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numicon affiliate programme

Assessment and Differentiation with Numicon

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What is Assessment? NZC pg 40

benefits students – It clarifies for them what they know and can do and what they still need to learn. When students see that they are making progress, their motivation is sustained and their confidence increases.
involves students – They discuss, clarify, and reflect on their goals, strategies, and progress with their teachers, their parents, and one another. This develops students' capacity for self- and peer assessment, which lead in turn to increased self-direction.
supports teaching and learning goals – Students understand the desired outcomes and the criteria for success. Important outcomes are emphasised, and the teacher gives feedback that helps the students to reach them.
is planned and communicated – Outcomes, teaching strategies, and assessment criteria are carefully matched. Students know in advance how and why they are to be assessed. The teacher's programme planning is flexible so that they can make changes in response to new information, opportunities, or insights.
is suited to the purpose – Evidence is obtained through a range of informal and formal assessment approaches. These approaches are chosen to suit the nature of the learning being assessed, the varied characteristics and experiences of the students, and the purpose for which the information is to be used.
is valid and fair – Teachers obtain and interpret information from a range of sources and then base decisions on this evidence, using their professional judgment. Conclusions are most likely to be valid when the evidence for them comes from more than one assessment.

Formative Assessment
Improves students **learning** and teachers **teaching**.
Is an **ongoing process** that arises out of **interaction** with between teaching and learning.
It involves the focussed **gathering**, analysis, interpretation, and use of information that can provide **evidence** of student progress.
Much of this evidence is 'of the moment'. Analysis and interpretation often take **place in the mind of the teacher** who then uses the insights gained to shape their actions as they **continue to work** with their students.

Summative assessment
This is an evaluation made by the teacher at the **conclusion** of a unit of work, instruction, or assessment activity to assess student skills, knowledge, and understandings ***at that particular point in time*.**

However, these assessments can also be used formatively if they are used to promote future learning.
From TKI Assessment Online.

Dylan Willam has written some excellent books on assessment.

Formative assessments are *for* learning,
while summative assessments are *of* learning.

Or as assessment expert Paul Black put it, "When the cook tastes the soup, that's formative assessment. When the customer tastes the soup, that's summative assessment."

There is also an excellent Garden analogy on TKI Assessment online.

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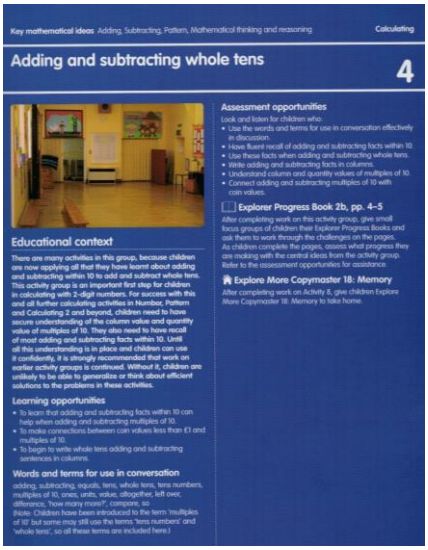
Assessment with Numicon

- Numicon employs a **formative assessment approach** which involves making judgements about **developments in children's mathematical communication.** This gives you a deeper and more convincing picture of a child's learning and progress.
- **Assessment Opportunities** are listed on the summary overview of every activity group.
- **Milestones** are markers along a student's learning journey. They are a summary of the previous 4 - 6 weeks of learning.
- This gives teachers an opportunity to **pause and reflect** on every student's journey and make adjustments to teaching as required.
- **Use a 3 point marking scale**. E.g B, P, A; Red Amber Green. Started, Almost, Got it. Not a pass or fail test.
- **Milestones** are provided in the back of every Teaching Handbook and as an Excel spreadsheet downloaded through the Oxford Owl subscription


Key mathematical ideas Adding, Subtracting, Pattern, Mathematical thinking and reasoning Calculating

Adding and subtracting whole tens 4

Assessment opportunities

Look and listen for children who:

- Use the words and terms for use in conversation effectively in discussion.
- Have fluent recall of adding and subtracting facts within 10.
- Use these facts when adding and subtracting whole tens.
- Write adding and subtracting facts in columns.
- Understand column and quantity values of multiples of 10.
- Connect adding and subtracting multiples of 10 with coin values.

Explorer Progress Book 2b, pp. 4–5

After completing work on this activity group, give small focus groups of children their Explorer Progress Books and ask them to work through the challenges on the pages. As children complete the pages, assess what progress they are making with the central ideas from the activity group. Refer to the assessment opportunities for assistance.

Explore More Copymaster 18: Memory

After completing work on Activity 8, give children Explore More Copymaster 18: Memory to take home.

