Thomas Mills
High School & Sixth Form

CURRICULUM OVERVIEW: INFORMATION TECHNOLOGY

Our Information Technology curriculum in Year 10 builds directly upon the foundational skills and understanding established in Year 9 and Key Stage 3, where pupils gained initial exposure to the digital world and basic IT tools. We aim to equip pupils with practical skills and a deeper understanding of how technology shapes our world, fostering confident and responsible digital citizens. This year, we dive into the exciting and rapidly developing field of Augmented Reality (AR), allowing pupils to explore how digital information can enhance our physical world.

Our approach centres on the following key areas:

- **Substantive Knowledge:** Pupils will gain substantive knowledge about Augmented Reality, including its purposes, various types and diverse applications across different industries.
- **Ways of Knowing:** We teach pupils "how to know" about IT, fostering creative, innovative, analytical, logical and critical thinking. This involves understanding and applying IT appropriately for specific purposes and audiences and exploring effective design tools and testing methods to create IT solutions that meet user requirements. Pupils will learn to select the best tools and techniques to solve problems and find imaginative ways to address IT challenges. This features significantly in the AR unit, where pupils are required to think critically about user interaction, triggers, layers and effective information delivery in an immersive environment. This builds on the basic understanding of IT tools from Year 9 by focusing on the underlying design principles and problem-solving methodologies.
- **Personal Knowledge:** Pupils will build awareness of their own perspectives and values regarding the digital world. We aim to develop their independence and confidence in using relevant IT skills and understanding the broader impacts of digital technologies on individuals, organisations and society. This ensures they can plan, design, create, test and evaluate IT solutions that are fit for purpose, considering Human Computer Interface (HCI) principles for defined audiences. In the AR unit, this will involve reflecting on how AR impacts users and society, encouraging thoughtful and responsible design choices for immersive technologies.

Through practical, real-life situations, such as designing and creating IT solutions and developing innovative AR prototypes, pupils will develop essential learning and practical skills for both the IT sector and wider life and work situations. We aim to foster an environment of analysis, evaluation and discussion. Pupils are encouraged to reflect on their own views and those of others, promoting respect for diverse perspectives and empowering them to share ideas and ask questions.

Qualification: OCR Cambridge Nationals Level 1/2 in IT J836

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Year 10

Term	Topic	Knowledge and Skills	Useful Links
1	**Unit R060 NEA:** Data Manipulation using Spreadsheets - Non-Exam Assessment (NEA)	This unit is a crucial piece of coursework where your child will apply their knowledge to plan, design, create, test and evaluate a spreadsheet solution to a real-world problem. This unit is designed to build essential practical skills in data handling. **Knowledge:** • Understanding the different phases involved in creating a spreadsheet solution: planning, designing, creating, testing and evaluating. • Knowledge of how to plan and design a spreadsheet for a specific purpose. • Understanding the steps involved in constructing a functional spreadsheet. • Knowledge of various testing methods for spreadsheets to ensure accuracy. • Understanding how to assess the effectiveness and suitability of a completed spreadsheet solution. **Skills:** • Practically applying planning and design principles to spreadsheet projects. • Developing and implementing spreadsheet solutions. • Conducting thorough testing of spreadsheets.	**How you can help at home:** • If you manage household budgets or lists, involve your child in creating or maintaining a simple spreadsheet for it, focusing on basic formulas and organisation. • Discuss real-world examples of where spreadsheets are used, such as tracking sports scores, managing finances, or organising events. • Encourage them to practice using their previously created user guides with Microsoft Excel (see link below). **OCR Specification:** • R060: TA1 to TA4 • OCR Level 1/Level 2 Cambridge National in IT (J836) Specification **Links:** • Microsoft Office 365 Suite (including Excel) (your child has a complimentary licence to install and use the Office 365 suite of applications at home as part of their studies at Thomas Mills High School.)

		• Evaluating spreadsheet solutions based on predefined criteria.	• Level 1/Level 2 Cambridge National in IT (J836): R060 (See pages related to design tools and documentation – pages 91 - 144) • The student guide to NEA assessment • Additionally, please see the individual link sections in the Year 9 curriculum map for all units covered last year in preparation for this NEA assignment.
Assessments	Your child will complete their R060 NEA coursework based on the units covered last year. This is an externally set assignment brief from OCR which is worth 30% of your child's final grade. It is completed over 10 hours under supervision, internally marked and externally moderated. Your child will have the opportunity of a resubmission to improve their mark for this assessment if required, later during the academic year.		

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1	**Unit R070 TA1:** Augmented Reality (AR)	This unit introduces the exciting world of Augmented Reality (AR). Your child will learn what AR is and explore its diverse applications across various industries, such as education, entertainment and retail. They will delve into the different types of AR, including marker-based AR and location-based AR. Additionally, they will learn about how users interact with AR applications and the different devices that can be used to experience AR.
		
