Free Sample Activity Group!

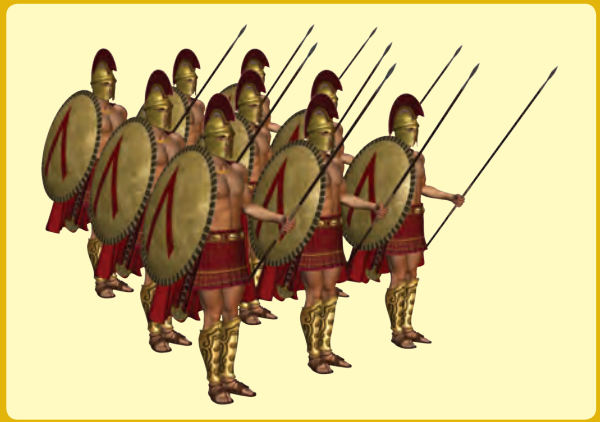
Numicon Kit 3 Advance Sample Activities

Numbers and the Number System – Activity Group 3

OXFORD

Key mathematical ideas Counting, Place value, Mathematical thinking **Numbers and the Number System**

Counting things that move and writing numbers down 3



Educational context

This group of activities builds on children's earlier experiences of grouping and place value, as they explore problems encountered when counting moving objects, and use the idea of tallying. The advantages of grouping over counting in ones are explored further with a close look at number lines. Investigating different ways of representing numbers opens opportunities to think about number lines and the importance of accurate recording.

It is not uncommon for children to have difficulty with numbers that involve 0, and a conversation about the role of zero as a 'place holder' is opened with the question, 'If we missed out the zero by mistake, would it matter?'

Learning opportunities

- To experiment with different ways of tallying when counting moving objects, e.g. traffic.
- To look closely at number lines, identifying multiples of 10s and 5s, and filling in a blank number line.
- To appreciate that when counting large collections, grouping is more efficient than counting in ones.
- To realise that the value of a digit is determined by its place.

Words and terms for use in conversation

estimate, guess, about, nearly, approximately, exactly, hundreds, tens, units, arrange, patterns, groups, more, fewer, place, value

Assessment opportunities

Look and listen for:

- Children who use the above words and terms effectively in discussion.
- Children who understand that the position of numerals in relation to each other denotes their value.
- Children who can read aloud 2- and 3-digit numbers, including those using '0'.
- Children who can record 3-digit numbers quickly and accurately.
- Children who can use tallies to represent a count.

Focus activities

Activity 1: Counting the Grecian way!

Have ready: a choice of apparatus for counting (Numicon 0–100 cm Number Line, Numion 1–100 cm Number Rod Track, Numicon Coloured Pegs, Numicon Coloured Counters, cubes, pots, etc.)

Step 1

Set the scene by telling children a story from Ancient Greece about the soldiers of Alexander the Great, who after a long day's march, returned to their fort. It was important for the cooks at the fort to know how many soldiers were returning so they could prepare sufficient food. As each soldier passed through the gate into the fort, they placed a pebble into a container. Each time this first container was filled with exactly 10 pebbles, 1 of the pebbles was placed in the next pot, and the first container was emptied.

Ask children what they think happened when 100 soldiers had passed through the gate. How many pebbles would there be in the second pot? (Answer 10).

Discuss whether they think this was a good way of recording the number of soldiers.

Step 2

Agree the criteria, i.e. the system must allow children to count quickly and accurately to keep up with the passing soldiers, showing each time 10 soldiers have passed through the gate. Give children a choice of equipment (number lines, number tracks, cubes, Pegs, Counters, pots, etc.) to try out different ways of recording their count without writing numbers down. Give children time to work on their solutions in small groups or pairs.

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Step 3

Discuss children's suggestions. Talk about situations at school, such as school performances, discos, etc. where the number of people has to be limited, and how we keep count of them.

Activity 2: A traffic survey

Plan a survey where children will need to gather information about moving objects, e.g. a survey of the traffic passing the school during a given time. Discuss different ways children might record their data. Arrange for children to conduct the survey to try out their ideas.

Activity 3: Exploring number lines and empty number lines

Have ready: Numicon 0–100 cm Number Lines, empty number lines, long blank strips of paper (some just over 100 cm in length) or cm-squared paper that children can cut up themselves to make a number line, number rods, base-ten apparatus, Numicon 0–100 Numeral Cards

Step 1

Discuss the ways of tallying and keeping count that children suggested for Activity 1. Ask whether they could have used the 0–100 cm Number Line, and what the limitations might be of using it. Look at the 0–100 cm Number Line and discuss what they notice about it. Look and listen for children who point out that the colour changes for alternate decade sections (see Fig. 1). Ask children to think about which are the most important numbers on the 0–100 cm Number Line for helping them to find other numbers. Look and listen for children who suggest multiples of 10.

Step 2

Discuss how children could make their own number lines on long blank strips or cm-squared paper (working in twos or threes according to space). Look and listen for children who suggest using rulers and rods or base-ten apparatus to help them space the numbers. Suggest that to start with, they could just mark the important multiples of 10. Give children time to experiment and actually make their own number lines to 100, marking multiples of 10 using rods or base-ten apparatus.

Step 3

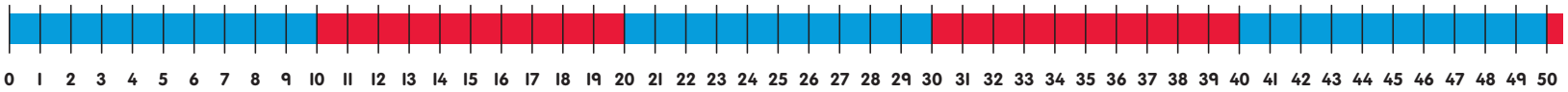
Generate numbers by turning Numeral Cards for children to build by placing rods end to end horizontally along their number lines. Children mark the positions of the numbers they have made.

