

THERMOCHEMICAL PRINCIPLES

CHEMISTRY

LEVEL 3

Strategy Guide

This is a pretty 'middle of the road' standard! There is a bit of content to learn - but in terms memorisation, you're pretty safe! Focus on understanding the concepts in depth, and you'll be away in no time!

OVERVIEW OF THE STANDARD/STRUCTURE OF THE EXAM

There are a few main topics in this standard:

- Electron configuration
- Periodic trends
- Shapes and polarity
- Intermolecular forces
- Enthalpy and entropy

When it comes to the exam, there are generally three questions, one on each of the following topics:

1. Shapes and polarity
2. Periodic trends (with some electron configurations thrown in)
3. Enthalpy and entropy (with some intermolecular forces thrown in)

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:

Shapes and polarity:

Without fail, there is always at least one question on shapes and polarity. If you can identify shapes based on the number of regions of electron density and how many of them are occupied, as well as predict whether a molecule will be polar or non-polar - with an explanation as to why, it's at least one free E mark every year. Your answer to this question can be very formulaic, so it's good to practice this a bunch - and really get a structure that you like, and that covers all the elements needed to answer the question.



Enthalpy definitions:

This standards has a lot of definitions that you can be asked for at any point. Things like ionisation energy, enthalpy of formation and electronegativity all have really specific definitions that you may be asked to recall - so having these down is a must. Thinking about the definitions can also help you figure out formulae when answering more complex questions!

Periodic trends:

As with shapes and polarity, your answers are going to look very similar, regardless of the situation. Focus on having a formulaic response ready to go for all the different trends (electronegativity, radius and ionisation energy) - where you can explain why it changes either down or across the periodic table. If you can nail these, you are looking at another free E mark. When you get into the question, take a second to think "what trend are they looking for?" and "am I moving across or down the periodic table?" This should help kick start your answer.

COMMON MISTAKES:

From the NCEA gods themselves:

Defining concepts in full:

Make sure you define anything concept you talk about. Common mistakes involve throwing out abbreviations without defining them, or talking about shielding or effective nuclear charge without actually saying what they are.

While the trends in electronegativity and ionisation energy are explained by similar things, saying that ionisation energy increases because electronegativity increases is not quite true - you need to go a bit deeper and talk about effective nuclear charge and/or electron shielding.

Electron configurations:

With electron configurations there are a few big things to remember. The first is that the 4s shell fills before the 3d subshell. However, it is just as important to remember that, when we are making an ion, we take away from the 4s shell first (because it is the furthest away from the nucleus). The other big thing students struggle to remember, are the exceptions of chromium and copper. Because these are special, one of them is almost guaranteed come up - check out our guide for a more thorough explanation of their exceptions!

Enthalpy calculations:

When completing enthalpy calculations using the heat capacity formula, always make sure to check your sign at the end! Asking yourself "is this reaction exothermic and endothermic?" is a good way to make sure that you have nailed this.

OVERALL STUDY AND EXAM STRATEGY:

This paper is very repetitive! By taking the time to fully understand concepts and definitions - and how the the different equations relate to them, you will find yourself able to answer almost any question NCEA throws your way. Always remember to check exactly what questions are asking for - and make sure you answer with the correct information and units!

