

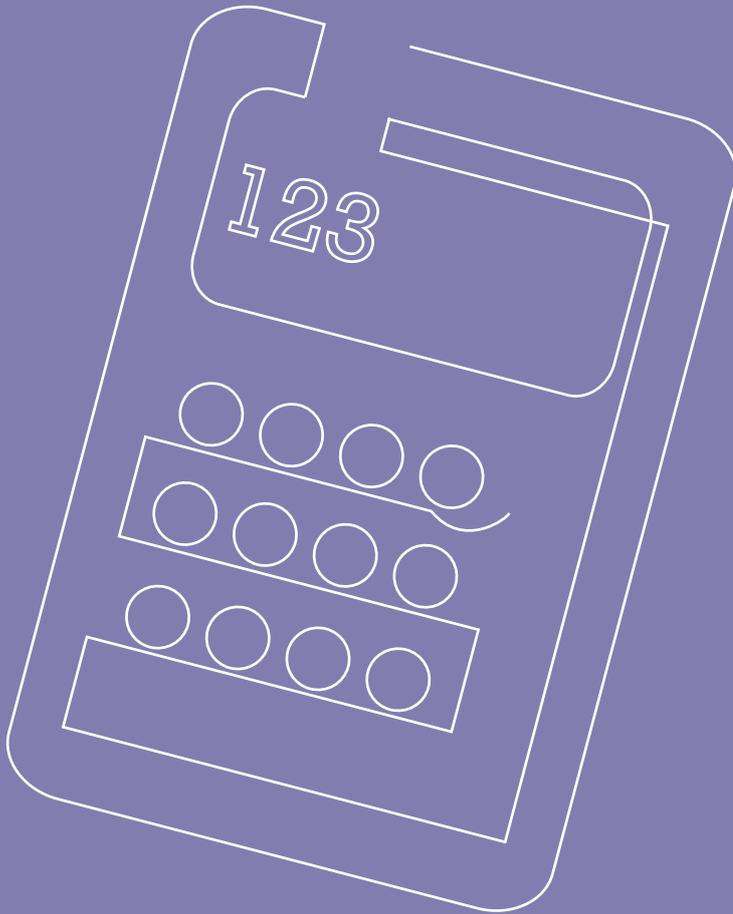
PRIMARY

Mathematics

Guidelines for Teachers of Students with

SEVERE and PROFOUND

General Learning Disabilities



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Introduction

Exploration and development of the senses through use of a wide range of three-dimensional materials is an important part of the *Primary School Curriculum: Mathematics* for students with severe and profound general learning disabilities.

The development of the ability to indicate choice and preference is an essential foundation skill for early learning in mathematics.

Mathematics education provides the student with a wide range of knowledge, skills, and related activities that help him or her to develop an understanding of his/her physical environment and of social interactions. Students with severe and profound general learning disabilities need a variety of experiences and opportunities to develop their sensory awareness and their ability to reach out, explore, and solve problems in order to comprehend basic mathematical concepts. The ability to solve problems is an essential building block for all learning.

The exploration and development of the senses through the use of a wide range of three-dimensional materials is an important part of the *Primary School Curriculum: Mathematics* for students with severe and profound general learning disabilities.

Much of the early work in mathematics will consist of building up the student's awareness of similarities and differences in the properties of familiar objects. While the students may not be able to express themselves verbally they will need to hear verbal descriptions of what they are discovering as they discover it. Therefore, it is important to use correct mathematical language to accompany their discoveries.

Mathematical activities help to develop the student's ability to imitate and this in turn facilitates the development of symbolic understanding. As the student learns to discriminate between objects he/she will need to be able to express choice. The development of the ability to indicate choice and preference is an essential foundation skill for early learning in mathematics, as in many areas of the curriculum. Mathematics offers exciting possibilities for stimulating interaction between the helper and the student. It also lends itself to the structuring of activities to promote interaction with peers.

Play is an essential part of the student's early mathematical development. It allows the student to explore the properties of objects and facilitates awareness of concepts, such as cause and effect and object permanence. However, students with severe and profound general learning disabilities often need guidance to stimulate and maintain their interest in play. Therefore, they should be given opportunities to develop and apply their early mathematical skills and understanding in both undirected and structured play.

Using mathematics meaningfully

Activities in mathematics should be based on the student's own everyday experiences, since mathematics is meaningful for students with severe and profound general learning disabilities only when it is made relevant to the life and experience of the student. Mathematics has much to offer the student who is struggling to make sense of the world around him/her. For one student, mathematics may open his/her eyes to exciting colours, shapes and patterns. For another, it may enable him/her to improve his/her functional understanding of objects, while other students may learn to use numbers functionally in play or real-life situations. The range of experiences offered to the student should not be limited by his/her ability to reach the 'next step'. Through mathematics the teacher seeks to improve the student's understanding of the environment, to increase his/her interest in it, and to improve his/her ability to interact with it.

Overview of content

The strands of the *Primary School Curriculum, Mathematics* in these guidelines are as follows:

- Early mathematical activities
- Number
- Pattern and sequence
- Shape and space
- Measures
- Data.

Early mathematical activities

This strand concentrates on alerting the student to the similarities and differences between objects. Essential concepts such as object permanence and one-to-one correspondence are introduced, and students are enabled to work on the skills of classifying, matching, comparing, and ordering.

Number

All number work is based on the student's everyday experiences. It reinforces the concept of one-to-one correspondence and enables the student to develop an appreciation of quantity. Students become familiar with patterns of number and are introduced to the use of number games and numerals in play and functional situations.

