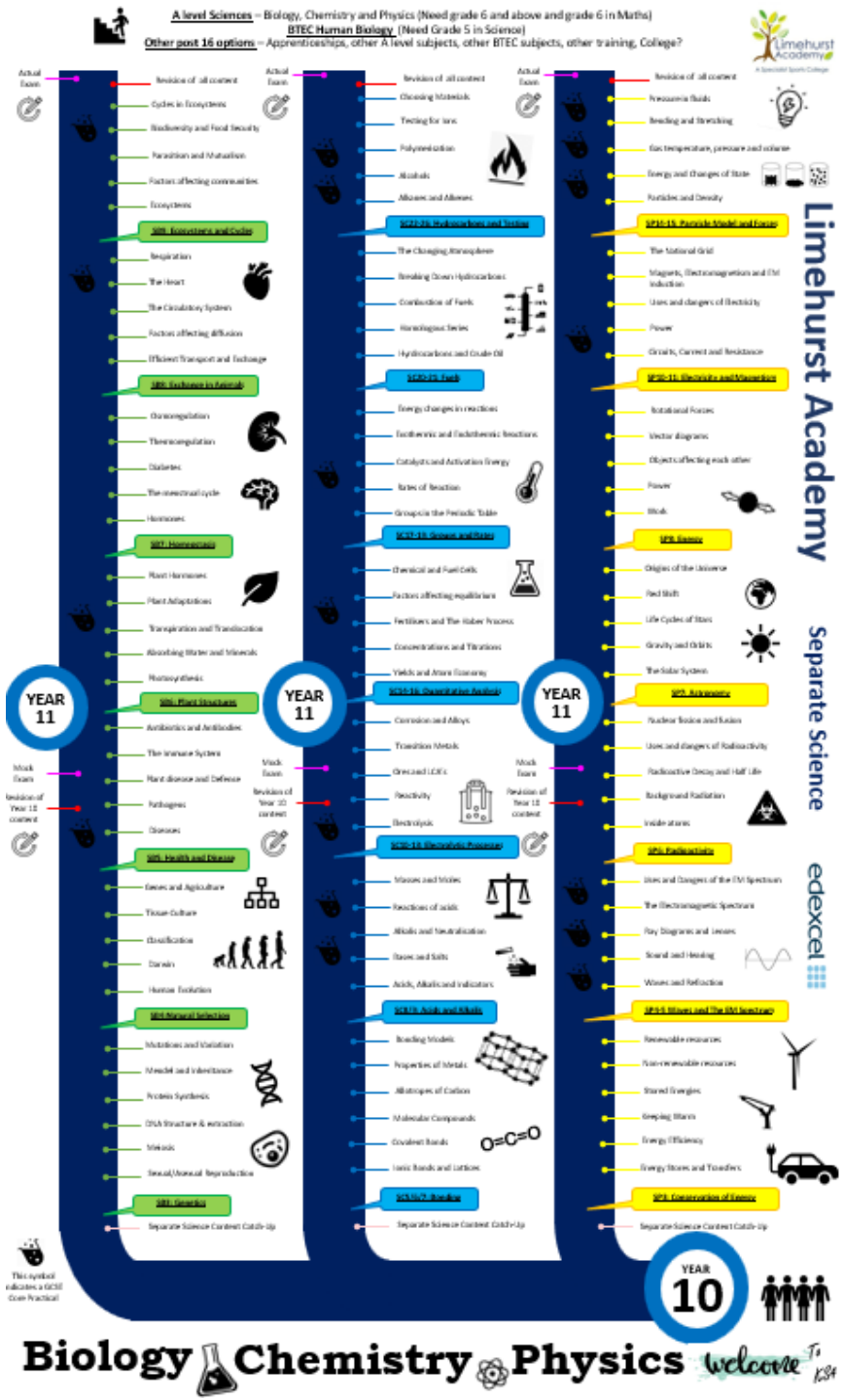

KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SP6 Radioactivity

Knowledge acquired:

In this unit you will find out more about atoms and their structure, and how atoms can produce radioactivity when they change and how we can use these ideas to generate electricity now and in the future.

Skills developed:

Maths Skills: Recognise and use expressions in decimal form/Recognise and use expressions in standard form/Use an appropriate number of significant figures/Find arithmetic means/Understand and use the symbols: =, <, <<, >>, >, ∝, ~/Change the subject of an equation/Substitute numerical values into algebraic equations using appropriate units for physical quantities/Solve simple algebraic equations.

