

MAB Sculptures

Purpose

To develop understanding of place value using Multi-base Arithmetic Blocks (MAB)

The task may also offer opportunities for integration with other learning areas, such as The Arts. The children could explore sculpture as art and experiment with a variety of materials to create different forms. The focus here is on the EsSEnTial Learnings and Mathematics.

The Task

Effi and Luigi are builders. They want to make an interesting sculpture using MAB. They need to use a combination of ones, tens and hundreds. After completing their sculpture they will need to work out how many blocks they have used. How could they do this?

Possible sequence:

1. Discuss the scenario about Effi and Luigi. Explain the need to create an interesting sculpture. The sculpture:
 - can be any shape
 - must use a combination of MAB (hundreds, tens & ones).
2. A photo of the sculpture is taken. After this, students deconstruct their sculpture and lay their blocks onto a hundreds, tens and ones (HTO) place value chart, sorting them accordingly. Another photo is to be taken of this first sorting.
3. Students regroup their blocks. They exchange any blocks that need to be exchanged, ie: ten ones (shorts) for a ten (long), ten tens (longs) for a hundred block (flat). Another photo is to be taken of their regrouping.
4. Students complete *HTO (Place Value) chart* detailing how many ones, tens and hundreds were used and record the total number of blocks in numerical and word form.
5. After photos are printed, students describe steps required to find total number of blocks that were used in sculpture.

Task Resources

- MAB & HTO (Place Value) chart
- Digital camera, computer and printer
- Teacher Rubric & Student self assessment rubric

NTCF Outcomes

EsSEnTial Learnings

Domain	KGP3	B1	B2	B3	B4	B5
Creative		CR 1				
Constructive		CON 2				

Creative Learner Cr 1

A persevering and resourceful INNOVATOR who uses imagination and a variety of resources for self-expression and to explore ideas and situations for the insights and opportunities they offer.

Constructive Learner Con 2

A thoughtful PRODUCER and CONTRIBUTOR who uses and justifies a variety of methods to plan, organise and complete tasks, and continually reflects when evaluating the quality of their work.

Mathematics

	KGP3	B1	B2	B3	B4	B5
Number Sense	KGP3.1	1.1				

Number Sense

NS KGP3.1 Numbers and Number Systems

Learners demonstrate evidence of KGP 3 by recognising, ordering and using 1 and 2 digit numbers in familiar contexts

NS 1.1 Numbers and Number Systems

Learners demonstrate evidence of Band 1 by applying place value knowledge to compare, order and use 2 and 3 digit numbers and demonstrate awareness that these numbers belong to a larger system

Assessment

- Teacher Rubric
- Student Self Assessment Rubric
- Teacher anecdotal observations
- Photographic evidence

Extension/Variation Activities

- Effi and Luigi need to build a sculpture using MAB blocks. They have access to 4 thousands blocks which they can break into hundreds, tens and ones. What could their sculpture look like? What combinations of hundreds, tens and ones could they use?
- Using the same number of blocks in total, what different forms of sculpture can you make?
- Create an animal sculpture using 4 thousand blocks.
- If Effi and Luigi want to branch out and start building MAB houses, how many blocks would they need to use, if their house had one room, two rooms etc?
- Draw your Sculpture and measure the area, volume etc.
- If each of the MAB ones is worth \$1, what is the total cost of the sculpture?

Mathematical Language

one, ten, hundred, ones, tens, hundreds, sort, trade, exchange, number, numeral, regroup, expander, shorts, longs, flats, place value.

NOTE: This is not an exhaustive list

Acknowledgements

Debra Witte prepared this MAB Sculptures task. The annotated evidence of learning samples associated with this task were collected from students in her class in 2006.

Prior Learning

For this task, students need to have an understanding of:

- Counting items individually and groups of items
- Grouping items into hundreds, tens and ones
- Recognising groups of hundreds, tens and ones
- Exchanging ones for tens, tens for hundreds and vice versa
- Writing numerals represented by MAB

Resources

- Popsticks, counters, pebbles, buttons, Unifix blocks, Straws, MAB
- Elastic bands
- Dice
- Hundred, Tens and Ones (HTO) Charts laminated
- Whiteboard markers
- Hundreds, tens and ones number expanders
- Numeral cards 0 – 9
- Coins
- Chalk for targets on carpet/concrete
- Beanbags

Activities

The following activities will help to develop the concept before conducting the MAB Sculpture task. These activities are predominantly taken from *Developing Efficient Numeracy Strategies* (DENS) - Stage 1.