Pattern and sequence

Students become aware of patterns and sequences in their immediate environment. They become aware of the pattern and sequencing of familiar events and activities and use this understanding to anticipate and take turns. They are enabled to observe and make patterns and sequences using familiar equipment.

Shape and space

Spatial awareness for students with severe and profound general learning disabilities begins with the awareness of the position of their own body and parts of the body. Language associated with body position and movement is very important, as this will enable some students to regulate and control their movements. The ability to reach out and explore is developed. The initial emphasis is on examining the shape of three-dimensional objects and how they move and interact with each other. Some students develop the ability to discriminate, and matching and sorting activities progress from using three-dimensional to two-dimensional objects.

Measures

This strand introduces the student to the concepts of length, weight, capacity, area, time, and money in a way that is meaningful in his/her everyday life. The emphasis at first is on noticing differences in the length, weight and capacity of familiar objects. The concepts of area, time and money are introduced in playful or functional situations, with a view to enabling the student to make sense of and gain more control over his/her environment.

Data

This strand seeks to enable students to understand that information about objects and people can be collected, sorted, classified, and represented visually. The ability to interpret data is introduced as the student is encouraged to look at charts in order to find out information about familiar events that have been recorded.

School planning

The Primary School Curriculum: Mathematics, Teacher Guidelines, contains advice on school planning for mathematics. Some of that advice will be applicable when planning for students with severe and profound general learning disabilities. The following section outlines some additional aspects of planning that may need to be considered when planning for students with severe and profound learning disabilities.

Curriculum and organisational planning

Some extra issues that may need to be discussed as part of the school's planning for mathematics include the following:

The purpose and nature of mathematics

Exploring and discussing the nature of mathematics can help to clarify for all school staff the role that mathematics may play in the overall education of the student. There may be a need to alert all school staff to the aims of the mathematics curriculum, so that each member of staff can play an active role in enabling students to become aware of the functional uses of mathematics in their environment. Parents should also be involved in this process, so that they can use natural opportunities at home to support the student's awareness of mathematics. Parents could help by

- encouraging play with sand, water, and three-dimensional objects
- emphasising one-to-one correspondence when giving out items to students or siblings
- using natural opportunities to point out similarities and differences or to play matching games
- pointing out interesting shapes and patterns in everyday objects
- using natural opportunities to emphasise number patterns in a fun way with rhymes and songs.

It is important that students with severe and profound general learning disabilities experience the consistent use of mathematical language by all those helping to teach the mathematics curriculum in the school. This should be agreed at whole-school level, and the sharing of ideas on approaches and methodologies found to be successful would also be beneficial to all staff members. A discussion on mathematics will also help to clarify how best to use available materials and equipment, and will assist in identifying new resources that may be needed for the school or individual classrooms.

A mathematics-friendly school environment

Ideas for creating a mathematics-friendly school environment might include

- the use of large, bright, textured, or three-dimensional numerals around the school instead of conventional commercial ones
- a pictorial display in the assembly area linking the mode of transport with the students who 'belong' to each car/van/bus
- patterns and interesting visual sequences used as decorative borders around the corridors or doors
- the provision of equipment to help with spatial awareness (a safe play area, soft-play equipment, safe equipment for body movement experiences)
- the use of a big, bright clock in the assembly area to highlight school starting and finishing times. (It could be made in school and have big hands that can be moved to appropriate times.)

A mathematics-friendly local environment

Various strategies can be used in helping to create a mathematics-friendly local environment.

- Local shopkeepers might be willing to support teachers in enabling students to learn about money. A shopkeeper might agree to put out the coins required for an item on a piece of card. The student would then match the coins with his/her own money. Clear photographs of coins could be laminated and used in a similar way.

Classroom planning

The *Primary School Curriculum: Mathematics, Teacher Guidelines*, contains advice on classroom planning for mathematics. Some of that advice will be applicable when planning for students with severe and profound general learning disabilities. The following section outlines some additional aspects of planning that may need to be considered when planning for students with severe and profound learning disabilities.

Planning issues for the teacher

Planning ensures that the classroom is a responsive environment and facilitates the best use of resources and space. Possible extra classroom planning issues for mathematics include

- organising a water/sand play area
- providing a good selection of bricks, blocks, interesting three-dimensional shapes, or other play equipment
- using large, bright, textured, or three-dimensional numerals and shapes functionally around the classroom
- alerting all significant adults to ways of using incidental opportunities to reinforce priority aspects of the mathematics curriculum for each student, for example drawing attention to one-to-one correspondence as instruments are given out in a music session
- ensuring that the classroom is a responsive environment so that students can learn incidentally about concepts such as object permanence
- clearly marking/highlighting students' personal belongings (for example, chair/table/coat hook/shelf) using specific colours/shapes.

What can I, the student, learn through mathematics?

- I can build up my understanding of essential concepts such as object permanence.
- I can be inspired to show preference and make choices.
- I can extend my receptive and expressive vocabulary.
- I can greatly improve my ability to solve problems.
- I can learn to appreciate the variety that exists in the colour, shape, size, and texture of objects in my environment.
- I can learn how to match, sort and classify objects.
- I can begin to appreciate and use number in a playful and functional way.
- I can have my senses alerted to exciting and interesting visual, aural and tactile patterns around me.
- I can learn to make interesting patterns and sequences.
- I can improve my understanding of the shape and positioning of my body and the parts of the body.
- I can learn actively to compare and measure according to size, length, weight, and capacity in a playful and functional way.
- I can learn to become aware of and use time to make sense of daily and weekly routines.
- I can learn that money can be used to buy things.
- I can learn to represent and record meaningful and interesting data about the people, events and phenomena around me.