Understanding (In this topic you will learn):

- How the particles inside an atom are arranged and how represent them using symbols.
- About the different types of radiation and how they affect atoms.
- About background radiation that is all around us.
- About the dangers of radiation and how we protect ourselves.
- About how we can use radioactive materials to diagnose and treat cancer, and generate power.

Links to previous study (you previously learnt in KS3):

- About the particle model of matter and that atoms contain smaller charged particles called electrons.

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 11, A level Physics and many areas of employment e.g. British Nuclear Fuels.

KS4 Combined Science

SP6 Radioactivity

Number of lessons: 15

Sequence of Lessons

Lesson	Lesson title	Core Practical
1	Atomic models	
2	Inside atoms	
3	Electrons and orbits	
4	Background radiation	
5	Types of radiation	
6	Radioactive decay	
7	Half-life	
8	Using radioactivity	
9	Dangers of radioactivity	
10	Radioactivity in medicine	
11	Nuclear energy	
12	Nuclear fission	
13	Nuclear fusion	
14	Preparing for assessment/exams	
15	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 90-116.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
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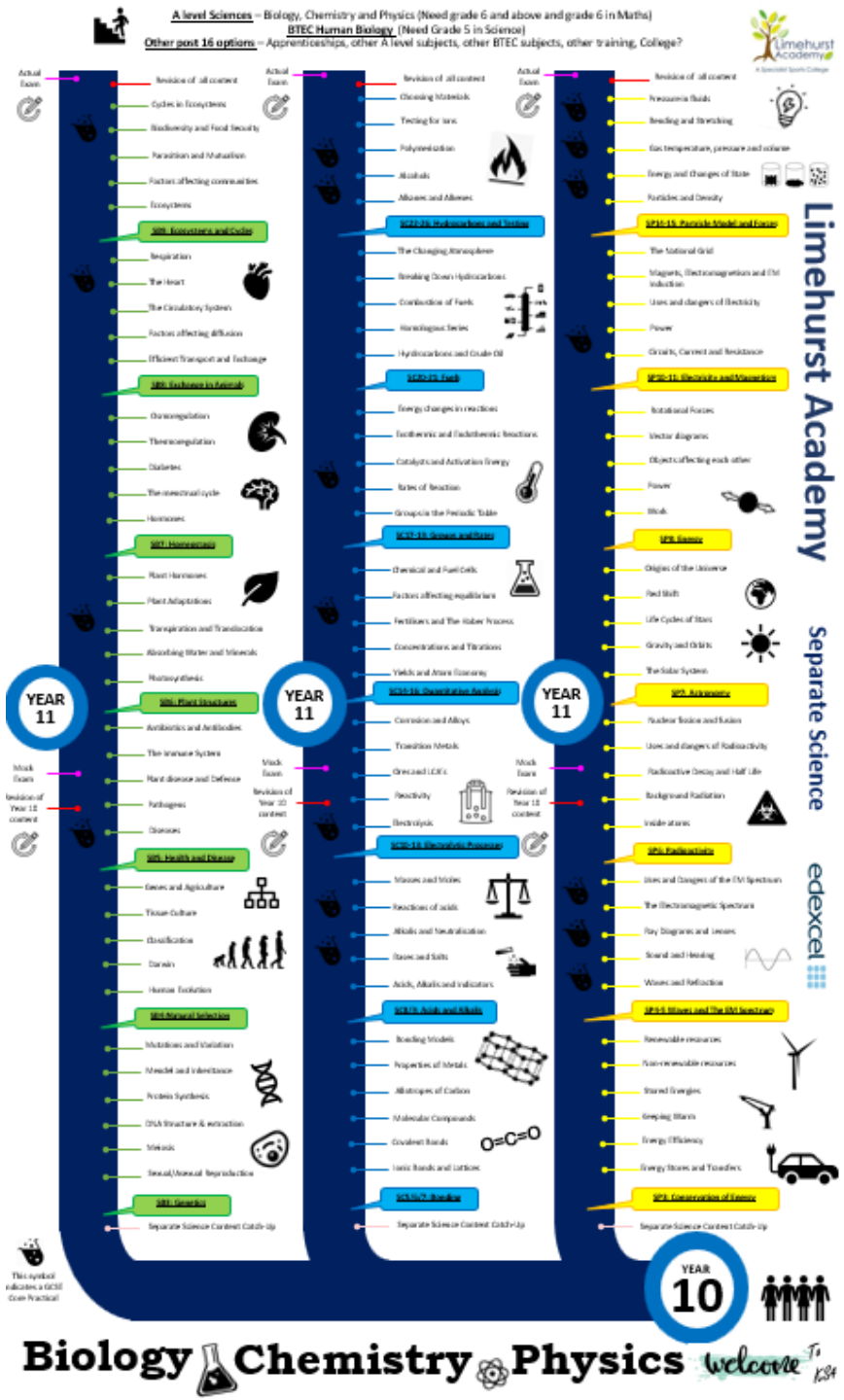
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Summer Mock in Year 10.
- Final assessment: assessed within Physics Paper 1 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SP7 Astronomy

