Maths in Context: 'Number Walks'

An AMSI Schools Activity
for Students in Foundation to Year 2

FOUNDATION LEVEL ('Kindergarten' / Early Stage 1 / 'Prep'): Number & Counting Sequence

Aims and Objectives for this Task:

The aim of this task is to provide a rich, contextual activity through which students can begin to recognise the occurrence and importance of numbers in our everyday lives.

- Students will demonstrate **understanding** by connecting the symbols (digits) for the numbers 0 – 20 with their names and representative quantities in familiar environments outside the classroom;
- Students will demonstrate fluency by readily counting numbers in sequences and identifying continuing patterns;
- Students will demonstrate **problem-solving** by using familiar and unfamiliar objects to model authentic problems and to sort objects
- Students will demonstrate **communication skills** by describing mathematical situations and discussing the reasonableness of their answers; and
- Students will demonstrate **reasoning** by explaining their comparisons of quantities and by creating new patterns from observed objects and numbers.

Intended Syllabus Outcomes (Foundation / Kindergarten / Prep):

Australian Curriculum (Mathematics):
ACMNA001 - Establish understanding of the language and processes of counting by naming numbers in sequences, initially to and from 20, moving from any starting point
ACMNA002 - Connect number names, numerals and quantities, including zero, initially up to 10 and then beyond
ACMNA289 - Compare, order and make correspondences between collections, initially to 20, and explain reasoning
ACMNA004 - Represent practical situations to model addition and sharing

NSW Syllabus:
MAe-4NA - Counts to 30, and orders, reads and represents numbers in the range 0 to 20
MAe-1WM - Describes mathematical situations using everyday language, actions, materials and informal recordings
Mae-2WM - Uses objects, actions, technology and/or trial and error to explore mathematical problems
Mae-3WM - Uses concrete materials and/or pictorial representations to support conclusions

Timing: At least one double-period (60 – 90 minutes)

Resources: Clip boards and paper (per student);
Pencils / markers / crayons for writing and drawing;
Tablet with photographic app for teacher/s (if available);
Smartboard and / or whiteboard (back in the classroom) for plenary session;
Hats, sunscreen, drink bottles and practical walking shoes for students.

Preparation: Excursion organisation including risk assessments;
Teachers may need to pre-determine appropriate stopping points and environments for students to take breaks and to write / draw their findings, depending upon the size and nature of the group, number of parent helpers (if available), likely weather etc.

Foundation ('Kindergarten' / 'Prep') Number & Counting Activity:

The concept of 'Number Walks' involves taking a stroll with the class or group around the school or the local neighbourhood / community. Students carry with them pencils and a clipboard or a tablet and, guided by the teacher, they note down anything they see that relates back to their understanding of the topic.

1. **For this activity, students take a 'Number Walk' down the main street of the local neighbourhood or town centre.** The objective is to be able to find and record as many numbers up to 20 as they can see; almost like a 'treasure hunt' for numbers.

   Students carry paper and a clipboard on their walk and identify as many numbers in given environments during say 4 or 5 stops as possible. During each stop, have students sit (eg. under a shady tree, in a small park, in the central mall of a local shopping centre…) and draw or write down as many of the numbers from 1 – 20 as they can find. Teacher/s may want to prompt students or assist them by pointing out environments which are a 'rich' source of numbers, eg. "Here we are at the Post Office. Who can see some numbers near here? …"

   Numbers identified by students could be a count of individual objects (eg. "This is 7 cars in the street"; "There were 4 drinking fountains in the park") or could be the numerals they identify on signs, letterboxes etc. (eg. "This is the number 13 on a letterbox.") Students might like to draw each object they have chosen with the number/s featured.

   Ensure students also indicate where they saw this number (eg. "I saw the number 9 on the back of the bus shed", or "I saw the number 5 on the truck number plate". *Teachers (or parent helpers) can further help by using a tablet to photograph the objects or environments students are working from, for reference during the post-activity plenary session.*

2. **Upon returning to the classroom, hold a post-activity plenary discussion about what students found.** Each student can be asked to share one object or situation they observed and noted in which a number or numbers were featured.

   The teacher should then prompt further discussion by asking open inquiry questions about each student's findings

   Good questions to ask might include:

   - "Why were there that many (seats, trees, drinking fountains…) in the park?"

   - "Why do houses and shops have numbers out the front / on their letterboxes?"

   - "Why do café menus have numbers on them?"

   - "How might the numbers help us know which bus to catch?"

   - "What do you think '4 tonnes' means?" *(a hard one!)*

   The objective here is to have students recognise the purposes and uses of numbers in everyday life and the ways in which numbers can help us understand the world around us.

3. **Have students complete their drawings from their Number Walk**, along with an explanatory sentence (and perhaps some photographs of students during their small excursion!) **and publish these** on the classroom walls as a record of the event.

    These can then become contextual reference points for specific mathematical concepts in 'Number' related topics as the term / year progresses.

YEARS 1 & 2 LEVEL (NSW 'Stage 1'): Addition & Subtraction

Aims and Objectives for this Task:

The aim of this task is to provide a rich, contextual activity through which students can begin to explore the addition and subtraction of one- and two-digit of numbers in everyday contexts.

- Students will demonstrate **understanding** by connecting names, numerals and quantities, and partitioning numbers in various ways;
- Students will demonstrate **fluency** by counting number in sequences readily forward and backwards;
- Students will demonstrate **problem-solving** by using materials to model authentic problems, using familiar counting sequences to solve unfamiliar problems;
- Students will demonstrate **communication skills** by describing mathematical situations using every-day and some mathematical language, drawings, diagrams and symbols; and
- Students will demonstrate **reasoning** by explaining patterns that have been observed and discussing the reasonableness of their answer.