Early mathematical activities

Attending	Responding	Initiating
<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ develop his/her awareness of the existence of objects <ul style="list-style-type: none"> – <i>have opportunities to look closely at visually stimulating objects</i> – <i>interact with objects that respond when touched</i> – <i>listen to the variety of sounds that objects can make</i> – <i>be helped to mouth/rub/hold /squeeze/poke objects</i> – <i>have a prompt to use one hand/both hands/to transfer from hand to hand</i> ■ develop awareness of the use of some very familiar objects ■ observe, feel and compare objects that are the same in one attribute, such as texture, smell, colour, shape, size, length, weight ■ observe and feel a bag of soft materials, a box of red things <ul style="list-style-type: none"> – <i>have the opportunity to smell and taste (if able) a collection of things that have similar smells/tastes, such as real strawberries, strawberry jam, strawberry jelly, strawberry ice-cream</i> ■ observe, feel and compare objects that are clearly different in one attribute as above <ul style="list-style-type: none"> – <i>a marble versus a tennis ball</i> – <i>a beanbag of sand versus a beanbag of Styrofoam.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ develop his/her ability to explore objects <ul style="list-style-type: none"> – <i>carry out explorations as in Attending with gradually decreasing help</i> – <i>begin to show an active interest by visually tracking/ reaching out/grasping</i> ■ with decreasing help begin to use some familiar objects appropriately ■ imitate the sorting of objects according to one attribute, such as colour, shape <ul style="list-style-type: none"> – <i>with appropriate prompting put all marbles in one box and all tennis balls in another</i> – <i>show interest in collection of foods that have a particular smells/flavours (See Attending)</i> ■ imitate the ordering of three objects or order them according to size, length, height, or weight <ul style="list-style-type: none"> – <i>cubes, balls, bags filled with substances of contrasting weight.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ experiment with the properties and uses of objects <ul style="list-style-type: none"> – <i>show curiosity about objects</i> – <i>examine them independently and interact with them</i> ■ independently use some familiar objects appropriately ■ sort objects in everyday situations <ul style="list-style-type: none"> – <i>tidy away all small cars into one box after play</i> – <i>put his/her own cup with all the other cups</i> ■ place three or more objects in order according to size, length, height, or weight.

Attending	Responding	Initiating
<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ with physical facilitation, attend to terms such as 'same as', 'not the same as', 'big', 'small', 'light', and 'heavy' <ul style="list-style-type: none"> – <i>feel similar/different textures, sizes or weights while listening to the language of comparisons</i> ■ attend to activities involving object permanence <ul style="list-style-type: none"> – <i>games of 'peek-a-boo'</i> – <i>an object of interest being partially covered/fully covered with a cloth –and then uncovered</i> – <i>pushing a train through a tunnel</i> – <i>putting toy cars in a garage</i> – <i>looking at a jack-in-the box.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ show an understanding of the terms 'same as,' 'different,' 'big,' 'small,' 'light,' 'heavy' <ul style="list-style-type: none"> – <i>'show me the big ball'</i> – <i>'show me a brick the same as'</i> ■ with decreasing assistance find objects or people that are partially or fully hidden <ul style="list-style-type: none"> – <i>engage with decreasing help in activities suggested in Attending</i> – <i>look for a hidden favourite food/drink/object (at first partially hidden while he/she watches)</i> – <i>gradually move to games of hide and seek with people and objects.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ use the terms 'same as,' 'different,' 'big,' 'small,' 'light,' 'heavy' ■ engage independently in hide and seek games with people and objects <ul style="list-style-type: none"> – <i>seek to play games involving hide and seek</i> – <i>ask for desired objects that are out of sight.</i>

Attending	Responding	Initiating
<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ develop an awareness of the relationship between objects and himself/herself, given visual, tactile and verbal clues <ul style="list-style-type: none"> – <i>awareness of his/her own belongings, such as coat, bag, hairbrush</i> ■ observe and attend to the matching of identical objects in one-to-one correspondence <ul style="list-style-type: none"> – <i>bricks, toys, utensils, clothing</i> ■ have an awareness of the relationships between familiar objects <ul style="list-style-type: none"> – <i>observe that a drumstick goes with a drum, a lid goes on a jar of sauce</i> ■ attend to situations where non-identical one-to-one correspondence is used <ul style="list-style-type: none"> – <i>one cup for each student at break time</i> – <i>one coat for each student when going for a walk.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ indicate a relationship between an object and himself/herself <ul style="list-style-type: none"> – <i>indicate his/her own coat, bag, toothbrush, hairbrush when asked</i> – <i>laugh or push away wrong item given by mistake</i> ■ with decreasing help match identical objects in one-to-one correspondence on request ■ match familiar related objects on request <ul style="list-style-type: none"> – <i>show that a cup goes with a saucer, a sock goes with a shoe</i> ■ with decreasing help carry out tasks where non-identical one-to-one correspondence is used. (See <i>Attending</i> for ideas.) 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ look for his/her own belongings from selection of items <ul style="list-style-type: none"> – <i>pick out/look for his/her own coat at home time</i> ■ match pairs of identical objects in play and functional situations <ul style="list-style-type: none"> – <i>match pairs of socks/gloves</i> – <i>play games of finding things 'the same as this'</i> – <i>match related objects functionally and in play</i> – <i>take out a drumstick to play a drum</i> – <i>set the table with a knife and fork</i> – <i>button his/her coat, brush his/her hair with a hairbrush</i> ■ independently use one-to-one correspondence of non-identical objects in play and functional situations <ul style="list-style-type: none"> – <i>put out a spoon for each teddy for a picnic</i> – <i>put one percussion instrument in front of each student for a music session.</i>

