Approaches to Learning and Teaching – Design, Creativity and Technology Level 6

The following table provides examples of activities for students to demonstrate elements of the standards in each dimension.

Standard	Examples of learning contexts
Investigating and designing	
Students **identify considerations and constraints within a design brief**. **[1]** They **undertake research relevant to the design brief**. **[2]** They locate and use relevant information to help their design thinking and identify the needs of a variety of client/user groups. When designing, they **generate a range of alternative possibilities**, **[3]** use appropriate technical language, and **justify their preferred option**, **[4]** explaining how it provides a solution to the problem, need or opportunity. They **make critical decisions on materials**/ingredients, systems components and techniques **based on their understanding of the properties and characteristics of materials**/ingredients **[5]** and/or of the relationship between inputs, processes and outputs. They effectively **use information and communications technology equipment, techniques [6]** and procedures to support the development of their design and planning. Students take account of function and performance, energy requirements, aesthetics, **costs**, and **ethical and legal considerations [7]** that address the requirements of design briefs. They **identify a range of criteria for evaluating their products [8]** and/or technological systems. Students **plan a realistic and logical sequence of the production stages, incorporating time, cost and resources needed for production**. **[9]**	**[1, 2, 8]** Students develop a design brief that identifies one or more particular types of jewellery and its intended users. Considerations and constraints are identified. Students use Internet research on styles and influences in jewellery to develop a survey for targeted users to gauge the most important factors in jewellery design. Students develop eight criteria to evaluate their design ideas and the finished product, with reference to the design brief. **[3, 4, 6]** Students research how design elements are used in clock design and design a clock that incorporates at least one geometric shape and two colours. They develop ideas for clock faces and then use a range of techniques including Computer-aided Design (CAD) to represent their ideas in three dimensions. After applying evaluation criteria to their design ideas, they explain what led to the decision for selecting their preferred design. **[5]** When designing sportswear, students conduct tests to analyse suitable materials. They make decisions about the best material/s to use and describe the characteristics and properties of these materials that make them suitable for sportswear. **[6, 7, 9]** Students use project management software to develop a plan that includes a timeline, required resources (including predicted costs) and how risks associated with raising poultry for egg production will be addressed. They refer to the Code of Accepted Farming Practice for the Welfare of Poultry (2003) in their planning.

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Producing	
Students implement a **range of production processes [10]** accurately, consistently, safely/hygienically and responsibly, and select and use personal protective clothing and equipment when necessary. They produce products/systems using **complex** tools, equipment, **[11]** machines, materials/ingredients and/or systems components with precision. They clearly explain decisions about the **suitability of materials**/ingredients, **systems components**, energy requirements and production techniques based on their understanding of the **properties and characteristics of materials**/ingredients, **[12]** and **the inputs, processes and outputs of systems. [13]** In response to changing circumstances, they **adapt their methods of production and provide a sound explanation for deviation [14]** from the design proposal. They make products/systems that meet the **quality, aesthetic, functionality** and performance **requirements outlined in the design brief**. **[15]**	**[10]** As students prepare food for a day-long hike they use a range of processes including cooking (biscuits/cake), freezing (drinks), drying (fruit) as well as preparing flat bread wraps that can be taken on the hike. On completion of the processes, they securely package the items. **[11]** When constructing a pot plant display unit, students safely use welding equipment. **[12]** Students develop a test for the strength of wood for a bookshelf unit. They compare softwood, hardwood and manufactured board by carefully placing weights in the middle of each board (supported at each end) and use a steel ruler to test its deflection. They conclude that hardwood is the most suitable wood to use, as it deflects least. **[12, 13, 14]** Students identify in their plan for a solar car the materials and components they intend to use and why these were selected, looking at characteristics of materials and systems components required to achieve the intended outputs. As they build their car, they record in their journal details of any changes made that deviate from their original design and why they were made. **[14, 15]** During the production of the vest, students realise the fabric decoration technique that they have identified is not going to provide the effect they wanted. They return to their research and select a different technique. As they near completion of the product, they reassess the function and aesthetics of the product and make final adjustments to ensure that it has a quality finish, as specified in the design brief.
Analysing and evaluating	
Students use evaluation criteria they have previously developed, and **critically analyse** processes, materials/ingredients, **systems components [16]** and equipment used, and **make appropriate suggestions for changes to these that would lead to an improved outcome**. **[17]** They use a range of **suitable safe testing methods [18]** in this analysis. They **relate their findings to the purpose for which the product** and/or system **was designed [19]** and the appropriate and ethical use of resources. Students synthesise data, analyse trends and draw conclusions about the social, **cultural**, **[20]** legal and **environmental impacts** of their own and others' designs and the **products/systems, and evaluate innovative new technology in the manufacturing industry**. **[21]**	**[16, 19]** Students apply the criteria that they have developed to test the effectiveness of their electronic mail delivery indicator. They check to see that it operates as designed and that it is suitable for the identified users. They make minor adjustments as required. **[17, 18, 19]** On completion of the child's tent, students develop three testing methods to check whether the materials are suitable for the users, that the tent is a suitable size, and that it can be easily and safely erected and dismantled. They incorporate the results of these tests into their evaluation report. **[17, 19]** After completing a table for a 'difficult situation', students analyse the materials used, function and aesthetics of the table. They explain how their product addresses the specific situation they have identified. They make suggestions about ways the product could be improved and modified. **[20]** Students design educational games for students at their 'sister' school, in another country. They describe what cultural aspects they needed to consider in the design of the games, and how the game will be suitable for the students. They explain how they could modify the game for use in their own country. **[21]** Students have designed and produced a model hydrogen fuel cell car. In their evaluation, they consider the potential and environmental impacts of commercially produced energy efficient transport. **[21]** Following the design of a main meal in food technology, students research new methods of packaging to protect and preserve main meals used in food manufacturing systems and consider the environmental impacts of the packaging.