

Student Feedback & Marking Report

Student: Megan Cain (2518443)

Module: ACMA4000 – Materials and Introduction to Processing

Assessment: Manufacturing Processes and Defects (Report 40% + Video 10%)

REPORT MARKING (40%)

1. Engagement with Literature Skills

Mark Awarded: 15 / 20

The report engages with a range of web-based technical and industry sources to support material choice, manufacturing routes and environmental considerations, including the British Stainless Steel Association for recyclability of stainless steel, BBC News for contextual statistics on plastic straw usage, Fractory and Plastikcity for process descriptions, and various technical websites for ceramic properties and mug manufacturing. These sources are applied to support descriptive statements throughout the report, and referencing is generally present across sections.

However, the literature base is dominated by non-academic web sources and commercial blogs, with no core materials science textbooks (e.g. Callister, Ashby) or peer-reviewed journal articles used to underpin mechanical and thermal property claims, structure–property relationships or lifecycle assessments. Several references (e.g. Alibaba product insight pages) are not suitable academic sources for performance or lifespan claims and weaken the credibility of the evidence base. The literature is used largely to support isolated statements rather than synthesised into comparative or evaluative arguments.

To improve this criterion, the student should incorporate authoritative academic sources for materials properties and processing (e.g. standard textbooks or peer-reviewed reviews) and synthesise evidence across multiple sources into comparative statements, particularly in the sustainability and lifespan sections. Removing commercially biased sources and replacing them with independent technical references would significantly strengthen engagement with literature.

2. Knowledge and Understanding Skills

Mark Awarded: 16 / 25

The submission demonstrates basic to sound understanding of materials and manufacturing processes. The identification of stainless steel for forks and the general description of forging and stamping as forming processes are broadly correct, and the explanation of extrusion for polypropylene straws is appropriate for continuous hollow profiles. The ceramic mug section correctly outlines clay preparation, moulding, drying, glazing and firing stages, showing awareness of key steps in ceramic processing. The report also recognises relevant property–performance relationships, such as corrosion resistance and hygiene for stainless steel cutlery, flexibility and low cost for polypropylene straws, and thermal resistance for ceramic mugs.

However, there are several technical inaccuracies and oversimplifications. The comparison section incorrectly equates injection moulding with forging in terms of process similarity, which indicates

conceptual misunderstanding of fundamental differences between metal forming and polymer moulding. The statement that titanium is brittle relative to stainless steel is inaccurate in a general sense and oversimplifies titanium alloy behaviour. The claim that ceramics possess “thermal conductivity” as a beneficial property for mugs is misleading; ceramics typically have low thermal conductivity relative to metals, and their suitability for mugs relates to thermal insulation rather than high conductivity. The discussion of “thermal resistance” in plastics is vague and not linked to specific service temperature ranges. Structure–property–process linkages are present only at a descriptive level, with limited explanation of why materials behave as stated.

To strengthen this criterion, the student should correct technical misconceptions, clearly distinguish between metal forming, polymer processing and ceramic shaping processes, and provide more rigorous structure–property–process explanations (e.g. bonding types, microstructural features and their influence on properties).

3. Cognitive and Intellectual Skills

Mark Awarded: 13 / 20

The report demonstrates emerging evaluative reasoning in material selection and alternative choices. The comparison of stainless steel forks with aluminium alloys considers trade-offs between strength, durability and weight. The discussion of plastic versus paper straws identifies sustainability versus robustness trade-offs, and the comparison of ceramic mugs with stainless steel mugs considers durability and cost implications. These sections show awareness that material selection involves balancing multiple competing criteria.

However, the evaluation remains largely qualitative and sometimes inconsistent. Trade-offs are stated but not critically examined using structured comparison or quantitative evidence. Environmental considerations are discussed in general terms without consistent lifecycle framing or metrics, and economic trade-offs are asserted without supporting cost data beyond broad statements. The evaluative reasoning is present but lacks depth and systematic justification.

To improve this criterion, the student should adopt a more structured evaluative framework, such as a simple decision matrix ranking original and alternative materials against weighted criteria (performance, manufacturability, cost, sustainability). Explicit justification of why certain criteria are prioritised for each product would demonstrate stronger cognitive and intellectual skills.

4. Practical Application Skills

Mark Awarded: 14 / 25

The chosen objects are appropriate everyday items that allow application of materials and manufacturing theory to real-world contexts. The report links material properties to functional requirements, such as hygiene and corrosion resistance for cutlery, low cost and high production efficiency for plastic straws, and heat resistance for ceramic mugs. Manufacturing processes are described in general industrial terms, and a basic comparison of forging, extrusion and injection moulding is attempted.

However, the practical application is weakly supported by visual evidence. The report contains limited or no integrated photos, process diagrams, flowcharts or comparative tables illustrating manufacturing routes, defects or lifecycle stages. The manufacturing comparison section includes textual process flow descriptions but no clear schematics or process flow diagrams to support understanding. In line with the marking approach, the limited use of photos, figures and tables significantly constrains the mark for this criterion. The discussion of lifespan and defects is largely textual and not supported by visual examples of typical degradation mechanisms (e.g. wear of cutlery, straw deformation, ceramic chipping).

To significantly enhance this criterion, the student should include labelled process flow diagrams for forging/stamping, extrusion and ceramic moulding/firing; add comparative tables of properties and costs; and include lifecycle flow diagrams and defect illustrations. Stronger visual and tabular integration would substantially improve practical application marks.

5. Transferable Skills for Life and Professional Practice

Mark Awarded: 7 / 10

The report is clearly structured with an abstract, contents page and logical sectioning aligned with the coursework brief. The writing is generally coherent and accessible, and referencing is present throughout. The overall organisation supports readability.

However, presentation quality is inconsistent. There are typographical and grammatical errors, repetition in phrasing, and some formatting issues. Figures are absent or not integrated, and the comparison sections would benefit from clearer tabulation of data. The professional tone is generally appropriate, but academic rigor in presentation and referencing standards is limited by reliance on non-academic web sources.

To improve this criterion, the student should proofread for language accuracy, standardise formatting, integrate tables and figures to summarise comparisons, and ensure all references meet academic standards.

VIDEO PRESENTATION MARKING (10%)

Video file reviewed: Yes (MP4 submitted)

Video Technical Content and Communication

Mark Awarded: 5 / 10

The video introduces the three products and identifies their materials and general manufacturing processes. The student communicates basic understanding of why each material is used and references environmental considerations. The delivery is understandable and structured.

However, the video is largely descriptive and mirrors the report content without strong comparative analysis or explicit trade-off discussion. Visual reinforcement is limited, with little or no use of on-screen process diagrams, comparative tables or lifecycle visuals to support verbal explanations. In

line with the marking approach that rewards visual and tabular support, the limited visual content constrains the video mark.

To improve, the student should incorporate simple on-screen process flow diagrams for forging/stamping, extrusion and ceramic moulding/firing, and include a concise comparison table of properties or lifecycle impacts. Clearer synthesis of trade-offs in the conclusion would also enhance technical communication.

Overall Summary

Report marks:

Engagement with Literature: 15/20

Knowledge and Understanding: 16/25

Cognitive and Intellectual Skills: 13/20

Practical Application: 14/25

Transferable Skills: 7/10

Video mark: 5/10