Number

Attending	Responding	Initiating
<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ attend to repetitive actions <ul style="list-style-type: none"> – <i>participate with full help in repetitive actions such as banging hand on table,</i> – <i>banging with objects</i> – <i>repeatedly pressing a button on a toy to get a sound</i> – <i>repeatedly pressing switch to change the image on computer screen</i> ■ become aware of differences in quantity <ul style="list-style-type: none"> – <i>look and listen as objects are added to and taken away from a collection</i> – <i>watch as sand is poured on a small pile to form a bigger pile</i> – <i>have his/her attention drawn from one object to another</i> ■ participate in activities where the difference between ‘one’ and ‘a lot’ is emphasised <ul style="list-style-type: none"> – <i>feel and observe one ball versus a box full of balls, one sweet versus a bag full of sweets</i> ■ attend to the use of terms such as ‘some’ and ‘more’ <ul style="list-style-type: none"> – <i>‘You have some biscuits there; I’ll give you one more.’</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ show interest in repetitive actions <ul style="list-style-type: none"> – <i>begin to show that he/she wants an action to be repeated</i> – <i>begin to imitate repetitive actions such as those outlined in Attending</i> ■ show awareness of increasing and decreasing quantities <ul style="list-style-type: none"> – <i>look from one object to another with decreasing help</i> – <i>show reaction when objects are added to or taken away from a collection</i> ■ actively explore the difference between ‘one’ and ‘a lot’ <ul style="list-style-type: none"> – <i>with decreasing help observe and feel the difference between one object and a collection of objects</i> – <i>give an adult one item from a selection when asked</i> – <i>indicate the bag with a lot of sweets in it</i> ■ indicate or give ‘some’ items on request <ul style="list-style-type: none"> – <i>‘Show me some toys.’</i> ■ respond to the offer of ‘more’; indicate if he/she would like more when asked. 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ consistently repeat (or seek the repetition of) actions for pleasure or for a particular purpose <ul style="list-style-type: none"> – <i>consistently indicate that he/she wants an action to be repeated</i> – <i>independently repeat actions such as those in Attending</i> ■ communicate an interest in increases and decreases <ul style="list-style-type: none"> – <i>independently alternate attention between objects</i> – <i>gather objects together</i> – <i>show or give objects to adults</i> ■ use understanding of the difference between ‘one’ and ‘a lot’ in functional and social situations <ul style="list-style-type: none"> – <i>take one sweet when offered a selection and asked to take one</i> – <i>take the bigger bag of sweets if offered a choice</i> ■ indicate desire for items and then ask for or show desire for ‘more’ <ul style="list-style-type: none"> – <i>sweets, biscuits, toys</i> ■ show understanding of the term ‘more than’ <ul style="list-style-type: none"> – <i>two students using construction materials, who has ‘more than’ the other?</i> ■ ask for or recite number rhymes or stories ■ perform actions with an adult/ another student for number rhymes and stories ■ use number sequences in games.

Attending	Responding	Initiating
<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ gain experience of patterns of numbers <ul style="list-style-type: none"> – <i>listen to number rhymes and stories</i> – <i>listen to the use of numbers in games such as ‘one, two, three, go’</i> – <i>feel a pattern of numbers tapped out on his/her hand</i> ■ develop awareness that quantity can be represented by a number <ul style="list-style-type: none"> – <i>listen to the language of number as a quantity is tapped out on his/her hand</i> – <i>listen/look/feel as one/two/three objects are counted out</i> ■ attend to the use of number in the context of the classroom and school <ul style="list-style-type: none"> – <i>the number of students in the class</i> – <i>the number of students out sick today</i> ■ observe and feel 3D and 2D numerals <ul style="list-style-type: none"> – <i>participate in making 3D and 2D numerals</i> – <i>attend to his/her fingers outlining shape/being traced over a sandpaper numeral.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ respond to familiar number sequences by expression, vocalisation or action <ul style="list-style-type: none"> – <i>indicate recognition that some of a number rhyme is left out or needs to be continued</i> – <i>supply missing numbers on request</i> ■ with decreasing help respond to a request to count out a number of items up to 6 in familiar situations <ul style="list-style-type: none"> – <i>‘Give me two crayons.’</i> – <i>‘Put three bricks on the table.’</i> – <i>‘Count the students in the class.’</i> – <i>‘Count out six paintbrushes for painting lesson.’</i> ■ respond to familiar numerals; indicate numerals on request, find way back to numbered team in game ■ show interest in observing and manipulating 2D and 3D numerals <ul style="list-style-type: none"> – <i>tracing numerals with a finger</i> – <i>tracing over numerals with a marker</i> – <i>imitating with a finger in air/ on surface/ with a marker on paper.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ use number appropriately in functional or play situations <ul style="list-style-type: none"> – <i>count out three cups for three teddies when playing</i> – <i>count out six towels for six students when going swimming</i> ■ recognise and name by gesture or verbalisation numerals up to 6 ■ count the number of objects/people in a set to 6 by gesture or verbalisation <ul style="list-style-type: none"> – <i>‘Count the number of students in class today.’</i> – <i>‘Count a row of objects up to six.’</i> – <i>‘Count out six cups to be used for drinks at break-time.’</i> ■ order numerals to 6 ■ order sets of objects to 6 ■ ask questions involving numbers. <i>‘How many sweets can I have?’</i> ■ construct 3D numerals for functional use <ul style="list-style-type: none"> – <i>using papier maché, Play Doh</i> ■ construct 2D numerals for the classroom by pasting, drawing.

