Year 8: Innovation through iterative design.

Vocabulary associated with this unit: Iterative design, iteration, models, prototypes, form, aesthetics, ergonomics, solar power, rechargeable batteries, LED, USB.

Task: define these words using this website to help you.

Iterative design is a cyclic design process of modelling and testing to achieve gradual improvements to the design. **The iterative design process** is revisited and reflected upon at regular points in order to improve and refine design ideas to ensure they best meet the needs of the final user.

analysis - starting with a context or *design brief*, a designer may explore the design issue and generate ideas to solve the design problem

design ideas - create a series of *freehand sketches* of design ideas that may help to solve the problem

modelling - *modelling* ideas in card, paper, clay or other materials can create a cheap and quick way to do initial trials with a product

testing - once a model has been made it can be tested in a variety of ways:

- destructive testing - tests the product to its extreme to see what conditions it can tolerate before being destroyed to help decide on the best materials and construction methods to use
- non-destructive testing - tests the model to identify areas of weakness without destroying it to test the function of the product and highlight any unexpected design flaws
- market testing - tests the product with its *target market* to give feedback on performance and design

evaluating - the data gathered from the testing of a model should be evaluated to highlight any modifications that need to be made at the next stage

modification - from the evaluation, a designer can revisit the models and design ideas to make improvements

Evaluating against the specification

Designers will have written a *design specification*, developed from the *design brief* and based on the results of completed research. This is where a specific list of *criteria* is written that a designer can follow as a set of rules. During the iterative design process, this specification should be referenced to and designs evaluated against it to ensure the final solution is the best fit. Click here for printable evaluation sheets

Anthropometrics is the practice of taking measurements of the human body and provides categorised data that can be used by designers. Anthropometrics help designers collect useful data, eg head circumferences when designing a safety helmet. In this example, as there is a large variation in size, the designer would need to build some adjustment into the safety helmet design.

Ergonomics can incorporate the use of anthropometric data when designing products to improve the user experience. If a designer doesn't use anthropometric data during the design process, it can lead to a poor user experience that causes discomfort, pain and potential injury. Ergonomics is a consideration that leads to a product being designed in a way to make it easy to use. Size, weight, shape, position of buttons and controls are all aspects that contribute to it being ergonomically designed.

Task: Explain the concept of making incremental improvements during iterative design.

Modelling can be time-consuming and expensive, but a physical model allows a person to see and handle a product unlike viewing it on a screen through computer aided design (CAD. Computer aided manufacture (CAM) models made on a 3D printer using a CAD drawing are very accurate but also expensive, time-consuming and limited to 3D-printable materials. Product designers can use easy-to-form and easily accessible materials, eg balsa, jelutong, and cardboard, to create cheap models quickly and cheaply.

Task: Discuss the importance for a model to accurately represent the final product in design technology projects.

Task: Provide an example of how anthropometrics can be applied in designing a chair.