Thomas More Catholic Academy
FAITH | EXCELLENCE | RESPECT

BTEC Curriculum Sequence – Key Stage 5

	KS4 prior learning	By the end of the term, students can:	Year 12 Term 1 Unit 1: Externally Assessed Exam	Year 12 Term 2 Unit 2: Internally Assessed Coursework	Year 12 Term 3 Unit 2: Internally Assessment Coursework	Year 13 Term 1 Unit 3 Externally Assessed Exam	Year 13 Term 2 Unit 8: Internally Assessed Coursework	Year 13 Term 2 Unit 8: Internally Assessed Coursework
What we want our students to know and remember	Biology: Cell Biology - identify the difference between prokaryotic and eukaryotic cells. Cell specialisation and adaptation of specialised cells. Chemistry: Ionic & Covalent bonding, structure of the periodic table, intermolecular forces, oxidation and reduction reactions. Physics: Waves, transverse & longitudinal waves, diffraction, EM spectrum	Define the key tier 3 vocabulary:	Chemistry: relative atomic mass, reactivity, standard solution, relative molar mass, Avogadro's constant, concentration, ionic, covalent, metallic, intermolecular forces, periodicity, oxidation, reduction Biology: organelles, prokaryotic, eukaryotic, gram positive, gram negative, specialisation, adaptation, gametes, chromosomes, endothelial, epithelial, atherosclerosis. Physics: waves, transverse, longitudinal, resonance, superposition, diffraction, refractive index, internal reflection, critical angles, electromagnetic spectrum,	Chemistry: titration, colourimetry, balance, mass, volume, density, calibration, conclusion, pH meter, secondary data, dilution series, absorbance, cooling curve, calorimetry, tangent, chromatography, TLC, Rf value, amino acids	Chemistry: titration, colourimetry, balance, mass, volume, density, calibration, conclusion, pH meter, secondary data, dilution series, absorbance, cooling curve, calorimetry, tangent, chromatography, TLC, Rf value, amino acids	Biology: carboxyl group, R group, amino acid, activation energy, enzymes, diffusion, percentage error, Brownian motion, biotic & abiotic Chemistry: viscosity, combustion, specific heat capacity, chemical & physical reactions, Physics: Resistance, power, work done, specific heat capacity	Biology: Musculoskeletal system, demineralisation, dissection, lymphatic system, lymph, tissue, Lymphedema, lymphadenitis and Hodgkin's Lymphoma, digestive system, small intestine, villus, enzyme, chemical digestion, mechanical digestion	Biology: Musculoskeletal system, demineralisation, dissection, lymphatic system, lymph, tissue, Lymphedema, lymphadenitis and Hodgkin's Lymphoma, digestive system, small intestine, villus, enzyme, chemical digestion, mechanical digestion

		Recall the knowledge:	In Unit 1 building in complexity is achieved through the initial recapping of GCSE subject matter. Students approach the Unit 1 specification in a bottom to top approach. E.g. - in the biology content, students start by recapping GCSE cells, before moving onto the more complex KS5 content of cells and then through to the organ systems and diseases associated with the systems. Students develop this knowledge throughout their course: Chemistry: Recall the structure of the periodic table and how this relates to their properties. Describe how to undertake a titration and prepare a standard solution & concentration Describe how to determine the electronic structure of elements within the periodic table. Biology: Recall the structure of the organelles within key animal cells. Discuss the difference between light and electron microscopes. Calculate magnification using the IAM equation triangle. Describe the difference between gram positive and gram negative bacteria. Physics: Identify the difference types of waves. Know how to calculate wave speed. Know how to draw graphs to show sine waves.	Unit 2 is internally assessed coursework. As such, students are first introduced to the key skills and given opportunity to gain the skills and knowledge that they will need to be successful in their assignments. This Unit is split into 4 learning aims, with key recall content highlighted below: Learning Aim A: Describe how to calibrate equipment Explain the relationship between mass and volume Calculate density using given values. Define the term titration Demonstrate correct titrimetric technique Evaluate the most difficult parts of titrimetric technique Evaluate the quality of titration results Demonstrate correct titrimetric technique Apply understanding of own titration to complete logs for learning aim D Learning Aim B: Define key terms associated with cooling curves Explain what the curves on a cooling curve graph shows Identify alternations necessary to the cooling curve method Evaluate methods used and suggest improvements for cooling curves Learning Aim C: Define polarity Explain precautionary measures necessary in a practical Draw conclusions based upon data Explain how to create	Unit 2 is internally assessed coursework. As such, students are first introduced to the key skills and given opportunity to gain the skills and knowledge that they will need to be successful in their assignments. 