Attending	Responding	Initiating
<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ develop awareness that quantity can be represented by a numeral <ul style="list-style-type: none"> – <i>have the appropriate number of taps tapped on his/her hand when looking at or feeling numerals from one to three</i> – <i>look at and feel numerals as numbers are said</i> – <i>look at and feel numerals as one, two, three objects are counted out</i> ■ attend to the use of numerals in the context of the classroom and school <ul style="list-style-type: none"> – <i>numerals on classroom walls</i> – <i>numerals in stories and games (visually striking and texturally interesting numerals should be used where possible)</i> ■ listen to and observe the use of the language of the ordinal numbers 'first' and 'last,' used in familiar situations. 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ with help match numerals to sets in meaningful situations <ul style="list-style-type: none"> – <i>'How many students in school today?'</i> – <i>'How many adults are helping today?'</i> – <i>'How many paintbrushes do we need for painting?'</i> – <i>'How many sisters/brothers are in the photograph?'</i> ■ respond to the use of the language of the ordinal numbers 'first' and 'last' <ul style="list-style-type: none"> – <i>show delight at coming first in a race</i> – <i>respond appropriately to being asked to go first/last in familiar situations</i> – <i>show awareness of the end of an activity when the last piece is placed or the last song is sung.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ match numerals to sets in meaningful situations <ul style="list-style-type: none"> – <i>put the appropriate numeral on the board with photographs of students to indicate the number of students present in school today</i> ■ use the language of the ordinal numbers 'first' and 'last' in functional and social situations <ul style="list-style-type: none"> – <i>ask to be first/last in particular activities</i> – <i>tell who came into school first/last today.</i>

Pattern and sequence

Attending	Responding	Initiating
<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ attend to repeated patterns of sounds and movements <ul style="list-style-type: none"> – <i>listen to repeated patterns with musical instruments</i> – <i>feel a pattern tapped on his/her body</i> – <i>participate in repetitive songs/ actions and turn-taking games</i> ■ attend to the sequencing of two or three familiar activities <ul style="list-style-type: none"> – <i>develop awareness that he/she will be tickled in game of ‘around and around the garden’</i> – <i>a bottle must be opened before a drink is poured</i> – <i>bags must be packed before going swimming</i> – <i>socks must be put on before shoes</i> ■ observe visual patterns in the immediate surroundings <ul style="list-style-type: none"> – <i>patterns in wallpaper/on the computer</i> – <i>patterns made in the art class</i> – <i>observe patterns made in colour, shape and size with familiar classroom materials</i> – <i>patterns made with blocks/shapes from inset boards/rings from ring towers.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ imitate and repeat sounds and movements <ul style="list-style-type: none"> – <i>with musical instruments</i> – <i>using the voice</i> – <i>during action songs and turn-taking games</i> ■ indicate awareness of sequencing in familiar activities <ul style="list-style-type: none"> – <i>indicate what comes next in activities such as those in Attending</i> – <i>show awareness of wrong sequencing by expression, gesture or vocalisation</i> ■ on request, indicate visual patterns in the immediate environment <ul style="list-style-type: none"> – <i>point to pattern on a jumper</i> – <i>patterns made in art class</i> ■ use 3D and 2D materials to copy and extend patterns in colour, shape and size <ul style="list-style-type: none"> – <i>copy patterns already made</i> – <i>make his/her own patterns with help using bricks, pegs, and art materials.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ initiate and create repetitive sounds and movements <ul style="list-style-type: none"> – <i>clapping games</i> – <i>musical patterns</i> ■ notice and ask about visual patterns in the environment <ul style="list-style-type: none"> – <i>the pattern of frost on the window</i> – <i>the pattern of feet in snow/in mud</i> – <i>patterns in art work</i> – <i>correctly sequence two or three familiar events</i> – <i>preparing for familiar activities</i> – <i>dressing himself/herself</i> – <i>sequencing pictorial stories</i> – <i>sequencing the actions of familiar games</i> ■ use 3D and 2D materials to create and extend patterns in colour, shape, size, and number <ul style="list-style-type: none"> – <i>create and extend his/her own patterns using bricks, threading beads, pegs, art materials, computer programs.</i>

Shape and space

Attending	Responding	Initiating
<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ develop awareness of the position of his/her own body and parts of the body in space <ul style="list-style-type: none"> – <i>become aware of various body positions such as lying, sitting or standing</i> – <i>become aware of changes in position</i> – <i>observe the body in a large mirror</i> ■ have an awareness of the shape of his/her own body and parts of the body <ul style="list-style-type: none"> – <i>look at his/her image in a large mirror</i> – <i>observe and feel the shape of the whole body or parts of the body pressed onto damp sand</i> – <i>observe and participate in making hand or foot prints with paint</i> – <i>observe outline images of students projected with light on wall.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ respond to changes in the position of the body or parts of the body <ul style="list-style-type: none"> – <i>watch and control the movement of limbs</i> – <i>react by expression, gesture or vocalisation to activities such as bouncing, rolling</i> ■ react to activities that emphasise the shape of the body or parts of the body <ul style="list-style-type: none"> – <i>laugh at, observe intently, point to, or outline with a finger the shape of the body or parts of the body in the activities described in Attending</i> ■ follow instructions related to moving and positioning parts of the body. 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ experiment with body movement and moving parts of the body <ul style="list-style-type: none"> – <i>changing body position to see things upside down</i> – <i>spinning on swing</i> ■ experiment with and explore his/her own body and the shape of parts of the body <ul style="list-style-type: none"> – <i>make body shapes in PE</i> – <i>create prints of parts of the body</i> ■ use gestural, pictorial or verbal language related to moving and positioning parts of the body.