- Give groups of students a large group of items – How could we count these? Record all the methods you could use. What problems do you encounter when trying to count a large number of items? How could you make this task easier? Try some of the suggestions that could make the task easier
- Use pictures of bundles of popsticks to represent numerals (10 – 90) and words (ten – ninety).
- Match bundles of popsticks to their 'names' ie. ten, twenty, thirty, forty etc.
- Repeat 'Collections' with unifix blocks, joining them into groups of ten. Introduce MAB's, which are already conveniently 'stuck together' (the only problem is that they can't be broken down when they need to be made back into ones, they have to be traded).
- Count bundles of popsticks or MAB's as they are placed into a container. Counting forwards and backwards by tens to 100.
- Play 'Buzz' by counting by tens to one hundred. Student who is 'one hundred' is out and counting starts again from ten.
- 'Straw Javelin' (DENS) – Students throw a straw as far as they can then measure the distance the straw travelled using unifix blocks in towers of ten as well as single blocks. Repeat this activity using MAB tens and ones. Discuss pros and cons of each method.
- Given groups of MAB's, sort them into hundreds, tens and ones. Count how many are in each group.
- 'Collections' (DENS) bundling popsticks to count them. As groups of ten are made these are bundled together with an elastic band and added to the HTO chart. The


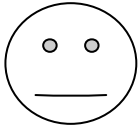


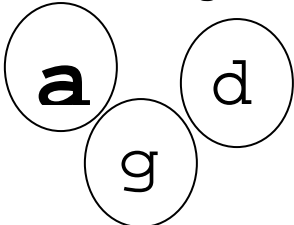
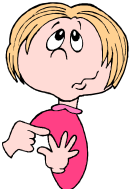

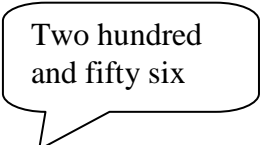
collections of tens and ones are then counted and written with a whiteboard marker on the chart. This will give the final two/three digit number.

- Trading game – students take turns throw a die and add the number of ones to their HTO chart. When ten ones are accumulated they can be traded for one ten. When ten tens are accumulated they can be traded for one hundred. First to one hundred wins the game.
- Experiment with Expanders expressing a range of numerals as combinations of hundreds, tens and ones.
- 'Highest/Lowest' game - Using sets of numeral cards 0 – 9 students draw cards, placing them on a HTO chart to try and make the highest or lowest 2/3 digit numeral that they can. They are then to represent their numeral using popsticks/MAB's and compare them with others in the group. Highest or lowest number wins and scores a point on the scoreboard.
- 'Tens or Ones' game – Using a die and a coin marked with 'T' and 'O', students roll the die and collect the corresponding tens (T) or ones (O) as indicated by the flip of the coin. They add these to their HTO charts. When ten ones are accumulated they can be traded for one ten. When ten tens are accumulated they can be traded for one hundred. First to five hundred wins the game.
- 'Targets' – Draw a large target on the floor marked with tens and ones (eg. in the middle = 1 ten, on the outer rings = 1 one, 2 ones, 3 ones etc.) In groups, students throw beanbag to land on target and collect the corresponding number of tens or ones. They add this to their HTO chart and exchange accordingly. First to 5 hundred or above, wins the game.
- In pairs, students are given 3 numeral cards and are to investigate how many different numerals can be made with combinations of those cards. They are to represent each numeral with MAB's to create a display.
- Given a set number eg. 97, 146 or 523, children make a MAB sculpture representing that number. Children may choose to exchange to make a different combination. Compare different combinations of hundreds, tens and ones. Students record what combination they used.
- Mrs Witte went into a shop and bought three large brass numbers to put on her letterbox eg. 3, 6 and 9. What number could her house be? What if she did not have to use all of the numbers? What numbers are not her house number?

Teacher Rubric for MAB Sculptures Task

	Indicators of student performance		
	KGP 3	Band 1	
Counts sets of items	Counts blocks to find total with support. Demonstrates 1:1 correspondence with: <ul style="list-style-type: none"> • 1 digit • 2 digits 	Counts blocks correctly most of the time. At times requires reminding to recheck total. Is beginning to demonstrate 1:1 correspondence with <ul style="list-style-type: none"> • 2 digits • 3 digits 	Accurately counts sets of MAB. Consistently demonstrates accurate 1:1 counting sets of: <ul style="list-style-type: none"> • 2 digits • 3 digits
Sorts MAB's into ones, tens and hundreds	Sorts MAB into groups of <ul style="list-style-type: none"> • Ones • Tens with support.	Sorts MAB into groups of <ul style="list-style-type: none"> • Ones • Tens • Hundreds most of the time. Some support needed.	Accurately sorts MAB into <ul style="list-style-type: none"> • Ones • Tens • Hundreds.
Exchanges MAB ones for tens & tens for hundreds	Exchanges/regroups ones for tens.	Exchanges/regroups ones for tens & tens for hundreds most of the time.	Accurately exchanges/regroups ones for tens & tens for hundreds.
Writes numeral represented by MAB	Expresses groups of MAB as numerals with support.	Expresses groups of MAB as numerals most of the time.	Accurately writes numerals from groups of MAB.
Reads one, two and three digit numbers	Reads/says <ul style="list-style-type: none"> • 1 digit numbers without support • 2 digit numbers with support. • 3 digit numbers with support. 	Reads/says <ul style="list-style-type: none"> • 2 digit • 3 digit numbers most of the time without support.	Reads/says 2 and 3 digit numbers accurately.
Writes one, two and three digit numbers	Writes <ul style="list-style-type: none"> • 1 digit numbers without support • 2 digit numbers with support. • 3 digit numbers with support. 	Attempts to write <ul style="list-style-type: none"> • 2 digit • 3 digit numbers most of the time without support.	Writes two and three digit numbers accurately.

Student Rubric for MAB Sculptures

	How I think I went....		
			
Building Sculpture 			
Sorting 			
Counting 			
Exchanging 			
Reading 256 			
Writing 347 