  **INTRODUCTION**

**Subject Knowledge Audit for Design and Technology**

**2022 -2023**

**What is the Subject Knowledge Audit?**

This subject knowledge audit initially aims to help you understand what subject knowledge means for Design and Technology in secondary schools and help you identify your strengths and areas for development at the pre course stage. This audit then becomes a working document to enable you to track your knowledge progress throughout the PGCE.

This audit aims to do several things

* Identify the areas of strength and good practice that you bring with you to the course from experience outside of the classroom.
* Identify areas of development that you will address as you journey through the course and set clear, manageable targets
* Identify key knowledge that you will need before the course starts
* Identify the essential subject knowledge that you will need as you begin teaching across the Key Stages
* Prioritise your areas to focus development in line with your specialist discipline.

This should be seen as a **working document** that is **consistently updated** – to make you aware of where you are in your subject knowledge and through training, sharing good practice and experience- how you are developing as a teacher of design and technology.

Your academic tutor and mentors will assist you in tracking your progress in subject knowledge across the first university phase (September), the first school placement (October- December), the second university phase (January) and the second school placement from (January – May) towards meeting Teacher Standard 3 at the end of the course. You can track your progress with your Academic tutor and school mentors at checkpoints (Progress Review Points or PRPs) throughout the year.

* **Pre course - for interview**
* **Initial Tutorial - September**
* **PRP1- October**
* **PRP2- December**
* **PRP3- March**
* **PRP4- May**

It is also important to look beyond this as subject knowledge changes as new technology is introduced and environmental influences adapt existing practices. It is important to think about where you want your subject knowledge to develop as you enter the profession at the end of the course as an Early Careers Teacher (ECT).

**The Structure of the Audit**

The audit is grouped into different areas:

**Key Stage 3**

* Design
* Make
* Evaluate
* Technical knowledge
* Cooking and nutrition

**Key stage 4**

* Core level knowledge
	+ **Design and Technology and our world**
	+ **Smart materials**
	+ **Electronic systems and programmable components**
	+ **Mechanical components and devices**
	+ **Materials**
* **GCSE - Food and nutrition**

# **Levels of subject knowledge**

**The three levels**

The audit identifies three levels of subject knowledge. These range from green as the highest level, through to red as the lowest level. **The definitions focus on your knowledge of the material rather than on the teaching methods needed to teach it.**

**Red**

I do not currently understand what is expected of a teacher and pupils for this topic

**Amber**

I have knowledge of this topic but am not yet prepared to teach it.

**Green**

I have prepared and taught this topic.