Attending	Responding	Initiating
<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ participate in activities that involve feeling and observing objects of various shapes <ul style="list-style-type: none"> – <i>look at and be helped to rub/hold objects with one hand and both hands (Use objects with strong lines and corners, such as large blocks and pyramids.)</i> ■ participate with full help in changing the positions of objects <ul style="list-style-type: none"> – <i>move objects around with hands/feet</i> – <i>push/pull/roll objects and observe what changes occur</i> ■ participate in putting objects into containers <ul style="list-style-type: none"> – <i>put bricks into a large box/tin/bag</i> – <i>put toys or books into schoolbag</i> ■ attend to the properties of various objects and shapes <ul style="list-style-type: none"> – <i>observe and feel that bricks can be stacked but spheres cannot</i> – <i>observe and feel that certain shapes have corners and others have not, and that some have more corners than others</i> ■ participate in the construction of 3D and 2D shapes at a tactile visual level ■ observe and attend to the matching and sorting of 3D and 2D shapes in the immediate environment ■ participate in matching games <ul style="list-style-type: none"> – <i>help with and observe the sorting of all bricks into one box after play and all balls into another.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ react to objects of different shape <ul style="list-style-type: none"> – <i>reach out and touch, hold, examine, move objects around (Use objects with strong lines and corners, such as large blocks and pyramids.)</i> ■ participate with decreasing help and begin to imitate an adult/ another student in changing the positions of objects (See activities in <i>Attending</i>.) ■ show interest in putting objects into containers <ul style="list-style-type: none"> – <i>put shapes into large open containers</i> – <i>help to fit large or awkward shapes into containers/bags</i> – <i>engage in shape-posting activities with decreasing help</i> ■ demonstrate an awareness of the effects of shape <ul style="list-style-type: none"> – <i>certain shapes will roll</i> – <i>certain shapes have corners</i> – <i>certain shapes can be stacked</i> ■ manipulate a variety of 3D and 2D materials to increase awareness of regular and irregular shapes <ul style="list-style-type: none"> – <i>bricks, balls, Play-Doh, clay</i> ■ match 3D and 2D shapes in one-to-one correspondence on request <ul style="list-style-type: none"> – <i>posting activities, insert boards, putting shapes on outlines, matching shape cards</i> ■ with guidance, trace around the outline of a variety of shapes <ul style="list-style-type: none"> – <i>join the dots to outline a shape with finger, crayon or marker.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ explore the shape of objects <ul style="list-style-type: none"> – <i>independently manipulate and play with objects of different shapes</i> – <i>move objects around confined and unconfined spaces, for example in a box or on the floor</i> – <i>try to fit all the bricks/toys into a medium-sized box and close the lid</i> ■ use gestural, pictorial or verbal language related to the movement, positioning and shape of objects ■ investigate similarities and differences between shapes <ul style="list-style-type: none"> – <i>engage in posting and construction activities</i> – <i>use shapes functionally when packing items</i> ■ match and sort shapes in play functional situations <ul style="list-style-type: none"> – <i>play shape-matching games with another student</i> – <i>put everything that is likely to roll away safely into a box or bag</i> ■ create 3D and 2D shapes from a variety of materials <ul style="list-style-type: none"> – <i>communicate about and experiment with their creation</i> ■ imitate the drawing of a variety of shapes.

Attending	Responding	Initiating
<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ attend to the language related to the movement, position and shape of objects in familiar situations. 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ follow instructions related to movement, position and shape of objects ■ indicate familiar 3D and 2D shapes on request ■ respond to a request to sort a collection of 3D or 2D shapes <ul style="list-style-type: none"> – <i>‘Find me all the shapes like this one’.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ solve problems involving shape <ul style="list-style-type: none"> – <i>use smaller shapes to cover a large one</i> – <i>fit together jigsaw pieces to form shape</i> ■ use appropriate signs or vocabulary to describe and name simple shapes.

Measures

Attending	Responding	Initiating
<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ attend to objects according to length, weight and capacity by observing and feeling <ul style="list-style-type: none"> – <i>long/short, tall/short, wide/narrow, full/empty</i> ■ attend to comparisons of objects by size, length, weight, and capacity by observing and feeling <ul style="list-style-type: none"> – <i>as long as, longer, longest</i> ■ attend to the language associated with describing, comparing and ordering objects according to length, weight and capacity. 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ respond to instructions involving length, weight and capacity <ul style="list-style-type: none"> – <i>‘Give me the heavy bag.’</i> – <i>‘Show me the long ruler.’</i> – <i>‘Which is the empty cup?’</i> ■ demonstrate ability to compare a selection of objects according to length, weight and capacity <ul style="list-style-type: none"> – respond to, <i>‘Show me the tallest girl.’ ‘Whose bag is heavier?’</i> ■ expand receptive vocabulary associated with describing, comparing and ordering objects according to length, weight and capacity. 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ investigate and make comparisons about objects in relation to length, weight and capacity <ul style="list-style-type: none"> – <i>discover that things are too heavy to lift</i> – <i>choose/ask for the fullest glass of orange</i> – <i>find out that certain items are too long to fit into a container</i> ■ order objects according to length, weight and capacity <ul style="list-style-type: none"> – <i>the height of students or adults in the class</i> – <i>school bags</i> – <i>containers of drinks</i> – <i>stories such as ‘The Three Bears’ or ‘The Hungry Caterpillar’</i> ■ use gestures, signs or verbal language associated with describing, comparing and ordering objects according to length, weight and capacity.