		Knowledge:
		• What Augmented Reality (AR) is and its fundamental definition.
		• The various purposes and common uses of AR in everyday life and professional settings.
		• The specific sectors that utilise AR, such as architecture, education, entertainment, retail and lifestyle.
		• How AR is applied within these sectors for activities like training, virtual tours, marketing and visualising designs.
		• The different types of AR, including object recognition, marker-based, location-based, marker-less and superimposed AR.
		• How each specific type of AR is applied across various industries.
		• The different ways users can interact with an AR application, distinguishing between static and interactive methods.
		• How different sectors implement distinct types of user interaction in their AR solutions.
			How you can help at home:
			• Explore existing AR apps on your smartphone or tablet together (e.g., games like Pokémon Go, apps that place furniture in your room, or educational apps that show augmented models of planets). Discuss how they work and what makes them engaging.
			• Watch short introductory videos about AR online. Discuss what you have learned and how AR is changing different industries.
			• Talk about the differences between Virtual Reality (VR) and Augmented Reality (AR) and when each might be more useful.
			• Discuss the various uses of AR you encounter in advertising, retail, or entertainment.
			
			OCR Specification:
			• R070:
			  ○ 1.1 Purpose and uses of AR
			  ○ 1.2 Types of AR and user interaction
			  ○ 1.3 Devices used with AR
			• OCR Level 1/Level 2 Cambridge National in IT (J836) Specification
			
			Links:
			• What is augmented reality?
			• How augmented reality works
			• Industries that are using AR
			• Top ten industries adopting AR in 2022

		• The various devices on which AR can be experienced, such as mobile devices, smart devices and laptops/PCs. • Which types of AR are best suited for specific devices. **Skills:** • Explaining the concept of AR clearly and concisely. • Describing the various purposes and applications of AR. • Explaining how specific sectors utilise AR for different functions. • Identifying and differentiating between the various types of AR. • Explaining how each AR type is used in practical scenarios. • Identifying the different methods of user interaction with AR applications. • Finding and selecting appropriate photographic examples of different devices being used for AR. • Designing a poster that effectively uses photographic examples of AR devices.	• Use of augmented reality in education • Augmented Reality use cases • The Future of AR: 10 Use Cases • Types of AR • Examples of AR devices • Blippar - AR platform • Level 1/Level 2 Cambridge National in IT (J836): R060 (See pages related to design tools and documentation – pages 145 - 157)

Assessments	Your child will have a mid-point multiple-choice quiz and a summative multiple-choice assessment to evaluate their understanding and application of augmented reality.

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1	**Unit R070 TA2:** Designing an Augmented Reality (AR) model prototype	This unit involves learning the crucial steps for creating a successful AR experience. Your child will understand the importance of considering the purpose of the AR application, identifying the needs of its users and defining its target audience. They will also learn about various design tools such as flowcharts (to map out the sequence of events), mind maps (to generate ideas) and storyboards (to visualise the user experience). Your child will learn how to effectively use these tools to plan the content and the flow of interactions within an AR app.
		
		Knowledge:
		• The purpose of AR.
		• User requirements and target audiences for AR scenarios.
		• Why it is necessary to design an AR prototype.
		• The importance of incorporating client requirements into an AR prototype.
		• Appropriate content for an AR app.
		• Suitable assets, triggers, layers and user interaction for a given AR app.
		• Different types of design tools: flowcharts, mind maps, visualisation diagrams, wireframes, storyboards.
		• The purpose of each design tool.
		• How to use design tools when designing the content and action flow of an AR app.
		• Appropriate/suitable design tools for a given context.
			How you can help at home:
			• Engage in an idea's sessions for potential AR apps. Ask your child to think about a problem or a fun idea and how AR could be used to solve it or enhance it.
			• Discuss the target audience for imaginary AR apps. For example, "If you made an AR app for a museum, who would use it and what would they want to see?"
			• Ask your child to explain the purpose of different design tools they are learning, like flowcharts or storyboards and how they help in planning an AR app.
			• If they are creating a design document for a particular scenario, ask them to present their ideas to you, explaining their choices for content, triggers and user interaction.
			
			OCR Specification:
			• R070:
			  ○ 2.1 Planning and design considerations
			  ○ 2.2 Design tools
			• OCR Level 1/Level 2 Cambridge National in IT (J836) Specification
			
			Links:
			• 3 Basic Types of Mind Maps
			• Guide to Flowchart Symbols
			• How to Create Great Mood Boards
			• Storyboarding and wireframing

		Skills: • Identifying and describing the purpose of AR. • Identifying and describing user requirements and target audiences from given scenarios. • Identifying appropriate content for an AR app. • Identifying suitable assets, triggers, layers and user interaction. • Understanding and identifying different types of design tools. • Using and creating design documentation for a given scenario. • Designing an AR app for a specific scenario.	• Visualisation Diagrams • What Is a Wireframe? • Mind map software • Flowchart software • Wireframe software • Level 1/Level 2 Cambridge National in IT (J836): R060 (See pages related to design tools and documentation – pages 158 - 167)
Assessment		Your child will have an ungraded multiple-choice quiz on planning and designing considerations and two graded practical assessments on the creation, planning and design documentation to evaluate their understanding of planning and design tools based on a given scenario.	

2	**Unit R070 TA3:** Creating an Augmented Reality (AR) model prototype	In this unit, your child will gain a practical understanding of what a prototype is, explore different types of prototypes and learn how to build one for an AR model.
		
