

Carry out a practical investigation into a substance present in a consumer product using quantitative analysis. [4 Credits, Internal Assessment]

This achievement standard involves carrying out a practical investigation into a substance present in a consumer product using quantitative analysis.

Quantitative analysis involves using a titration procedure to determine the concentration of a substance present in a given sample.

The titration must be one of:

- acid-base
- complexometric
- precipitation
- oxidation-reduction.

A practical investigation is an activity involving planning and carrying out the investigation, collecting primary data, processing and interpreting data, and reporting on the investigation. Students may make changes to their initial method as they work through the investigation.

Determination of the concentration of a substance must involve the use of stoichiometric principles and both the relationships $n=m/M$ and $c=n/V$.

Achievement

Carry out a practical investigation into a substance present in a consumer product using quantitative analysis involves:

- developing a workable plan to determine if the consumer product sample and/or titration procedure requires modification
- collecting, recording and processing a sufficient quantity of data to enable a conclusion to be reached
- determining the concentration of a substance relevant to the investigation
- describing how significant variables were controlled in the investigation.

Achievement with Merit

Carry out an **in-depth** practical investigation into a substance present in a consumer product using quantitative analysis involves:

- using results from preliminary trials to develop a valid plan to modify the consumer product sample and/or titration procedure
- collecting, recording and processing **quality** data that enables a **valid** conclusion to be reached
- **accurately** determining the concentration of the standard solution; and the substance present
- **explaining** how control of variables improved the quality of the investigation.

Achievement with Excellence

Carry out a **comprehensive** practical investigation into a substance present in a consumer product using quantitative analysis involves:

- **accurately** determining the concentration of the substance in the consumer product, including **correct use of significant figures and units**
- **justifying** how modifying the consumer product sample and/or the titration procedure improved the validity and accuracy of the investigation
- **evaluating the outcome** of the investigation in relation to the consumer product.

