



# The Cornerstone Academy

## Design & Technology Curriculum



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# The Cornerstone Academy Design & Technology Curriculum for Years 7-11

The Cornerstone Academy Design & Technology Curriculum is studied by all students at Cornerstone in Key stage 3.

At Key Stage 4 students can opt to study AQA GCSE Design & Technology.

## 1. Intent of the Design & Technology curriculum

The Cornerstone Academy Curriculum for Design & Technology, based on The Curriculum Framework for Design & Technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to become resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education make an essential contribution to the creativity, innovation, culture, wealth and well-being of the nation.

The Cornerstone Academy Curriculum for Design & Technology will ensure that all students

- Know about and understand the core principles around which Design & Technology is based.
- Develop and generate design ideas through a process of iterative design scaffolded by the use of taught design strategies.
- Ensure learners develop an appropriate breadth and depth of current knowledge and understanding in design and technology.

The subject content at GCSE is presented under three headings: technical principles, specialist principles and designing and making principles. Within each area, the content is further divided into core knowledge and understanding and in-depth knowledge and understanding.

The ambition is for all students to achieve the expectations which are outlined in the curriculum. That is, that all pupils are taught the full content of the curriculum and that all pupils are taught to achieve the key performance indicators by the end of key stage 3. Mastery means that pupils should be able to recall and apply what they have learnt at another point in the future rather than just at the time they first meet an idea or technique. This is embedded in to the practical tasks and understanding of theory behind the application of skills. Achievements through the year contribute to evidence of mastery by the end of the year. Re-visiting a key performance indicator can provide opportunities to:

- demonstrate mastery
- address any gaps in learning
- widen and deepen learning as pupils apply their knowledge in a different context or tackle more complex design tasks within Design & Technology.

At KS4 students will follow the AQA scheme of learning, where the curriculum knowledge from Key stage 3 will be built upon. Students will develop more specific knowledge around the broader concept of Design & Technology



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and the impact it has on the wider world. At KS4 students are assessed using knowledge tests (self-quizzing) and summative assessments based on GCSE past papers and specimen papers.

## 2. Implementation of the Design & Technology Curriculum

KS3 Design & Technology teaching takes 1 x 100-minute lesson per week for six weeks in years 7, 8 and 1x 100-minute lesson for four weeks in year 9. It is taught by a specialist and forms part of the Creative Performing Arts rotation and students access their rotation twice in one year. KS4 Design & Technology is an option at GCSE and students have 1 x 50-minute single lesson (theory) and 1 x 100-minute double lesson (practical) per week.

The Design & Technology curriculum at The Cornerstone Academy is implemented according to the teaching and learning policy of the school. Rosenshine and Teach Like a Champion techniques are the basis of the schools teaching and learning practice. Staff will follow dedicated schemes of work to ensure that all students follow The Cornerstone Academy Design & Technology curriculum.

All lessons at each key stage should use quizzing to promote recall, retention, application and mastery of content. Students will have knowledge organisers with key subject content and key vocabulary which will be set for homework. This low stakes assessment for learning will be used by staff to inform their planning and class interventions.

Modelling should be used frequently with the aid of visualisers to guide student practice and improve the quality of student response.

Assessment in KS3 uses KPI assessments. These assessments are completed independently throughout a rotation, as well as at the end of topic to assess key knowledge or a skill. Certain KPI's can be applied to a range of topics and can be assessed multiple times across the year thus allowing for improvement, development and mastery. The KPI assessments are used to inform planning and intervention by the class teacher to address gaps in knowledge and to ensure students master the KPI's leaving them well prepared for the next stage of their education. The Cornerstone Academy Design & Technology assessment outcomes (KPIs) can be found at Annex 1.

### KS3

|               | Rotation 1                                                                                                                                                | Rotation 2                                                                                                                                                             |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Year 7</b> | <b>USB Lamp (Part 1)</b> <ul style="list-style-type: none"> <li>• Design process</li> <li>• CAD/CAM</li> <li>• Electronics</li> <li>• Polymers</li> </ul> | <b>USB Lamp (Part 2)</b> <ul style="list-style-type: none"> <li>• Timbers</li> <li>• Joints</li> <li>• Finishes for timber</li> <li>• Evaluation</li> </ul>            |
| <b>Year 8</b> | <b>Pewter Casting</b> <ul style="list-style-type: none"> <li>• Design process</li> <li>• Metals</li> <li>• Casting</li> <li>• Using hand tools</li> </ul> | <b>Design Movements</b> <ul style="list-style-type: none"> <li>• Design strategies</li> <li>• Drawing skills</li> <li>• Product analysis</li> <li>• CAD/CAM</li> </ul> |
| <b>Year 9</b> | <b>Ikea</b> <ul style="list-style-type: none"> <li>• Design process</li> </ul>                                                                            | <b>Sustainable Plastics</b> <ul style="list-style-type: none"> <li>• Sustainability</li> </ul>                                                                         |