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Define the term energy Explain what is meant by specific heat capacity Physics: Draw the electrical symbols for common circuit components Describe how to create a circuit Draw the electrical symbols for resistors Describe how to investigate how thermistors vary with temperature Evaluate practical for improvements Define the term work done Describe how to calculate work done using the equation	Learning Aim A: Identify the major bones in the human body. Describe the structure of key parts of the skeleton. Discuss the functions of the skeleton and relationship between structure and function. Identify the key components of bone. Describe the difference between compact bone and spongy bone Discuss the role of osteoblasts and osteoclasts Recall the three different types of joints Describe the characteristics of each of these joints Explain how joints are adapted for their function Identify some treatments for musculoskeletal systems Describe how to treat these conditions Suggest explanations as to why treatments work Learning Aim B: Identify key parts of the lymphatic system Describe the roles of the lymphatic system Explain the necessity of a lymphatic system Identify some diseases of the lymphatic system Describe how these diseases are treated Explain what would happen if they were not treated appropriately. Learning Aim C Identify the key components of a healthy diet Describe the function of each of these components Explain how to test for each component Identify the structure of the digestive system Describe peristalsis and retropeistalsis	Learning Aim A: Identify the major bones in the human body. 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			Describe how wavelength, frequency and wavelength change Discuss some uses of EM waves.	chromatograms using leaf pigments Create a research document on the chromatography of different pigments Discuss which solvent is most effective for extracting pigments Learning Aim D: Analyse and evaluate the evidence of skills gained during the course of the previous assignments	chromatograms using leaf pigments Create a research document on the chromatography of different pigments Discuss which solvent is most effective for extracting pigments Learning Aim D: Analyse and evaluate the evidence of skills gained during the course of the previous assignments		Explain the processes involved in digestion from mouth to anus Identify the core enzymes involved in digestion Recall the reactants and products of each enzyme involved in digestion Describe how enzymes work	Explain the processes involved in digestion from mouth to anus Identify the core enzymes involved in digestion Recall the reactants and products of each enzyme involved in digestion Describe how enzymes work

What we want our students to do	Students develop skills through the use of required practical activities at GCSE. These skills can then be further enhanced and developed within the Applied Science Curriculum. Skills that students already have within KS4 that are passed into this qualification are below: - Magnification calculations - Use of ripple tanks - Refraction - Angles of incidence & refraction - cooling curves - Drawing tangents to determine rates of reaction - Calculating concentration - Calculating density. - Evaluation of practical activities for improvements	Demonstrate excellence in these skills:	Skills build in complexity along with knowledge; because the students know more they will be able to do more in their skills development. Unit 1 focused upon subject knowledge and as such, skills development is minimal in comparison to Unit 2, which is much more comprehensive. Chemistry: Calculate the number of moles in a solution Calculate the relative atomic and molecular mass of substances Determine the end point of titrations Explain how to prepare a standard solution Calculate concentration Determine the electronic structure of elements using the bus seat method. Biology: Calculate magnification using the IAM equation triangle. Undertake an independent investigation using light microscopes. Create a practical to investigate whether bacteria are gram positive or gram negative Physics: Create a wave machine to show how waves transfer energy. Demonstrate superposition of waves using a ripple tank. Calculate wave speed Define the term refraction Calculate the refractive index by applying Snell's Law Create a practical method to determine angles of incidence & refraction Know the different waves	Learning Aim A: Correctly prepare and standardise solutions for titration and colorimetry. Investigate the concentration of unknown solutions, using procedures and techniques in titration and colorimetry. Demonstrate skilful application of procedures and techniques in titration and colorimetry to accurately determine the concentration of solutions. Evaluate the accuracy of procedures and techniques used in titration and colorimetry in relation to outcomes and suggest improvements. Learning Aim B: Correctly obtain data using different equipment to construct cooling curves. Correctly determine the rate of cooling of substances using