Educational context

There are many activities in this group, because children are now applying all that they have learnt about adding and subtracting within 10 to add and subtract whole tens. This activity group is an important first step for children in calculating with 2-digit numbers. For success with this and all further calculating activities in Number, Pattern and Calculating 2 and beyond, children need to have secure understanding of the column value and quantity value of multiples of 10. They also need to have recall of most adding and subtracting facts within 10. Until all this understanding is in place and children can use it confidently, it is strongly recommended that work on earlier activity groups is continued. Without it, children are unlikely to be able to generalize or think about efficient solutions to the problems in these activities.

Learning opportunities

- To learn that adding and subtracting facts within 10 can help when adding and subtracting multiples of 10.
- To make connections between coin values less than £1 and multiples of 10.
- To begin to write whole tens adding and subtracting sentences in columns.

Words and terms for use in conversation

adding, subtracting, equals, tens, whole tens, tens numbers, multiples of 10, ones, units, value, altogether, left over, difference, 'how many more?', compare, so

(Note: Children have been introduced to the term 'multiples of 10' but some may still use the terms 'tens numbers' and 'whole tens', so all these terms are included here.)

Assessment Opportunities are listed on the summary overview of every activity group

Look and listen for children who:

Use the words and terms for use in conversation effectively in discussion.

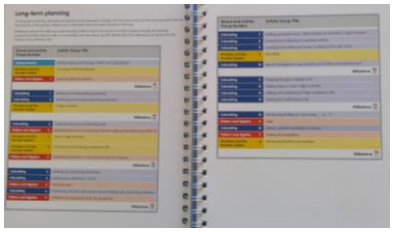
Have fluent recall of adding and subtracting facts within 10.

Use these facts when adding and subtracting whole tens.

Write adding and subtracting facts in columns.

Understand column and quantity values of multiples of 10.

Connect adding and subtracting of multiples of 10 within coin values.



When planning, look at the milestones that relate- see Long term planning page and the Milestones from the copymasters.

That way you will be more aware and able to check on the development as you see it in action. Remember that there are 5 activity groups to be taught for this Milestone.

Each activity group has two corresponding pages in the **Explore more progress books.**

The tasks have been designed to present children with tasks that use the mathematics of the activity group.

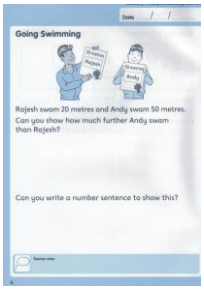
The tasks are **not tests** and are as open as possible.

Children are able to use all the imagery and materials that they require.

The summary overview page will tell you when to use these. Over time they paint a useful picture of the child's learning.

Assessment grid for this activity group

ASSESSMENT OPPORTUNITIES Look and listen for children who:	Name	Name
• Use the words and terms for use in conversation effectively in discussion.		
• Have fluent recall of adding and subtracting facts within 10 and can use these to add and subtract 1-digit numbers to and from a 2-digit number.		
• Use their understanding of place value to add and subtract 1-digit numbers to and from 2-digit numbers.		
• Record adding and subtracting of 1-digit numbers to and from a 2-digit number in columns.		
Additional notes/ways forward.		


Going Swimming

Rajesh swam 20 metres and Andy swam 50 metres. Can you show how much further Andy swam than Rajesh?

Can you write a number sentence to show this?

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Managing this in the classroom

- As you **plan** be aware of the lessons that will give opportunities to take note of student progress.
- Have the Milestones that you are working on in your **modelling book** so that both you and the students are aware of what they are learning and how they are going with that.
- When you reach the Milestone point (see Long Term planning page) **pause and reflect** on every student's journey and make adjustments to teaching as required.
- You may see that you haven't marked each child. So you may call them to do some of the activities again so that you can 'look and listen' to what they can do. Other children in the class could be doing some form of practice or some deeper problem solving.
- You may decide to set up a rotation of activities on some milestone points that will give you a better picture of progress for all students.
- You may see that quite a few children didn't have a great understanding of a milestone so you might decide to do some more work on that before moving on. Its best to **consolidate** understanding before moving on rather than **allowing it to accumulate**.
- Remember that Numicon uses a 3 point marking system and the Milestones are **not tests**. You are looking and listening for how they communicate their thinking.

What might that look like in lock down?
Video clips talking about what they have done.
Photos of what they have done. ?
Open ended tasks, children can illustrate their thinking and reasoning.

This Activity group (Book 2, Calculating 4) relates to many aspects of the Numeracy Framework. E.g NZC AO Stages and Number Framework taken from JAM Teacher Manual.