		Knowledge:
		• The definition and various types of prototypes, their purposes and characteristics in AR development.
		• The concept of AR triggers, including their uniqueness, characteristics and different implementation methods (e.g., object recognition, location-based).
		• Understanding single and multiple AR layers, user accessibility and different types of user interactions (swipe, click/select, voice).
		• How information can be output in various formats within an AR app (audio, video, images, text, charts/graphs, hyperlinks).
		
		Skills:
		• Defining and identifying different types of AR prototypes and selecting appropriate ones for given scenarios.
		• Creating and implementing various AR triggers, including marker-based and marker-less.
		• Selecting, creating and implementing appropriate layers and user interactions for AR model prototypes.
		• Creating triggers to produce specific information outputs within an AR prototype.
			How you can help at home:
			• If your child has access to a smartphone or tablet, you could explore existing AR apps together. Discuss how these apps use "triggers" to make digital content appear and how different "layers" of information are presented.
			• Encourage your child to explain the different types of user interactions (swipe, tap, voice) they are learning about and how these might be used in an AR app.
			• Talk about the importance of different output formats (audio, video, text) in an AR experience. For example, "Would a museum AR tour be better with audio descriptions or just text?"
			• Encourage them to consider accessibility: "How could this AR app be made easier for someone with a visual impairment to use?"
			
			OCR Specification:
			• R070:
			  ○ 3.1 AR model prototype
			  ○ 3.2 Triggers
			  ○ 3.3 Layers / user interaction
			  ○ 3.4 Information output
			• OCR Level 1/Level 2 Cambridge National in IT (J836) Specification
			
			Links:

		• Practical implementation of assets, layers, triggers, outputs and user interactions into an AR prototype.	• Blippar - AR platform • Blippar Tutorials • How to create triggers for augmented reality • Image recognition that triggers augmented reality • Marker-based AR explained • Marker less AR explained • Exploring AR interaction • Multi-device interactions in augmented reality • Level 1/Level 2 Cambridge National in IT (J836): R060 (See pages related to design tools and documentation – pages 168 - 173)
Assessment		Your child will have an ungraded multiple-choice quiz covering the different elements of creating an augmented reality product and two ungraded practical assessments on both planning and design documentation for an AR prototype. Additionally, your child will have a summative practical mock assessment, covering TA3 to evaluate both, their understanding and implementation, of creating an AR prototype, to prepare for the NEA.	

3	**Unit R070 TA4:** Testing and Evaluating AR Solutions	In this unit, your child will learn the critical importance of testing their AR prototypes. This includes understanding why testing is necessary, how to create a comprehensive test plan and the distinction between technical testing and user testing. They will also learn how to analyse test results, identify and resolve problems and evaluate the overall effectiveness of their AR model prototype.
		
		Knowledge:
		• The importance of testing AR prototypes, including understanding test plans and the differences between technical and user testing.
		• What should be included in a test plan and when testing should occur.
		• The importance of using design documentation and why reviewing processes are crucial.
		• The key aspects to consider when evaluating the effectiveness of an AR model prototype and how to analyse the effective use of AR tools and techniques.
		
		Skills:
		• Creating and completing test plans for technical and user testing of AR prototypes.
		• Carrying out technical and user testing, analysing results and implementing remedial actions or design adjustments.
		• Reviewing the process of creating an AR model prototype, identifying improvements and
			How you can help at home:
			• Discuss the importance of testing any new product, not just software. You could talk about products you have bought that worked well (or did not) and why.
			• If you have ever experienced an app update that fixed a previous problem, you can talk about how improvements are often made based on user feedback.
			• Offer to be a "user" for them to test their AR prototype or a small part of their design. Ask them to explain their test plan to you.
			• Encourage them to think critically about what makes a good test and how they would gather useful feedback from others on their AR prototype.
			• Discuss the idea of "iterative design" – how products are constantly improved through testing and feedback.
			
			OCR Specification:
			• R070:
			  ○ 4.1 Testing
			  ○ 4.2 Reviewing the process of creating the AR model prototype
			• OCR Level 1/Level 2 Cambridge National in IT (J836) Specification
			
			Links:

		explaining how the prototype meets its defined purpose. • Practically testing and evaluating an AR model prototype for a given context.	• BBC Bitesize A definition of data - Data, information and knowledge • Data types • Types of data • User testing • Technical testing • Review strategy and effective reviews • Level 1/Level 2 Cambridge National in IT (J836): R060 (See pages related to design tools and documentation – pages 174 - 178) • The student guide to NEA assessment
Assessment		Your child will have an ungraded multiple-choice quiz on testing and test data for AR, two ungraded practical assessments on both creating a test plan and completing an evaluation for a given scenario and a graded mock practical assessment covering TA4 to prepare for the NEA. Additionally, your child will complete a graded summative assessment covering all of the topics of R060 and R070 which cross over with the R050 examination unit. This will cover planning and design tools, types of test data and completing test plans. This assessment will be made up of past paper questions and include shade the lozenges, short answer questions and completing planning and design documentation.	