Intended Syllabus Outcomes (Years 1 & 2):

Australian Curriculum (Mathematics):
ACMNA015 - Represent and solve simple addition and subtraction problems using a range of strategies including counting on, partitioning and rearranging parts;
ACMNA029 - Explore the connection between addition and subtraction;
ACMNA030 - Solve simple addition and subtraction problems using a range of efficient mental and written strategies;
ACMNA031 - Recognise and represent multiplication as repeated addition, groups and arrays.

NSW Mathematics Syllabus:
MA1-5NA - Uses a range of strategies and informal recording methods for addition and subtraction involving one- and two-digit numbers;
MA1-1WM - Describes mathematical situations and methods using every-day and some mathematical language, actions, materials, diagrams and symbols;
MA1-2WM - Uses objects, diagrams and technology to explore mathematical problems;
MA1-3WM - Supports conclusions by explaining or demonstrating how answers were obtained.

Timing: At least one double-period (60 – 90 minutes)

Resources: Clip boards and paper (per student);
Pencils / markers / crayons for writing and drawing;
Tablet with photographic app for teacher/s (if available);
Smartboard and / or whiteboard (back in the classroom) for plenary session;
Hats, sunscreen, drink bottles and practical walking shoes for students.

Preparation: Excursion organisation including risk assessments;
Teachers may need to pre-determine appropriate stopping points and environments for students to take breaks and to write / draw their findings, depending upon the size and nature of the group, number of parent helpers (if available), likely weather etc.

Year 1 & 2 (Addition & Subtraction) Activity:

The concept of 'Number Walks' involves taking a stroll with the class or group around the school or the local neighbourhood / community. Students carry with them pencils and a clipboard or a tablet and, guided by the teacher, they note down anything they see that relates back to their understanding of the topic.

For this activity, students take a 'Number Walk' down the main street of the local neighbourhood or town centre. The objective is to find and record situations, objects or environments in which addition and subtraction might be used in the local community; almost like an 'addition and subtraction treasure hunt'.

With the guidance of the teacher, students identify situations where they can decompose and recombine small numbers up to 20 (Year 1) or into any 2-digit number (Year 2):

1. Students carry paper and a clipboard on their walk and identify as many numbers in given environments during say 4 or 5 stops as possible. During each stop, have students sit (eg. under a shady tree, in a small park, in the central mall of a local shopping centre…) and record by drawing or writing down examples of situations in which we can add or subtract numbers or objects. *Using mathematics vocabulary wherever possible,* teacher/s should prompt students or assist them by pointing out situations in which numbers can be added or subtracted, eg:

   - On a strip of footpath with 12 sections, have students play 'hopscotch' to make different number combinations up to 12 (eg. "*Let's do 9 jumps plus 3 jumps. How many jumps in total?"; "Let's do 7 jumps plus 5 jumps. How many jumps in total?"; "From square # 12, if I hop back 4 squares, which square am I on?"* etc.);

   - On a shopfront menu, look at prices for food. Have students record a version of the menu using whole numbers (there may be some opportunity for rounding for more capable students here) and then consider addition and subtraction problems using those amounts (eg. *"If I give the café owner $20 and I buy a cake costing $5 and a lemonade costing $4, how much change will I get?"*; or, *"What will a sandwich costing $6 and a dessert costing $12 cost altogether?"*).

   - Go to the local pool or the local running track and ask questions about distances swum or run to 50 or 100 metres (eg. *"If I swam 28 metres, how many metres left to get to the end of the pool?"*, or *"If I ran 75 metres and then walked to the 100 metre finish line, how far will I have walked?"*)

   - At the local park, count the number of trees then the number of light-posts: *"How many trees and light-posts if I added them together?"*

   - Look at a local carpark: *"How many cars in the carpark? How many empty spaces? How many cars can fit in the carpark altogether?"*

   Students should then record or draw a picture or diagram, with an accompanying sentence, describing at least one number sentence they examine during their Number Walk.

   Ensure students indicate where they performed this calculation, eg. *"We went to the pool. If I swam 25 metres plus 25 metres I would swim 50 metres in total".* Encourage students to use mathematics vocabulary were possible, such as 'plus', 'minus', 'add', 'subtract', 'total', 'difference', etc.

   Teachers (or parent helpers) can further help by using a tablet to photograph the objects or environments students are working from, for reference during the post-activity plenary session.

2. **Upon returning to the classroom, hold a post-activity plenary discussion about what students found.** Each student can be asked to share one object or situation they observed and noted in which addition or subtraction problems were featured.

The teacher should then prompt further discussion by asking open inquiry questions about each student's findings.

Good questions to ask might include:

- "How can adding and subtracting help builders make things like footpaths, houses and shops?"

- "Why do we need to add and subtract when we go shopping or buy our lunch in a café or restaurant?"

- "How might adding and subtracting 'distance' numbers help runners or swimmers train for their races?"

- "How might the numbers help us know which bus to catch?"

- "How can subtracting help us work out how much room there is left in the carpark?" *(a hard one!)*

The objective here is to have students recognise the contexts and uses of addition and subtraction number operations in everyday life and the ways in which these can help us solve problems in the world around us.

3. **Have students complete drawings from their Number Walk**, along with an explanatory sentence and a simple number sentence (eg. *"15 + 8 = 23"*), and perhaps some photographs of students during their small excursion, **and publish these** on the classroom walls as a record of the event.

These can then become contextual reference points for specific mathematical concepts in other number operation related topics as the term / year progresses.