|  |                                                                                                                                 |                                                              |
|--|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|  | <ul style="list-style-type: none"> <li>• User needs</li> <li>• Scale modelling</li> <li>• Anthropometrics/ergonomics</li> </ul> | <ul style="list-style-type: none"> <li>• Polymers</li> </ul> |
|--|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|

#### KS4

|                | Term 1                                                                                                     | Term 2 | Term 3                                                                                                 | Term 4 | Term 5          | Term 6                                                                            |
|----------------|------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------------------------------------------|--------|-----------------|-----------------------------------------------------------------------------------|
| <b>Year 10</b> | <b>Timber box</b> <ul style="list-style-type: none"> <li>• Specialist/Core technical principles</li> </ul> |        | <b>Mock NEA project</b> <ul style="list-style-type: none"> <li>• Design and make principles</li> </ul> |        |                 | <b>Section A NEA</b> <ul style="list-style-type: none"> <li>• Revision</li> </ul> |
| <b>Year 11</b> | <b>NEA</b> <ul style="list-style-type: none"> <li>• Revision</li> </ul>                                    |        |                                                                                                        |        | <b>Revision</b> |                                                                                   |

### 3. Impact of the Design & Technology Curriculum

**By the end of Key Stage 3** students will be familiar with where materials originate from and how they are manufactured and produced.

Students will be able to identify a range of issues that relate to Design and Technology and the World, include scales of production and the impact on the environment. Students will develop skills in research and development of initial design ideas which will allow them to produce models and prototypes of their work. Students will gain confidence in working independently and will be competent within the workshop. By adopting the iterative design process, concepts and ideas can be strengthened and comprehensive analysis undertaken.

**By the end of Key Stage 4** students will demonstrate knowledge and understanding in design and technology and its impact on daily life. Students at KS4 should develop a broad understanding of materials, systems and processes and have the opportunity to apply knowledge and understanding from other subject areas including mathematics and science.

The expectation is that students will have a core understanding of the following areas; Smart materials, Electronic systems and programmable components, Mechanical components and devices and Materials. In addition to this, they will have an in-depth knowledge and understanding in the following area: Natural & manufactured timber.

This knowledge and understanding is assessed by termly assessments based on exam questions and knowledge organisers, along with practical design tasks which show the application of the theory.



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## ANNEX 1 - The Cornerstone Academy KS3 Design and Technology curriculum and assessment outcomes

Students are encouraged to 'AME' high in KS3. We will assess them repeatedly against the following criteria. They will be awarded a A, M or E for the work completed. A is approaching, their abilities are not yet where we would expect a student to be for the year. M is meeting, they are completing tasks at the expected level. E is exceeding, the student is working above where we would expect them to be for that year.

In Design and Technology students will be working towards the following statements:

|                            | Year 7                                                                                                                     | Year 8                                                                                                                                                | Year 9                                                                                                                                                                                                       |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Research and Investigation | I can use research supplied by the teacher to assist me in my designing. I can verbalise the main categories of materials. | I can select and use information I have collected to assist me when designing. I am able to explain properties of materials.                          | I can carry out independent research and use it to support my designing. I can explain the environmental impact of the choices I make regarding material selection.                                          |
| Design Development         | I can create simple ideas which communicate my design intentions.                                                          | I can create designs ideas using design strategies which I have been taught.                                                                          | I can generate ideas which make use of research and design strategies, showing creativity and a lack of design fixation.                                                                                     |
| Planning and Making        | I can follow a simple set of instructions to realise my outcome. I can produce outcomes of a reasonable standard.          | I can plan my making considering materials, tools, processes and time in a retrospective manner. I can produce outcomes which are of a good standard. | I can plan my making before I start, setting out stages in a logical manner, identifying materials, tools, processes and time. Outcomes are of a good standard showing higher levels of accuracy and finish. |
| Analysis and Evaluation    | I can provide a review of my outcome or performance explaining what I did correctly and how I can improve.                 | I can analyse research to support my designing. I can provide a review of my outcome explaining what works well and what could be improved.           | I can analyse research to support my designing identifying key aspects. I can provide a review of my outcome explaining what works well and what could be improved.                                          |