Knowledge acquired:

In this unit you will learn about the Solar System and how gravity affects orbits. You will learn about the life cycles of stars and evidence for different theories of the origin of the Universe.

Skills developed:

Maths Skills: Understand and use the symbols: =, <, <<, >>, >, ∝, ~ / Change the subject of an equation / Substitute numerical values into algebraic equations using appropriate units for physical quantities / Solve simple algebraic equations / Translate information between graphical and numeric form / Plot two variables from experimental or other data / Determine the slope and intercept of a linear graph / Using standard form

Understanding (In this topic you will learn):

- About how our ideas about the universe and the way we observe it have changed over time.
- Why gravity is different on different bodies and how this effects orbits.
- What Red-Shift is and what it shows
- About the origins of the universe and the life cycle of stars.

Links to previous study (you previously learnt in KS3):

- About the Solar System, stars and the universe and about how gravity affects the Earth and other objects.

Links to previous study (you previously learnt in SP2):

- More about mass and weight

Links to future study / the wider world (where applicable):

Links to Paper 1 in year 11, A level Physics and many areas of employment e.g. Sports design.

KS4 Combined Science

SP7 Astronomy

Number of lessons: 7

Sequence of lessons

Lesson	Lesson title	Core Practical
1	The solar system	
2	Gravity and orbits	
3	Life cycles of stars	
4	Red-shift	
5	Origin of the Universe	
6	Preparing for assessment/exams	
7	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 118-128.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

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Use of assessment result(s):

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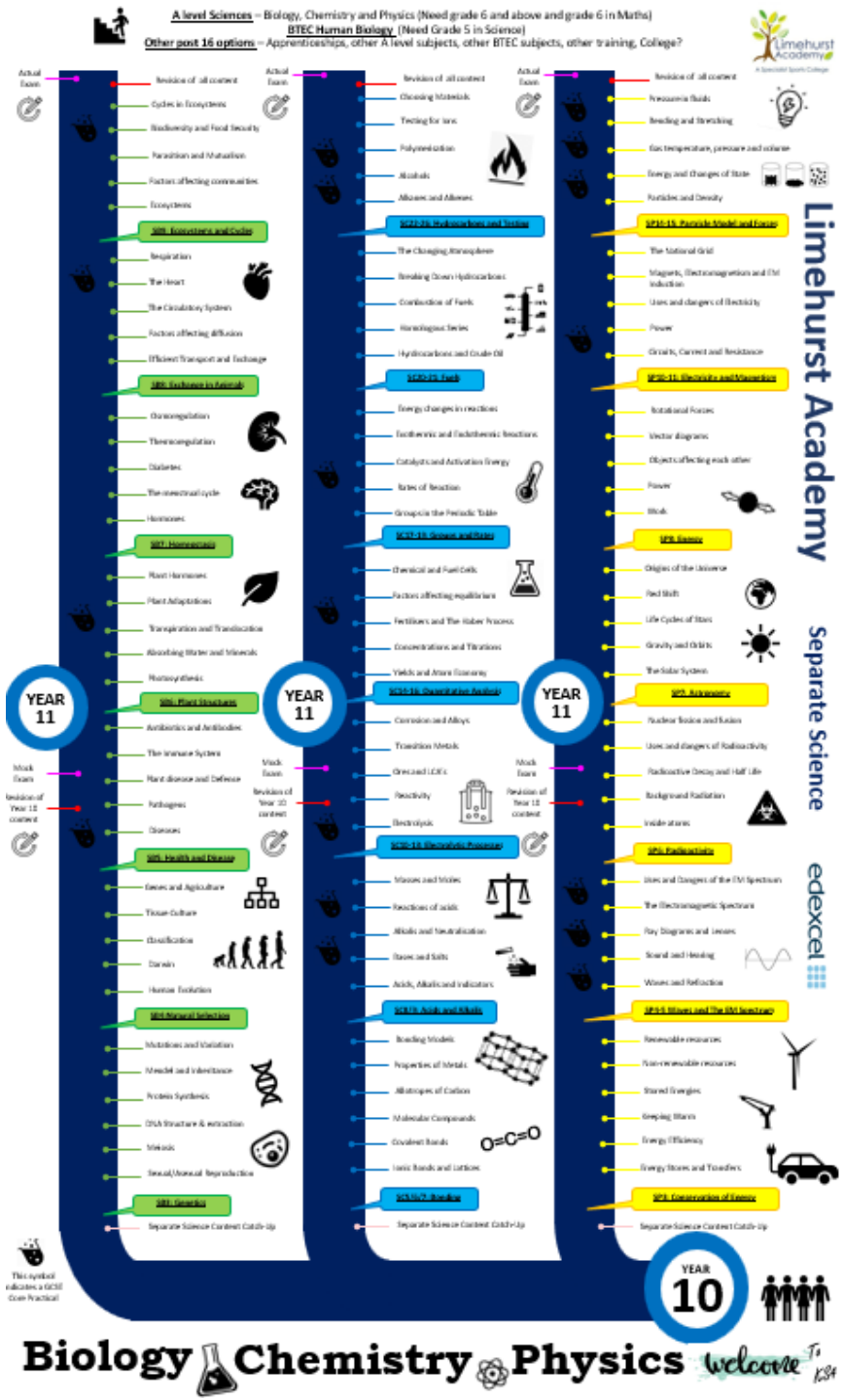

KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SP8/9 Energy, Forces Doing Work and their Effects

Knowledge acquired:

In this unit you will find out more about atoms and their structure, and how atoms can produce radioactivity when they change.

Skills developed:

Maths Skills: Recognise and use expressions in decimal form/Use ratios, fractions and percentages/Understand and use the symbols: =, <, <<, >>, >, ⍰, ~/Change the subject of an equation/Substitute numerical values into algebraic equations using appropriate units for physical quantities/Solve simple algebraic equations.

Understanding (In this topic you will learn):

- About how the energy in a system can be changed and how to calculate power and work done.
- How objects interact with each other, through force fields and contact forces.
- How to use vector diagrams to work out the effects of forces on an object.
- About rotational forces, calculating moments and how levers and gears work.

Links to previous study (you previously learnt in KS3):

- The ways that energy can be stored and transferred, about balanced and unbalanced forces and diagrams to represent them.

Links to previous study (you previously learnt in CP1 and CP3):

- About scalar and vector quantities, how to calculate potential energies and represent them in diagrams.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Physics and many areas of employment e.g. Engineering.

KS4 Combined Science

SP8/9 Energy, Forces Doing Work and their Effects

Number of lessons: 6

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Work and power	
2	Objects affecting each other	
3	Vector diagrams	
4	Rotational forces	
5	Preparing for assessment/exams	
6	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 130-138.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Winter Mock in Year 11.
- Final assessment: assessed within Physics Paper 2 (sat in June of Year 11).

Use of assessment result(s):

