

ACIDS AND BASES

SCIENCE

LEVEL 1

Strategy Guide

Acids and bases is one of the largest standards in Level One Science, with the most concepts to learn. However, if you aim to understand the concepts rather than rote learn them, the standard becomes a lot easier. Most of the questions will test your ability to understand the concepts, and a common mistake is that because the questions are similar between years, students try to memorise answers. A better strategy is to use this strategy guide in conjunction with our checklists, walkthrough guides and practice exams to try and get a deep understanding of the topic.

OVERVIEW OF THE STANDARD/STRUCTURE OF THE EXAM

This standard is broken into four key parts:

1. Electron configuration and ions
2. Acids and bases
3. Balancing chemical equations
4. Rates of reaction

Everything you learn will be under one of these four parts!

The exam is likely to have questions on electron configuration and ions, acids and bases, and rates of reaction - with an emphasis on balancing equations throughout!

CONCEPTS AND SKILLS TO FOCUS ON

Although every aspect of the exam is equally important, here are some key concepts to focus your study on:

How and why ions form, and why ions have a certain charge:

This comes up a lot - so it's important you understand this concept in depth. A handy way of doing this is by drawing a flow diagram, covering up certain parts of the flow diagram, and seeing if you can still explain it to yourself. Mix up which parts of the diagram you cover up, until you are confident to cover up the whole diagram and explain it from scratch.

Balancing chemical equations:

If you can nail this skill, it is an achievable excellence mark. Students either: (a) get freaked out by balancing chemical equations, or (b) underestimate the trickiness of balancing chemical equations and get untied in the actual exam. We cover how to balance chemical equations in our walkthrough guide and every past exam paper has a couple of questions you can practice with. Know this skill inside out and so you are guaranteed at least one Excellence mark. Even if you are an achieved student, an Excellence mark can make passing much easier.



Learn how to make a salt in the lab:

Although this is a straightforward question, students haven't always covered the practical work in class (or didn't take the lesson seriously and didn't take notes - oops). We suggest you learn this - as it is another very achievable M/E mark!

COMMON MISTAKES:

From the NCEA gods themselves:

Not being to relate why ions form to the need for a completely full or empty valence shell

Using the word 'faster' rather than 'increased rate of reaction' or 'frequency of collisions':

They aren't the same thing in chemistry!

Not learning the name in the table of ions:

Lots of students can use the ions in equations but they can't link the symbols to the names of the ions. Even though the table of ions is given to you in the exam, the names of the ions aren't. This causes mix-ups between similar sounding ions like 'sulfide' and 'sulfate' -- which sound similar but refer to completely different ions.

Not seeing the link between hydroxide ion concentration and pH values:

Remember that acids produce H^+ ions in water, and the higher the concentration of H^+ ions then the lower the pH.

Not understanding ionic bonding properly:

Remember, ionic bonding is the transfer of electrons between elements to attain stable valence electron shells and an overall neutral molecule, with ions retaining charges to give electrostatic attraction. If this all seems like gibberish to you, go to pages x to y of our walkthrough guide.

- One particularly common misconception is that ions get/give back electrons when forming a compound, presumably because the compound is neutral they assume that the ions need to be neutral again.
- The NZQA markers commented that this 'seems to be linked to the use of the swap and drop method'. Ouch.

Thinking that hydroxide or hydrogen ions are simply outnumbered by the other to change pH, rather than there being any interaction:

This one is a little bit more abstract, but basically H^+ and OH^- ions don't just sit there! They actually interact with each other by forming water!

OVERALL STUDY AND EXAM STRATEGY:

A decent grade is definitely achievable for this paper with a bit of hustle and grind. The key is to not rote learn, but try to understand the concepts. Pay careful attention to the wording of your explanations, and use the NCEA exemplars and marking schedules, as well as our walkthrough guides to get that M/E-level wording.