Milestone 4	NZC Achievement Objective	Stages	Number Framework
• Recall fluently most adding and subtracting facts within 10 and use them when adding and subtracting multiples of 10	Level 1:know groupings with five, within ten, and with ten. Level 2: know the basic addition and subtraction facts	3 4 Early 5	Recalls doubles to 10 and groupings within 10 Recalls facts to 10, doubles to 20, and corresponding halves and teen facts Recalls addition facts to 20 and subtraction facts to 10
• Partition 2-digit numbers into tens and units, e.g. for 35 say 3 tens + 5 units (column value), and write adding sentences, e.g. 10 + 10 + 10 + 5 = 35 (quantity value)	Level 1: know groupings with five, within ten, and with ten Level 2: know how many ones, tens, and hundreds are in whole numbers to at least 1000	3 4 Early 5	Knows doubles **to 10** and within **10** Knows groupings with 10 and the pattern of teens Knows the number of tens in decades Knows groupings of 10 in a three-digit number

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Mix and match Activity

Decide which statement is a Numicon Milestone, a NZC AO, or Behavioural indicators from the Number framework.

Numicon Milestone	NZC Achievement Objective (Number Knowledge)	Behavioural indicators from the Number framework. JAM

Know how many ones, tens, and hundreds are in whole numbers to at least 1000

Recalls addition facts to 20 and subtraction facts to 10

Recalls doubles to 10 and groupings within 10

Recall fluently most adding and subtracting facts within 10 and use them when adding and subtracting multiples of 10.

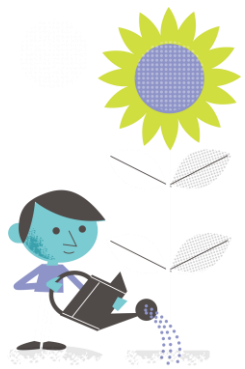
Knows groupings of 10 in a three-digit number

Partition 2-digit numbers into tens and units, e.g. for 35 say 3 tens + 5 units (column value), and write adding sentences, e.g. 10 + 10 + 10 + 5 = 35 (quantity value)

Know the basic addition and subtraction facts

Differentiation means tailoring instruction to meet individual needs. Whether teachers differentiate content, process, products, or the learning environment, the use of ongoing assessment and flexible grouping makes this a successful approach to instruction.
Carol-Ann Tomlinson.

Differentiation is at the heart of formative assessment.



Differentiation with Numicon.

- Numicon is a whole class teaching resource. All children work on the same concept within meaningful contexts.
- This does not mean that you teach the whole class all at once, but you teach all students the same concept at their pace.
- Each activity group starts with a 'low threshold' activity which is designed to be accessible for all children.
- The activities get progressively more difficult to reach a 'high ceiling'.
- When planning teachers make decisions about which activities are appropriate, where and how they will need to be adapted to meet the needs of the learners.

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What might that look like

- Some children may work through the activities more quickly to reach the high ceiling activities. You will find the open ended nature of these activities and the emphasis on mathematical thinking means that there is always room to take activities further.
- You may decide to supplement with activities from other resources such as Rich problems from NZ maths.
- For some children it may be appropriate to adjust the number range in the activities.
- While others may go more slowly and only cover the key learning and supplement with other resources that meet the intention of the activity group as outlined under Learning Opportunities.
- Remember that each activity group builds on the previous one and introduces ideas ready for the next one.

Recent research and thinking around ability grouping suggests that grouping by ability is a key factor in creating an inequitable education system.
The following web page by Sue Pine has links to many other articles as discussed.

https://nzcurriculum.tki.org.nz/Curriculum-resources/NZC-Online-blog/Grouping-students-in-mathematics

EROhttps://www.ero.govt.nz/publications/teaching-strategies-that-work-mathematics/

Using Numicon does require a '**shift' in thinking** about assessment and grouping.

Children are not grouped according to the result of their latest GLOSS or JAM test. They may be grouped according to how their understanding of the concept is developing which may change as the context changes. This means groupings are more flexible and more inclusive.
Children display and discuss their thinking using materials. This means a more inclusive programme as **those who struggle with thinking mentally are still able to do the maths**, they are not ***held back*** at a level because they cannot explain their strategies and thinking mentally.

This is in line with recent research and thinking around ability grouping.
https://nzcurriculum.tki.org.nz/Curriculum-resources/NZC-Online-blog/Grouping-students-in-mathematics
Teaching strategies that work EROhttps://www.ero.govt.nz/publications/teaching-strategies-that-work-mathematics/

Do remember to look www.numicon.co.nz for more information. Also take a look under the tab Maths at home.

Also the Oxford Owl website free access at the moment.
https://global.oup.com/about/covid19?cc=nz

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