WJEC Level 1-2 Engineering Unit 2: Understanding function and meeting requirements

Primary features of engineering products

Engineers need to be familiar with a range of components and parts that may appear in potential briefs or projects. These should include:

Electrical components

- **Connections:** these can include push fit electrical tabs, solder, screw down, etc.
- **LEDs:** a range of LED forms and sizes including bar graph, eight segment blocks and LED panels.
- **Resistors:** fixed and variable resistors.
- **Fuses:** their application and purpose.
- **Diodes:** identifying and understanding their use in a circuit.
- **Power supplies:** battery types, mains and low voltage systems.

Mechanical components

- **Fixings:** nuts, bolts, washers, etc.
- **Clamping devices:** cam locks, level locks, etc.
- **Adjusting mechanisms:** screw threads, ratchet systems and cams.

Properties of component materials

- **Conductivity:** looking at conductivity of both heat and electrical current, plus how these can be isolated when needed.
- **Friction:** the effects that friction can have on a product including intentional friction.
- **Durability:** how durable is the product, look at the materials and construction.
- **Quality:** does the quality of the product look high or low grade, flash on mouldings, sink marks in plastic, uneven fit of parts, etc.

Identifying features of other engineering products allows engineers to research and compare other similar products to determine if there are features that could be replicated or adapted to meet the criteria for the new-engineered product in the brief.

For example:

- **Aesthetics:** looking at how the aesthetic of other similar products meet the brief. Aesthetics focus on how a product looks.
- **User/customer/client needs:** how the products final outcome meet the needs of user and client.
- **Safety:** what safety factors or features are evident in the design.
- **Ergonomics:** how well do the ergonomics of the product function (comfort, use etc.).
- **Anthropometrics:** does the product conform to standard anthropometric data.
- **Mechanisms:** what mechanisms are featured, gears, levers, cranks, etc.
- **Electronics:** how have electronics been incorporated, what components have been used.
- **Sustainability:** has sustainable materials been used, is it easy to recycle the product?
- **Material properties:** what properties are required or seen in the materials used. Look at hardness, toughness, malleability, brittleness, etc.

Function of the proposed solution

Functional requirements are identified in briefs and specifications for engineered products and are an explanation of what the expectations of the product are.

Engineers need to ensure that details of how the product functions is clearly explained. This is often undertaken using notes and sketches to further detail their solutions.

Details should be given on areas such as:

- **Mechanical function:** should include any mechanisms in the solution, gears, cams and levers, as well as mechanical fixings such as clamps and catches should be explained.
- **Electrical function:** should detail the electrical or electronic details of a solution. Details on inputs, outputs and components could feature in this area.
- **Interrelating components:** should also be details, especially if unclear from an engineering drawing. Electrical input resulting in a mechanical output, for example.