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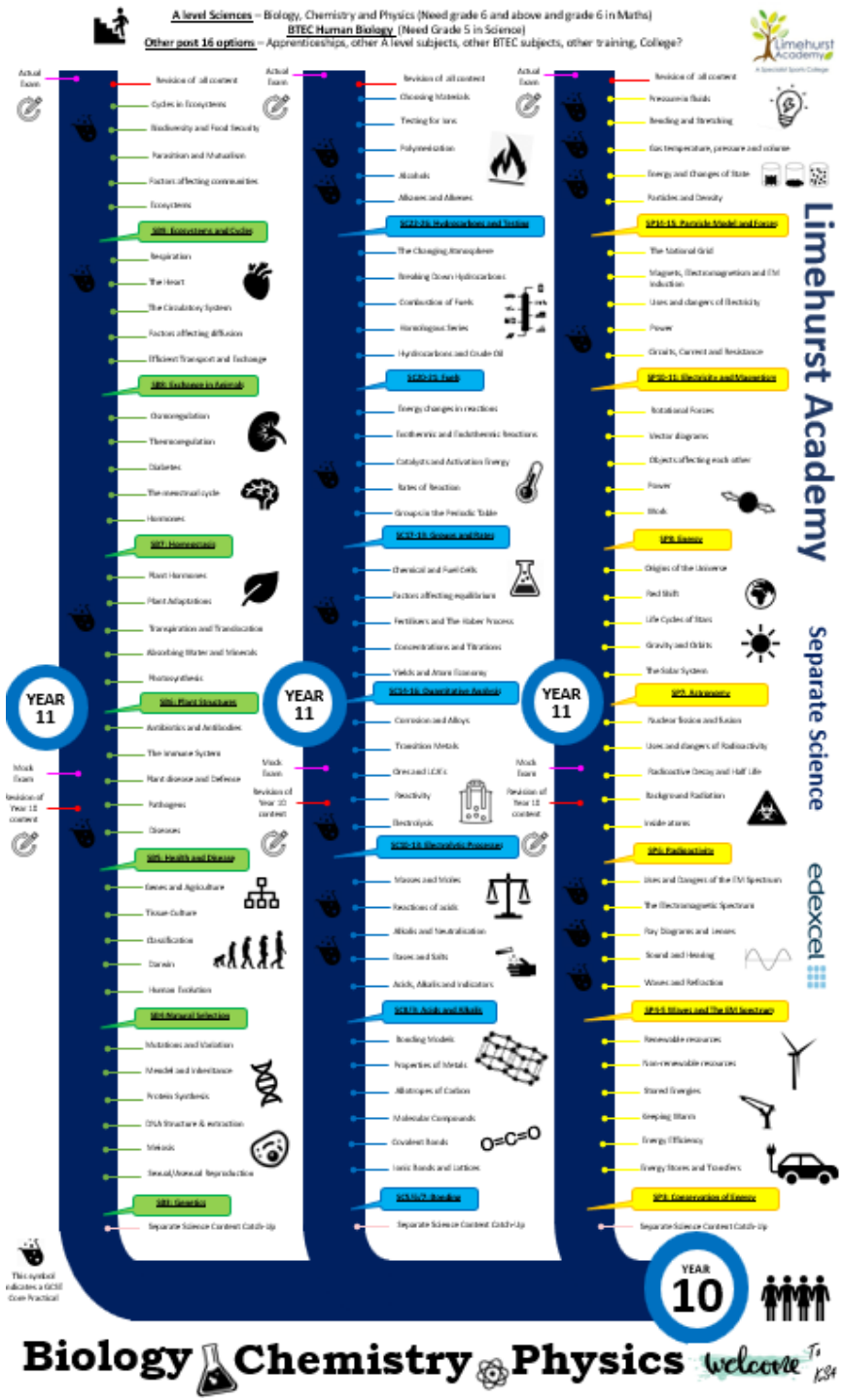


KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SP10/11 Electricity and Circuits & Static Electricity

Knowledge acquired:

In this unit you will learn how electricity is supplied to hospitals, homes and factories, and about its effects and uses in many different types of circuits and about static electricity.

Skills developed:

Maths Skills: Recognise and use expressions in decimal form/Recognise and use expressions in standard form/Use an appropriate number of significant figures/Understand and use the symbols:=, <, <<, >>, >,∝, ~/Change the subject of an equation/Substitute numerical values into algebraic equations using appropriate units for physical quantities/Solve simple algebraic equations/Visualise and represent 2D and 3D forms, including two dimensional representations of 3D objects
Core Practical Skills: Investigating resistance

Understanding (In this topic you will learn):

- About current, charge, and potential difference and how to calculate resistance, power and energy transferred.
- About components with changing resistance.
- About the UK domestic electricity supply and electrical safety features in homes.
- About the shape and size of electric fields and how they explain some phenomena caused by static electricity.

Links to previous study (you previously learnt in KS3):

- That electrical current is measured in amps and voltage is measured in volts.
- That circuits can be connected in series and parallel, and conductors have high resistance and insulators low.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Physics and many areas of employment e.g. Light designer.

KS4 Combined Science

SP10/11 Electricity and Circuits & Static Electricity

Number of lessons: 15

Sequence of Lessons

Lesson	Lesson title	Core Practical
1	Electric circuits	
2	Current and potential difference	
3	Current, charge and energy	
4	Resistance	
5	More about resistance	
6	Investigating resistance	*
7	Transferring energy	
8	Power	
9	Transferring energy by electricity	
10	Electrical safety	
11	Charges and static electricity	
12	Dangers and uses of static electricity	
13	Electric fields	
14	Preparing for assessment/exams	
15	End of Module Assessment	

Main resources:

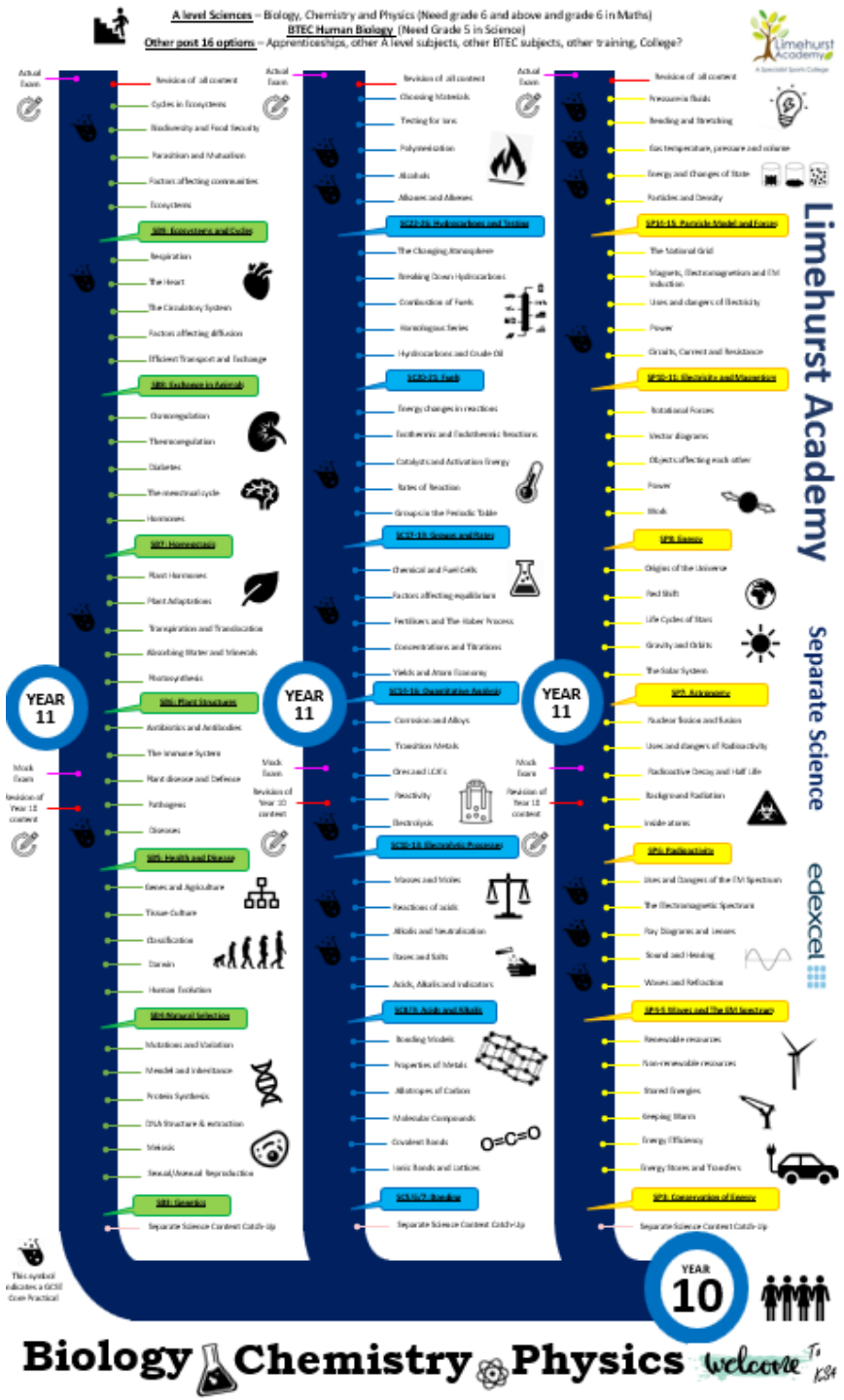
- Pearson Edexcel (9-1) Combined Science pages 139-166.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
- Science lessons start with a learning review, providing students with the opportunity to practise the recall of previous learning (from the previous lessons, previous weeks and previous months). This also allows teachers to quickly asses what has clearly been embedded and what areas still need some focus/time.
- Students receive regular verbal feedback as they complete tasks.
- Assessed as part of Winter Mock in Year 11.
- Final assessment: assessed within Physics Paper 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.



KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SP12/13 Magnetism and Electromagnetic Induction

Knowledge acquired:

In this unit you will learn about magnetic fields and how they are used to produce forces and to change the voltage of electricity supplies.

Skills developed:

Maths Skills: Recognise and use expressions in decimal form/Use an appropriate number of significant figures/Understand and use the symbols:=, <, <<, >>, >,∝, ~/Change the subject of an equation/Substitute numerical values into algebraic equations using appropriate units for physical quantities/Solve simple algebraic equations

Understanding (In this topic you will learn):

- About permanent and induced magnets and how to represent a magnetic field.
- About the magnetic field around a current in a wire and the factors that effect it and how the fields interact.
- How to use the power equation for transformers and how transformers are used in the National Grid.
- How current can be induced in a wire and the factors that effect it.
- How to calculate the size of the force on a wire carrying a current in a magnetic field.
- How to work out the direction of the force on a wire carrying a current in a magnetic field.

