

Extended essay: Example commentary
Subject: Biology
WSEE theme (if applicable):
Category for language essays (if applicable):
Subjects used for WSEE (if applicable):
Title of essay: The Antimicrobial Effects of Metals Copper, Barium and Silver on the Growth of Bacteria
Research question: To what extent do the antimicrobial properties of metals copper, barium and silver aid in inhibiting the growth of bacteria *Staphylococcus albus* and *Micrococcus luteus*?
Assessment details
Criterion Mark awarded
Commentary

A: Focus and method

[Maximum possible mark: 6]

4 The work meets the standard described by the 3–4 markband because there is a clear topic (antimicrobial effects of metals) and a focused research question. The method is well conceived although incomplete and shows clear evidence of student choice in terms of sources, materials and target organisms. It is not in the higher markband because the methodology is incomplete. Important elements are referred to (temperature, time of incubation, measuring area of inhibition) but no details are given so that the study cannot be replicated. There is a circular argument element to the research question since it assumes that the ions "inhibit bacteria (rather than being cytotoxic) as a result of their antibacterial properties". The method also does not indicate the exact format of the ions used and assumes no inhibitory effect of the anions.

B: Knowledge and understanding

[Maximum possible mark: 6]

6 The work meets the standard described by 5–6 markband because there is a clear understanding of metals acting as an alternative to antibiotics. The student understands the importance of gram positive and gram negative, and the significance of the cell wall structure. This is well explained and supported with references. Clear understanding and justification of the important stages in the method including sterile environment and this is effectively communicated.

C: Critical thinking

[Maximum possible mark: 12]

10 The work meets the standard described by the 10–12 markband because there are strong elements to the research which is consistently appropriate and focused. The statistical approach is outlined and justified and supports the line of argument set out in the null hypothesis. The sources are critically evaluated. Discussion and evaluation deal with the evidence from the data in a convincing way, although they are not compared with data from other studies. It is a weaker example of the markband because it is not clear why different concentrations of the solutions were used and how this might help to address the research question. Analysis does not go beyond graphing the raw data. Multiple t-tests on the same data set result in a high risk of error. There is little attempt to provide a discussion that integrates these findings with those from published papers. The conclusion quotes a slightly different research question than that presented at the

start. It is not in the lower markband because while the analysis may be in the 7–9 markband, the discussion and conclusion carry more weight.

D: Presentation

[Maximum possible mark: 4]

4The work meets the standard described by the 3–4 markband because there is a clear topic statement and research question, with numbered pages and a clearly set out table of contents. All other structural elements are addressed carefully.

E: Engagement

[Maximum possible mark: 6]

5The work meets the standard described by the 5–6 markband because for the most part the reflections are detailed and evaluative. They show initiative as well as clear examples of student choice in decision-making and the student voice in the way insights are expressed. However, there were opportunities to reflect more strongly on the choices of silver ion concentrations and the overall impact of this as a limitation on the study. Total marks awarded 29/34