## ANNEX 2 - The United Learning KS4 Design & Technology curriculum. AQA exam board.

The subject content is presented under three headings: technical principles, specialist principles and designing and making principles. Within each area, the content is further divided into core knowledge and understanding and in-depth knowledge and understanding. The specification content and assessment requirements are designed to ensure learners develop an appropriate breadth and depth of knowledge and understanding in design and technology.

The exam is based on two components; the first being a written examination which assesses their general knowledge and understanding about core materials as well as a providing students with an opportunity to demonstrate their wider understanding relating to one of those materials in more depth. The second is an (NEA) Non-examined assessment, which requires students to produce a folio of evidence based around a context set by the exam board, alongside a working prototype of their final design solution.

| Core and Specialist Technical Principles (Theory 50%)                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Core knowledge and understanding is presented in six clear and distinct topic areas:</p> <ul style="list-style-type: none"> <li>• New and emerging technology</li> <li>• Energy generation and storage</li> <li>• Developments in new materials</li> <li>• System approach to designing</li> <li>• Mechanical devices</li> <li>• Materials and their working properties</li> </ul> | <p>Core specialist technical principles are presented in nine clear and distinct topic areas:</p> <p>Selection of materials and components</p> <ul style="list-style-type: none"> <li>• Forces and stresses</li> <li>• Ecological and social footprint</li> <li>• Sources and origins</li> <li>• Using and working with materials</li> <li>• Stock forms, types and sizes</li> <li>• Scales of production</li> <li>• Specialist techniques and processes</li> <li>• Surface treatments and finishes</li> </ul> | <p>In-depth knowledge and understanding are presented in six clear and distinct topic areas:</p> <ul style="list-style-type: none"> <li>• Papers and boards</li> <li>• Timber based materials</li> <li>• Metal based materials</li> <li>• Polymers</li> <li>• Textile based materials</li> <li>• Electronic and mechanical systems</li> </ul> |
| <p>Learners are required to study all of the content in these six areas, to ensure they have a broad knowledge and understanding of design and technology and that they are able to make effective choices in relation to which materials, components and systems to utilise within design and make activities.</p>                                                                   | <p>Learners are required to study these six areas, to ensure they have an in-depth knowledge and understanding of all of these areas delivered through at least one material category.</p>                                                                                                                                                                                                                                                                                                                     | <p>Learners are required to study at least one of these six areas, to ensure they have an in-depth knowledge and understanding of a specific material area and/or components and systems to support their design and make activities.</p>                                                                                                     |

All topics within the core knowledge and understanding, the in-depth knowledge and understanding, and designing and making principles must be addressed. In each case, the left hand column identifies the content topic and the amplification indicates the areas that need to be covered. The amplification column provides more information on the content presented in the left hand column, including the breadth and depth of study required. Where 'e.g.' is used in the amplification column, the list which follows is illustrative only. In all other instances, the list of items in the amplification column must be covered. Centres are not restricted to how they will deliver this to the learner but it is anticipated that there will be an integrated approach between the core and the in-depth content.

### Designing & Making Principles (NEA 50%)

Learners should know that all design activities take place in a range of contexts. They should also understand that the prototypes they develop must satisfy wants and needs and be fit for their intended use. For example, the home, school, work or leisure.

They will need to demonstrate and apply knowledge and understanding of designing and making principles in relation to the following areas:

- Investigation, primary and secondary data
- Environmental, social and economic challenge
- The work of others
- Design strategies
- Communication of design ideas
- Prototype development

Learners are required to cover all of the content in these areas, to ensure they are able to apply a broad knowledge and understanding of design and technology principles within design and make activities.

In-depth knowledge and understanding is presented in five clear topic areas:

- Selecting and working with materials and components
- Tolerances - marking out
- Material Management
- Using specialist tools and equipment
- Using specialist techniques

Learners are required to cover all of the content in these five areas, in relation to at least one of the topic areas identified in the in-depth knowledge and understanding section of technical principles.