cooling curves. Analyse the rate of cooling of substances from your data using cooling curves to draw valid conclusions. Evaluate the accuracy of practical work in calorimetry in relation to the analysis of the cooling curve Learning Aim C: Correctly use chromatographic techniques to produce chromatograms. Explain the use of chromatographic techniques to separate mixtures. Analyse own chromatograms and relate the factors that affect the separation of mixtures to the quality of results obtained. Evaluate the	Learning Aim A: Correctly prepare and standardise solutions for titration and colorimetry. Investigate the concentration of unknown solutions, using procedures and techniques in titration and colorimetry. Demonstrate skilful application of procedures and techniques in titration and colorimetry to accurately determine the concentration of solutions. Evaluate the accuracy of procedures and techniques used in titration and colorimetry in relation to outcomes and suggest improvements. Learning Aim B: Correctly obtain data using different equipment to construct cooling curves. Correctly determine the rate of cooling of substances using cooling curves. Analyse the rate of cooling of substances from your data using cooling curves to draw valid conclusions. 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Explain why statistical analysis is necessary Calculate statistics based upon given data. Evaluate given data for statistical significance Physics: Calculate resistance using Ohm's law Define specific heat capacity Describe how to investigate SHC Create a method to show how to investigate SHC Explain why statistical analysis is necessary Calculate statistics based upon given data. Evaluate given data for statistical significance	Learning Aim A: Explain the functional role of the musculoskeletal system in the human body. Describe the effect of disorder of muscles and joints and possible corrective treatment(s). Compare how disorders of the musculoskeletal system can affect how muscles bring about movement of joints and the role of corrective treatment(s). Evaluate the effect of corrective treatment(s) associated with a musculoskeletal disorder. Learning Aim B: Describe the gross anatomy and function of the organs of the lymphatic system. Describe the effect of a disorder on the lymphatic system and possible corrective treatment(s). Explain the physiological reasoning for corrective treatment(s) associated with a disorder of the lymphatic system. Evaluate the effect of corrective treatment(s) for a disorder of the lymphatic system. Learning Aim C: Explain the role and location of organs involved in digestion. Correctly carry out investigations to establish sources and importance of key nutrients for a balanced diet. Describe the symptoms of nutrient deficiency as a result of dietary-related disease. Analyse the role of digestive enzymes on nutrient uptake in each part of the digestive system. Explain the use of corrective treatment(s)	Learning Aim A: Explain the functional role of the musculoskeletal system in the human body. Describe the effect of disorder of muscles and joints and possible corrective treatment(s). Compare how disorders of the musculoskeletal system can affect how muscles bring about movement of joints and the role of corrective treatment(s). Evaluate the effect of corrective treatment(s) associated with a musculoskeletal disorder. Learning Aim B: Describe the gross anatomy and function of the organs of the lymphatic system. Describe the effect of a disorder on the lymphatic system and possible corrective treatment(s). Explain the physiological reasoning for corrective treatment(s) associated with a disorder of the lymphatic system. Evaluate the effect of corrective treatment(s) for a disorder of the lymphatic system. Learning Aim C: Explain the role and location of organs involved in digestion. Correctly carry out investigations to establish sources and importance of key nutrients for a balanced diet. Describe the symptoms of nutrient deficiency as a result of dietary-related disease. Analyse the role of digestive enzymes on nutrient uptake in each part of the digestive system. Explain the use of corrective treatment(s)

			within the EM spectrum	chromatographic techniques used in relation to outcomes and suggest improvements. Learning Aim D: Summarise key personal competencies developed in relation to scientific skills undertaken. Analyse skills developed and suggest improvements to own practice. Evaluate scientific skills developed in terms of potential for future progression.	chromatographic techniques used in relation to outcomes and suggest improvements. Learning Aim D: Summarise key personal competencies developed in relation to scientific skills undertaken. Analyse skills developed and suggest improvements to own practice. Evaluate scientific skills developed in terms of potential for future progression.		for nutrient deficiency. Evaluate the effect of dietary disease and corrective treatment(s) on human health.	for nutrient deficiency. Evaluate the effect of dietary disease and corrective treatment(s) on human health.

