

TEACHER NOTES

Which metal is best for food and drink storage?

Background

This practical activity is a variation on the standard “acid plus metal” experiment found in most textbooks.

WORD EQUATION

Acid + metal → hydrogen gas + dissolved metal chloride.

Indeed, students carry out exactly the same experimental procedures as in the standard experiment.

A local company plans to use some of their excess metal to produce cans for food and soft drink storage. They are aware that some metals are highly reactive on contact with the acids in food while others are not. They have asked for your help in sorting the group of metals based on their reactivity. The company asks you to recommend one or more metals for can production.

Learning outcomes

At the end of this practical activity, students should

- Be able to make accurate observations of a reaction
- Know that hydrogen gas is produced by an acid plus metal reaction
- Know that various metals have different reactivities when mixed with hydrochloric acid.

Link to the Victorian Curriculum F–10

The main learning outcome is:

- Chemical reactions, including combustion and the reactions of acids, are important in both non-living and living systems and involve energy transfer (VCSSU126)

Secondary learning outcomes are (potentially):

- The ... properties of elements are used to organise them in the periodic table (VCSSU123)
- ... chemical reactions ... can occur at different rates; chemical reactions may be represented by balanced chemical equations (VCSSU125)
- Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries (VCSSU115)
- The values and needs of contemporary society can influence the focus of scientific research (VCSSU116)
- Analyse patterns and trends in data, including ... identifying inconsistencies in data ... and drawing conclusions that are consistent with evidence (VCSIS138)
- Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (VCSIS140)

Extensions

This experiment is intended for year 9.

This experiment can be extended by including a further inquiry question:

Using acids and metals to 'build' batteries (electric cells), using any of: combinations of metals; amount of metal; concentration of acid.; making a battery with a number of cells in series and compare with cells in parallel.

Possible extension for lower year levels:

Use this as a demonstration for making observations and placing different reactions in order of reactivity.

Possible extension(s) for higher year levels:

1. Compare the results to the periodic table. Is there a pattern with the results and where the metals are placed on the periodic table? Suggest a reason why.
2. Choose different metals to compare reactivity. Hypothesise the expected results and test.