Attending	Responding	Initiating
<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ attend to the concept of area in the immediate environment <ul style="list-style-type: none"> – <i>feel the entire surface of his/her own table/tray</i> – <i>participate in colouring in whole sheets of paper</i> – <i>cover items with contact</i> – <i>cover a table with a table-cloth</i> – <i>cover parcels with wrapping paper</i> ■ attend to the concept of time by experiencing events associated with certain times and listening to the language associated with that time <ul style="list-style-type: none"> – <i>today, yesterday, tomorrow, morning, evening, lunchtime, bedtime, now, later, next</i> ■ attend to the language of days of the week when used in meaningful contexts <ul style="list-style-type: none"> – <i>'We go swimming on Friday'</i> – <i>'We get holidays tomorrow'</i> ■ attend to the use of time in practical situations <ul style="list-style-type: none"> – <i>settings on the video and microwave</i> – <i>time for lunch/home.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ respond to instructions about covering area <ul style="list-style-type: none"> – <i>cover pages or objects with paint</i> – <i>stick and paste to cover a whole page</i> – <i>cover items to protect them</i> – <i>wrap presents</i> ■ respond appropriately to language associated with certain times of the day <ul style="list-style-type: none"> – <i>move to the dining hall when 'lunchtime' is indicated</i> – <i>respond appropriately at time to go home</i> ■ anticipate routine activities affecting himself/herself, family and friends ■ anticipate non-routine activities for which the students have prepared orally/visually ■ respond to questions about when routine and non-routine events happen ■ indicate awareness of days of the week <ul style="list-style-type: none"> – <i>show excitement when a favourite day is mentioned</i> – <i>indicate awareness of days when given gestural/ pictorial/ verbal clues.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ use problem-solving to cover area <ul style="list-style-type: none"> – <i>fitting shapes together to cover an area</i> – <i>finding a cloth big enough to cover a table</i> ■ have an understanding of time in relation to self, family and friends <ul style="list-style-type: none"> – <i>know what time his/her bus comes</i> – <i>know what time a friend will arrive into the school</i> – <i>know what day he/she goes swimming</i> – <i>know when his/her birthday is due</i> ■ ask questions about when routine and non-routine events will happen <ul style="list-style-type: none"> – <i>daily, weekly</i> ■ sequence routine and non-routine events according to time <ul style="list-style-type: none"> – <i>daily, weekly</i> ■ use time functionally <ul style="list-style-type: none"> – <i>read the clock for familiar times</i> – <i>look at the timetable of daily events at school</i> – <i>know the opening/closing time of the local shop.</i>

Attending	Responding	Initiating
<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ look at and hold a variety of coins <ul style="list-style-type: none"> – <i>look at a variety of coins</i> – <i>look at their colours</i> – <i>look at and feel the front/back/edges (Care is required when using small coins.)</i> ■ attend to and participate in the exchange of money for goods in functional and play contexts. 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ show interest in a collection of coins <ul style="list-style-type: none"> – <i>show response to the activities outlined in Attending</i> – <i>compare the size and weight of coins (See note on safety in Attending.)</i> ■ give money in exchange for goods in functional and play contexts ■ respond to ‘<i>show me what money you have</i>’ <ul style="list-style-type: none"> – <i>take money out of bag/purse/pocket on request</i> ■ isolate familiar coin or paper note from selection of items ■ become familiar with the use of notes (if appropriate) <ul style="list-style-type: none"> – <i>examine and compare notes</i> – <i>develop the ability to handle notes carefully.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ use money in exchange for goods in functional and play contexts <ul style="list-style-type: none"> – <i>show curiosity about money</i> – <i>show a desire to have money in his/her pocket or bag</i> – <i>understand that coins and notes (if using notes) can be exchanged for things in real or play shop situations</i> – <i>show the ability to differentiate between notes and coins (See note on safety in Attending.)</i> ■ look for and receive change in functional and play contexts ■ look for/ask for money to use in functional or play contexts ■ sort and name the coins/notes most frequently used ■ investigate the fact that some coins/notes are worth more than others <ul style="list-style-type: none"> – <i>go to shop and find out that certain coins/notes are needed to buy certain items</i> ■ choose from selection of coins/notes in order to buy certain items.

Data

Attending	Responding	Initiating
<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ become aware that objects can be sorted according to one criterion <ul style="list-style-type: none"> <i>observe that</i> <ul style="list-style-type: none"> – <i>all the red bricks are put into one container</i> – <i>all the small balls are in one basket</i> – <i>all the cups are put on a shelf together</i> ■ participate in recording data using real people and objects <ul style="list-style-type: none"> – <i>observe the grouping of students into boys/girls, ambulant/non-ambulant students, all adults wearing funny hats</i> ■ observe and participate in recording familiar data using objects of reference or pictures <ul style="list-style-type: none"> – <i>observe the placing of students' swimming suits on 'This week's swimming chart'</i> – <i>observe the recording of 'Who is in school today?'</i> ■ develop an awareness that representations of data can be interpreted ■ become aware that the timetable tells what has happened or what is about to happen <ul style="list-style-type: none"> – <i>become aware that the attendance chart can reveal who was in school/absent yesterday.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ with gradually decreasing guidance, sort objects according to one criterion <ul style="list-style-type: none"> – <i>put all the toy bricks into their box after play</i> – <i>help to sort cutlery after lunch</i> ■ respond to instructions for recording data using real people <ul style="list-style-type: none"> – <i>help to make a group of all the students who have yoghurt for break</i> – <i>help to group all students who go swimming every Friday</i> ■ with gradually decreasing guidance, represent and record familiar data using objects of reference, pictures or symbols <ul style="list-style-type: none"> – <i>record his/her journey to school</i> – <i>use pictures to record what was done in school today</i> ■ respond to questions about recorded data <ul style="list-style-type: none"> – <i>make an effort to answer questions about charts that are made.</i> 	<p><i>The student should be enabled to</i></p> <ul style="list-style-type: none"> ■ independently sort and classify objects in play and functional situations <ul style="list-style-type: none"> – <i>sort cutlery into cutlery trays</i> – <i>sort toys into appropriate containers after play</i> – <i>put all the fruit in the fruit basket after shopping</i> ■ seek to represent data with objects of reference, pictures or symbols <ul style="list-style-type: none"> – <i>use dolls and teddies to represent his/her own family</i> – <i>place the photographs of all students in school today on a school attendance chart</i> – <i>represent the daily/weekly timetable using objects of reference/ pictures/symbols/ words</i> – <i>represent the weather today/ this week using pictures/ symbols</i> ■ seek to interpret and communicate about recorded data <ul style="list-style-type: none"> – <i>use the daily or weekly timetable functionally</i> – <i>tell how many students were in school today</i> – <i>tell how many sunny days there were last week by looking at the chart.</i>