Step 4

Discuss with children what the next number would be if they extended their number line beyond 100, and how they would write the multiples of 10. As a class, you could compile a 1–1000 number line by sharing out the sections for groups of children to label with multiples of 10 and 100.

Step 5

Ask children to think about the different ways of carrying out a large count, and the advantages of different methods. Ask them to share their reasoning.



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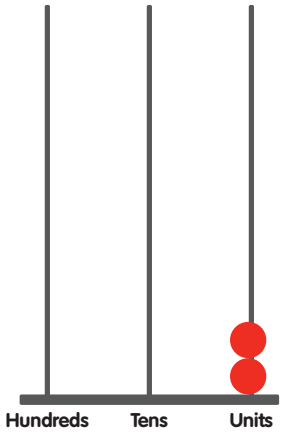
Activity 4: One hundred days

Explain to children that during this year the class will be recording each day spent at school, and on the 100th day will have a celebration.

Ask children to suggest ways in which they could keep track of the number of days as they pass. Share ideas and agree which system will be used. Some children may suggest using a number line; look and listen for those who suggest that it would be helpful to mark the multiples of 5 as the weeks pass.

Hold a celebration on the 100th day!



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Activity 5: Using zero as a place holder

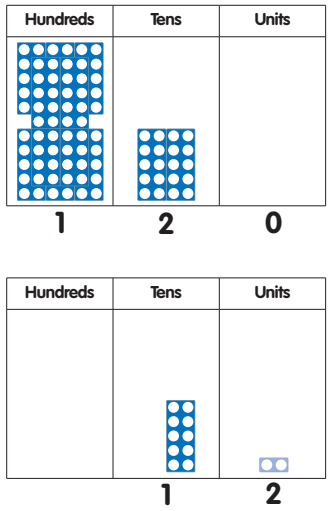
Have ready: photocopy masters 27 and 28, Numicon Shapes, number rods, Numicon Coloured Counters, base-ten apparatus

Step 1

Talk with children about when it is useful to write numbers down and why it is important to do this accurately, and in the right order, e.g. combination locks, passwords, dates, times, house numbers, prices, how much pocket money you have saved, etc.

Step 2

Show children a HTU abacus template (photocopy master 27) and discuss what it is and how it might be used. Use Counters to represent different numbers on the abacus and ask children to read them, e.g. 'two' in Fig. 2.



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Step 3

Give pairs of children photocopy master 27 and some Counters. Read aloud numbers for children to take turns to record on the HTU abacus, by placing the Counters on the appropriate 'sticks'. Ask children to suggest and then compare other ways of recording the same numbers.

Step 4

Show some numbers that include zero, e.g. 20, 102, 120, 210, etc. and ask, 'If we missed out the zero by mistake when we recorded or said these, would it matter?' Discuss children's suggestions and the ways that they found of recording their count of soldiers in Activity 1. Look and listen for children who recognise that zero holds the place, and represents no value. Give children a choice of structured apparatus and the HTU frame (photocopy master 28) to build these numbers, and ask them to write them down.

Step 5

Show children some further examples, like 102 and 12, or 120 and 12, e.g. Fig. 3, to discuss and build with structured apparatus.

Step 6

Read some 3-digit numbers playfully, where you make some deliberate mistakes for children to spot, e.g. deliberately misread 109 as 19.

Practice

Whole-class

- Decide on some class labels using numbers, e.g. the amount of equipment in a pot, drawers labelled with numbers as well as text, the number of children able to sit at a particular table or join a game, etc.
- Show children written 3-digit numbers for them to read aloud.
- Say a selection of number names from 98–122 and from 201–221 for children to write down.
- Choose three children who each hold a Numicon 0–100 Numeral Card for the rest of the class to see. They keep changing places for the class to read aloud the different numbers.
- Play a 'bingo' game where children have to record on their score card the number called out and then cover it when it is called a second time.
- Make class collections of 100 (or more) objects, e.g. pasta, matchsticks, little cars, rice, etc. and make a display with questions about how many hundreds of objects there are.
- Hold a class competition: how many things can you fit in a margarine tub (or alternative)?
- Ask children what numbers could be represented with six Counters on the HTU abacus template (photocopy master 27).

Independent

Paired work for Activity 5

Have ready: photocopy master 27, Numicon Coloured Counters

Children take turns to write a number for the other child to show on the HTU abacus template (photocopy master 27) using Counters.

Paired work for Activity 5

Have ready: photocopy master 28, Numicon Shapes, number rods

First child makes a number on the HTU frame (photocopy master 28) using apparatus. Both children record it. Second child then removes either the 'tens' or the 'units' apparatus and both children record the new numeral.

Paired work for Activity 5

Have ready: prepared numeral cards 98–122 shuffled and face down, photocopy master 28, structured apparatus, 0–1000 Number Line (available from the free resources section of the Numicon website) should be made accessible

Children take turns to pick a numeral card and read it aloud to their partner, who uses structured apparatus to build the number on the HTU frame (photocopy master 28) and records it. Together, children compare the number built with apparatus with the recorded number and the numeral card to check that they all match, and find the number on the 0–1000 Number Line.

Individual work for Activity 5

Have ready: two sets of 0–9 numeral cards cut out from photocopy master 37, photocopy master 28, structured apparatus

Children shuffle their numeral cards and take three, arranging them on the HTU frame (photocopy master 28) to show and record the greatest and smallest number they can. Some children may prefer to build the numbers with apparatus before recording.