Key assessment questions:			Chemistry: What is meant by Avogrado's Constant? How can the bus seat method be used to determine the orbitals in which electrons are found? How do we calculate concentration? What is the purpose of a titration? Explain how we undertake an acid-base titration. Biology: What is the difference between eukaryotic and prokaryotic cells? Describe the risk factors for atherosclerosis Discuss how L-dopa can be used to treat parkinson's disease. How do you use a light microscope to calculate the magnification of an object? Describe the process of a myofibril contraction. Describe the proccess by which neurotransmitter diffuses across a synapse. Physics: How do we calculate wave speed? Describe the differences between transverse and longitudinal waves What are the parts of the EM spectrum? Can you recall the uses of parts of teh EM spectrum? What is meant by the inverse square law? What does calculating it tell you?	What skills have you developed during this unit? How do you know that you have developed these skills? Explain how we calculate concentration. What is the difference between TLC and paper chromatography? How do you collect data to study cooling curves? Explain how to determine the rate of cooling using tangents on graphs What improvements could you use to ensure the accuracy of your data when studying cooling curves? What improvements could you make on any of the practical that you have undertaken? Where would these practicals be used in real life?	What skills have you developed during this unit? How do you know that you have developed these skills? Explain how we calculate concentration. What is the difference between TLC and paper chromatography? How do you collect data to study cooling curves? Explain how to determine the rate of cooling using tangents on graphs What improvements could you use to ensure the accuracy of your data when studying cooling curves? What improvements could you make on any of the practical that you have undertaken? Where would these practicals be used in real life?	What statistical test should we use for xxx data? What is the structure that all amino acids have in common? How does an enzyme work? What is meant by activation energy? How do we calculate percentage error? How do we plan a practical to measure specific heat capacity? What does SHC mean? How do we calculate resistance? How do we calculate power? What is the difference between mechanical and electrical power?	What are the main compositions of bone? What are the stages involved in a muscle contract? Give an example of a musculoskeletal disorder and dicuss the symptoms and treatments of the disorder. What are the main organs of the digestive system? What is an enzyme? Recall the reactants and products of the digestive enzymes Explain how a villus is adapted for it's function. How are AA's, lipids and glucose absorbed in the small intestine? What are some disorders of the digestive system? Give their symptoms and treatments	What are the main compositions of bone? What are the stages involved in a muscle contract? Give an example of a musculoskeletal disorder and dicuss the symptoms and treatments of the disorder. What are the main organs of the digestive system? What is an enzyme? Recall the reactants and products of the digestive enzymes Explain how a villus is adapted for it's function. How are AA's, lipids and glucose absorbed in the small intestine? What are some disorders of the digestive system? Give their symptoms and treatments