Links to previous study (you previously learnt in KS3):

- How to plot the shape of a magnetic field and that electric currents cause magnetic fields.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Physics and many areas of employment e.g. Electrical engineer.

KS4 Combined Science

SP12/13 Magnetism and Electromagnetic Induction

Number of lessons: 8

Sequence of lessons

Lesson	Lesson title	Core Practical
1	Magnets and magnetic fields	
2	Electromagnetism	
3	Magnetic forces	
4	Electromagnetic induction	
5	Transformers	
6	Transformers and energy	
7	Preparing for assessment/exams	
8	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 168-180.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
- End of topic assessment produced by the exam board. These are then reviewed in class to pick up common misconceptions.
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Use of assessment result(s):

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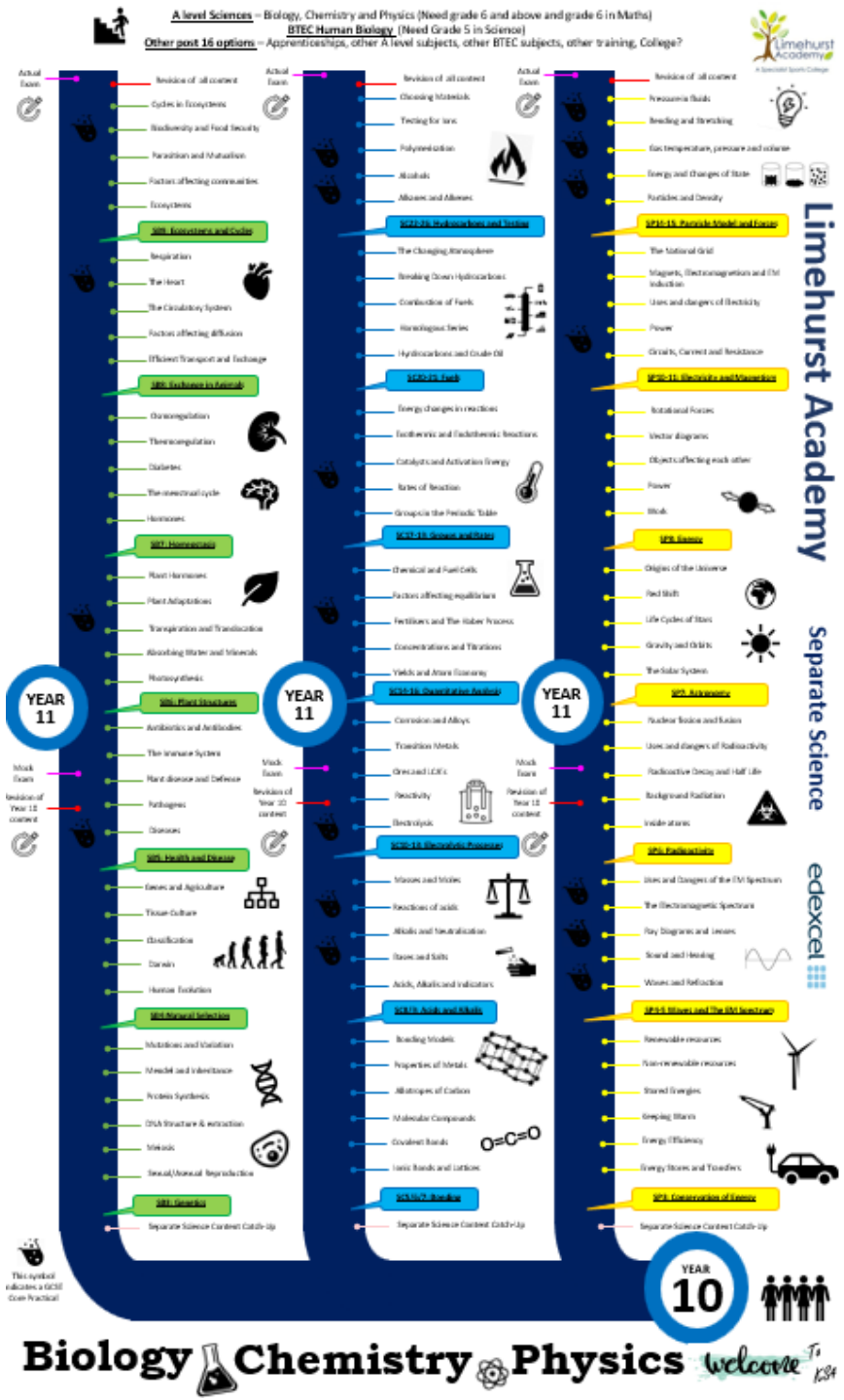