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|  | **Pre course** | **Initial tutorial** | **PRP1****October** | **PRP2****Jan** | **PRP3** **April** | **PRP4** **May** | **Relevant Evidence of Knowledge, Skill, Understanding and Experience.****(update regularly)** |
| **Subject knowledge at Key stage 3 - aligned with the NC** |
| **Design** |
| Use research and exploration, such as the study of different cultures, to identify and understand user needs  |  |  |  |  |  |  |  |
| Identify and solve their own design problems and understand how to reformulate problems given to them. |  |  |  |  |  |  |  |
| Develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations  |  |  |  |  |  |  |  |
| Use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses  |  |  |  |  |  |  |  |
| Develop and communicate design ideas using hand drawn techniques of annotated sketches and, detailed plans |  |  |  |  |  |  |  |
| CAD Produced 2D drawings, with a working knowledge of the software to be able to teach others  |  |  |  |  |  |  |  |
| CAD produced 3D drawings, with a working knowledge of the software to be able to teach others  |  |  |  |  |  |  |  |
|  |
| select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture |  |  |  |  |  |  |  |
| Appropriately use a variety of hand tools to mark out, cut and shape |  |  |  |  |  |  |  |
| timbers  |  |  |  |  |  |  |  |
| polymers  |  |  |  |  |  |  |  |
| metals  |  |  |  |  |  |  |  |
| use of power tools typical of school workshops to work materials to make prototypes and models  |  |  |  |  |  |  |  |
| pillar drills  |  |  |  |  |  |  |  |
| sanding machines  |  |  |  |  |  |  |  |
| power fret saws  |  |  |  |  |  |  |  |
| Strip heaters for polymers  |  |  |  |  |  |  |  |
| soldering irons  |  |  |  |  |  |  |  |
| select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties - with specific reference to  |  |  |  |  |  |  |  |
| wood |  |  |  |  |  |  |  |
| metals  |  |  |  |  |  |  |  |
| Polymers  |  |  |  |  |  |  |  |
| textiles  |  |  |  |  |  |  |  |
| food |  |  |  |  |  |  |  |
|  |
| analyse the work of past and present designers and other professionals |  |  |  |  |  |  |  |
| Use product analysis and research strategies to investigate new and emerging technologies |  |  |  |  |  |  |  |
| You can test, evaluate and refine ideas and products against a specification, taking into account the views of intended users and other interested groups |  |  |  |  |  |  |  |
| understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists |  |  |  |  |  |  |  |
| Technical knowledge |
| understand and use the properties of materials and the performance of structural elements to achieve functioning solutions |  |  |  |  |  |  |  |
| understand how more advanced mechanical systems used in their products enable changes in movement and force |  |  |  |  |  |  |  |
| understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs]  |  |  |  |  |  |  |  |
| apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable components [for example, microcontrollers]. |  |  |  |  |  |  |  |
|  |
| understand and apply the principles of nutrition and health |  |  |  |  |  |  |  |
| Cook a repertoire of predominantly savoury dishes so that they are able to feed themselves and others a healthy and varied diet |  |  |  |  |  |  |  |
| become competent in a range of cooking techniques [for example, selecting and preparing ingredients; using utensils and electrical equipment; applying heat in different ways; using awareness of taste, texture and smell to decide how to season dishes and combine ingredients; adapting and using their own recipes]  |  |  |  |  |  |  |  |
|  understand the source, seasonality and characteristics of a broad range of ingredients. |  |  |  |  |  |  |  |
| **Subject knowledge at KS4 - Core level knowledge**  |
| [Link to resources](https://www.data.org.uk/for-education/secondary/gcse-dt-key-resources/) from DATA for the NEA |  |  |  |  |  |  |  |
| [Link to all exam board GCSE](https://www.data.org.uk/for-education/design-and-technology-gcse-2017/) D&T specifications where amplification to the core knowledge below can be found. [Eduqas pages 8-16 is a suitable reference](https://www.eduqas.co.uk/media/25tlhhbw/gcse-design-and-technology-specification.pdf) |  |  |  |  |  |  |  |
| Design and technology and our world |  |  |  |  |  |  |  |
| Learners need a breadth of technical knowledge and understanding in order to make effective choices in relation to the selection of materials, components and systems. They should consider emerging technologies, environmental issues and impacts on society. They should consider the needs of future generations as well as their own, and take a broad view of the impact of design and technology activities. |  |  |  |  |  |  |  |
| Smart materials |  |  |  |  |  |  |  |
| You are aware of what determines a material to be ‘smart’, can relate to examples and know how to use them in practice.  |  |  |  |  |  |  |  |
| Electronic systems and programmable components |  |  |  |  |  |  |  |
| You are aware of the importance of electronic and programmable components to the product designer and end user and how such components are integrated into everyday products we use. |  |  |  |  |  |  |  |
| Mechanical components and devices  |  |  |  |  |  |  |  |
| Familiar products often include the use of mechanical components and devices. You are aware of the importance of mechanical components and devices to the product designer and end user and how mechanisms are integrated into everyday products we use. |  |  |  |  |  |  |  |
| Materials |  |  |  |  |  |  |  |
| You have a broad understanding of the categorisation and properties of a range of materials and where they are sourced, including.  |  |  |  |  |  |  |  |
| Natural & manufactured Timbers  |  |  |  |  |  |  |  |
| Ferrous & Non-ferrous metals  |  |  |  |  |  |  |  |
| Thermoforming and thermosetting polymers |  |  |  |  |  |  |  |
| Papers and boards  |  |  |  |  |  |  |  |
| Natural, synthetic, blended and mixed fibres, and woven, non-woven and knitted textiles. |  |  |  |  |  |  |  |
| **Subject knowledge - GCSE Food and nutrition**  |
| **Principles of Food and Nutrition (see a** [**course spec**](https://www.wjec.co.uk/media/frjcwjfo/wjec-gcse-food-and-nutrition-spec-from-2016-e.pdf) **pages 6-15)** |  |  |  |  |  |  |  |
| 1. Food commodities  |  |  |  |  |  |  |  |
| 2. Principles of nutrition  |  |  |  |  |  |  |  |
| 3. Diet and good health  |  |  |  |  |  |  |  |
| 4. The science of food  |  |  |  |  |  |  |  |
| 5. Where food comes from  |  |  |  |  |  |  |  |
| 6. Cooking and food preparation |  |  |  |  |  |  |  |

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| **Subject Knowledge Targets for development:** |
| **Pre course: (by September)** |  |
| **End of University phase 1: (by October)** |  |
| **End of Placement 1: (by December)** |  |
| **End of University phase 2: (by February)** |  |
| **End of Placement 2 towards ECT: (by September)** |  |