Disciplinary Rigour	Applied science is different in terms of subject specialisms as it does not focus on one particular science. This means that the subject must be taught by three separate subject specialists, each focusing on their particular area of expertise. Applied Science focuses upon key subject knowledge and how that is used within industry. It is necessary for students to approach the subject with a focus upon where the key sciencetific knowledge gained in this course is used in a real world context. This is achieved without the qualification by having a focus upon application of science within the classroom, as well as providing lots of opportunities for students to experience trips to places of industry, and have external visitors deliver talks to them.	What makes your subject different to other subjects? What are the expectations for students in your subject area in the KS5 qualification specification?	Topic A: Periodicity and properties of elements Topic B: Structure and function of cells and tissues Topic C: Waves and communication	Unit 2: AP.1, Correctly prepare and standardise solutions for titration and colorimetry. A.P2, Investigate the concentration of unknown solutions, using procedures and techniques in titration and colorimetry. A.M1, Demonstrate skilful application of procedures and techniques in titration and colorimetry to accurately determine the concentration of solutions. 1.D1, Evaluate the accuracy of procedures and techniques used in titration and colorimetry in relation to outcomes and suggest improvements. B.P3, Correctly obtain data using different equipment to construct cooling curves B.P4,Correctly determine the rate of cooling of substances using cooling curves. B.M3 Analyse the rate of cooling of substances from your data using cooling curves to draw valid conclusions. B.D2, Evaluate the accuracy of practical work in calorimetry in relation to the analysis of the cooling curve C.P5 Correctly use chromatographic techniques to produce chromatograms. C.M3 Explain the use of chromatographic techniques to separate mixtures. C.D3 Analyse own chromatograms and relate the factors that affect the separation of mixtures to the quality of results obtained. Evaluate the chromatographic	Unit 2: AP.1, Correctly prepare and standardise solutions for titration and colorimetry. A.P2, Investigate the concentration of unknown solutions, using procedures and techniques in titration and colorimetry. A.M1, Demonstrate skilful application of procedures and techniques in titration and colorimetry to accurately determine the concentration of solutions. 1.D1, Evaluate the accuracy of procedures and techniques used in titration and colorimetry in relation to outcomes and suggest improvements. B.P3, Correctly obtain data using different equipment to construct cooling curves B.P4,Correctly determine the rate of cooling of substances using cooling curves. B.M3 Analyse the rate of cooling of substances from your data using cooling curves to draw valid conclusions. B.D2, Evaluate the accuracy of practical work in calorimetry in relation to the analysis of the cooling curve C.P5 Correctly use chromatographic techniques to produce chromatograms. C.M3 Explain the use of chromatographic techniques to separate mixtures. C.D3 Analyse own chromatograms and relate the factors that affect the separation of mixtures to the quality of results obtained. Evaluate the chromatographic	Learning Aim A- Planning a scientific investigation Learning Aim B - Data collectiom processing and analysis and interpretation Learning Aim C - Drawing conclusion and evaluation Learning Aim D - Enzymes in action Learning Aim E - Diffusion of Molecules Learning Aim F - Plants and their environment Learnign Aim G - Energy content of fuels Learnign Aim H - Electrical circuits	Learning Aim A- Planning a scientific investigation Learning Aim B - Data collectiom processing and analysis and interpretation Learning Aim C - Drawing conclusion and evaluation Learning Aim D - Enzymes in action Learning Aim E - Diffusion of Molecules Learning Aim F - Plants and their environment Learnign Aim G - Energy content of fuels Learnign Aim H - Electrical circuits	A.P1 Explain the functional role of the musculoskeletal system in the human body.A.P2 Describe the effect of disorder of muscles and joints and possible corrective treatment(s).A.M1 Compare how disorders of the musculoskeletal system can affect how muscles bring about movement of joints and the role of corrective treatment(s).A.D1 Evaluate the effect of corrective treatment(s) associated with a musculoskeletal disorder.B.P3 Describe the gross anatomy and function of the organs of the lymphatic system. 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