KS4 Separate Science

Limehurst Academy
A Specialist Sports College

SP14/15 Particle Model and, Forces and Matter

Knowledge acquired:

In this unit you will how the particle model explains the properties of matter and what happens when energy is transferred to or from a substance. You will also learn about springs and the energy transfers in stretching them.

Skills developed:

Maths Skills: Make estimates of the results of simple calculations/Change the subject of an equation/Substitute numerical values into algebraic equations using appropriate units for physical quantities/Solve simple algebraic equations
Core Practical Skills: Investigating densities / Investigating water / Investigating springs

Understanding (In this topic you will learn):

- How to explain different densities about specific heat capacity & specific latent heat and how to calculate them.
- How changing the temperature of a gas effects its pressure and about the Kelvin and Celsius scales.
- About elastic and inelastic distortions and how to calculate the extensions of springs and their constants.
- How pressure in fluids depends on density and depth.

Links to previous study (you previously learnt in KS3):

- That mass is conserved during changes of state, about the properties of solids, liquids and gases, and how those particles are arranged.

Links to previous study (you previously learnt in CP2):

- Some of the effects that forces have on objects.

Links to future study / the wider world (where applicable):

Links to Paper 2 in year 11, A level Physics and many areas of employment e.g. Structural engineer.

KS4 Combined Science

SP14/15 Particle Model and, Forces and Matter

Number of lessons: 15

Sequence of Lessons

Lesson	Lesson title	Core Practical
1	Particles and density	
2	Investigating densities	*
3	Energy and changes of state	
4	Energy calculations	
5	Investigating water	*
6	Gas temperature and pressure	
7	Gas pressure and volume	
8	Bending and stretching	
9	Extension and energy transfers	
10	Investigating springs	*
11	Pressure in fluids	
12	Pressure and up thrust	
13	Preparing for assessment/exams	
14	End of Module Assessment	

Main resources:

- Pearson Edexcel (9-1) Combined Science pages 182-206.
- Worksheets that directly link to the textbooks and PowerPoints.
- PowerPoint presentations linked to the activities workbook and worksheets.
- Use of GCSEpod clips/BBC bitesize for revision of each component.
- Practical equipment and individual workbooks for students.

Method(s) of assessment:

- 6 mark question to be completed half way through the unit and reviewed in class.
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- Assessed as part of Winter Mock in Year 11.
- Final assessment: assessed within Physics Paper 2 (sat in June of Year 11).

Use of assessment result(s):

- Used to identify areas of weakness in terms of knowledge and skills. Addressed throughout the remainder of the course.

Post 16 – What do we prepare pupils for?

Limehurst Science Department

What could I do after I finish my GCSE in Science?

- GCSEs enable you to progress either directly to employment or to further education. Your opportunities for further study will depend on how well you do at GCSE.
- A good grade in Maths GCSE is also important if you want to study any of the sciences at a higher level.
- There are many routes available to you after you have finished your GCSEs, whether you decide to continue in education or begin working.
- **But remember: taking science will open up a variety of career options for your future providing you with skills that will make you very employable.**

What jobs could I get within the Science World?

There really are no limits to the type of job studying science and maths could lead to. You could get a well paid and respected job in thousands of professions:

- Interested in people and how the mind works? You could become a clinical psychologist.
- Do you live for football? Then sports science could be the job for you.
- Like the idea of designing and building structures? Perhaps you are an engineer?
- If you want to be involved in combating diseases and treating people who are ill, how about a career in medicine?
- Dentistry is a great choice if you want to put a smile on people's faces.
- Love music, but don't fancy appearing on Pop Stars? Music technology is a very popular choice.
- Are you obsessed by animals? Animal health is a great career choice for anyone who wants to improve their lives

What if you don’t want to work within the Science World?

You may be surprised to hear this, but the skills you gain from studying science and maths will open up opportunities in areas that are not obviously science related. For example:

- Teaching
- Marketing
- Patent law
- Photography
- Art restoration
- Media and film production
- Food technology
- Finance

…all these jobs directly use or build on the skills gained from studying science and maths.