Exemplars

Exemplars

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Exemplar 1: Mathematics

Strands: Shape and space

Learning about circles

Learning outcomes

1. The student will develop an awareness of circles in his/her environment.
2. The student will assist in making circular shapes.

Resources

- A selection of everyday circular objects.
- Coloured cards (perhaps fluorescent).
- Glue, scissors, felt-tipped pens.

Stages of the lesson

- Collect a number of everyday circular objects, such as plates or other circular pieces. Draw the students' attention to the rounded shape of these objects and enable them to feel their shape.
- This part of the lesson can lead to the students hunting around the classroom for (strategically placed) circular objects.
- Tell the students that they are all going to make a character called *Cindy Circle*. Tell a story about *Cindy* to help the students make a representation. The story should concentrate on her round elements. Using bright cardboard and a large plate as a template draw and cut out a large circle for *Cindy's* face. Circular eyes, nose and mouth can be made with coloured cardboard or drawn with felt-tipped pens. *Cindy* could also have round earrings or glasses. Circular hands and feet could be added, although a more uncomplicated large face with eyes, nose and mouth may be more suitable for students at the early stages of awareness. The circular edge could be emphasised with a strip of holographic paper, sandpaper, or paper of a contrasting colour.
- The *Cindy Circle* can be used in many ways to illustrate a circular shape. A visually attractive or tactile storybook can be created around her, or she can be used as a kind of puppet for language lessons.
- Whenever she is introduced, students should be encouraged to feel around the circumference of her face and the other circular features. If fluorescent paper is used, a lesson in a darkened room using an ultraviolet light can be very effective. A torch or fibre-optic pen used in a darkened room can also be used to draw attention to *Cindy's* circular shape.

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Extension activities

- The same idea can be used for other shapes, for example *Sammy Square*, *Tommy Triangle*, etc.

Exemplar 2: Mathematics

Strand: Early mathematical activities

Learning about 'blue'

Learning outcomes

1. The student will observe, feel and compare objects that are the same in one attribute—blue in colour.
2. The student will notice and learn to appreciate blue in his/her environment.

Resources

- Items that are blue in colour: blue box, blue scarf, blue glasses (if possible), blue hat, blue balls, blue bricks, blue cards, blue cellophane.

Other subjects directly involved

- **Visual arts:** blue explored through a variety of media, making a blue box.
- **Communication and language:** the word 'blue' is emphasised throughout all activities.

Preparation

- A blue box can be made in a visual arts lesson, covering a selected or constructed box in blue, using any materials suitable. The attention span of students should be considered when determining the number of students in the group.

Stages of the lesson

- The students sit or stand at a round table, supported by staff when necessary.
- The 'blue box' is introduced to the group. Within the blue box are activities and objects sharing the common attribute of being blue. The following items and ideas are possibilities for this activity:
 - The teacher pulls out the blue scarf and plays peek-a-boo by draping it over each student's head, emphasising the word 'blue'. If blue glasses are available the teacher wears these so that the student sees them when he/she emerges from under the scarf. The teacher says, '*Where is James? He's under the blue scarf!*'.
 - The students dress a willing adult, with help as required, in a blue scarf and a blue hat. This can be extended to dressing another student, a doll a teddy, or the student himself/herself in front of a mirror.
 - The students can be encouraged to look through blue cellophane, framed with card, to see items and people around them, or their reflection in a mirror.
 - The students can be prompted to post blue balls/bricks/cards into the blue box.

Extension activities

- Classroom staff might decide to wear a striking blue jumper on a particular day to see if it will evoke a reaction from students.
- This lesson format can also be used to introduce other colours. In time, one item of a contrasting colour could be introduced into the box to enable students to discriminate between what is blue and what is not. The students can be helped to see that an item of a contrasting colour is different from all the rest and put it to one side.

Exemplar 2: Mathematics

Ideas for integration

- **Music:** Songs about blue can be played or created.
- **Physical education:** Big blue shapes could be made and used in a physical education class for stepping, sitting or lying on.

Exemplar 3: Mathematics

Strand: Data

Creating a daily/weekly attendance record

Learning outcomes

1. The student will participate in recording familiar data using objects of reference or a photograph.
2. The student will engage in a one-to-one correspondence activity as each student's presence is recorded with an object of reference or a photograph.
3. The student will participate in counting the students present/absent each day.
4. The student will become familiar with numerals 1 – 6.

Resources

- Laminated chart.
- An object of reference or clear photograph of each student.
- Cards with the names of the days of the week.
- Velcro.
- An attractive box to hold objects of reference/photos.

Object of reference

- The object of reference must be something that the student learns to associate with his/her name. It should be mounted on a hard, flat background. Since it is to be associated with his/her name, the first letter of the name could be used. For visual learners, the letter could be made with bright, shiny paper on a contrasting background. For students who are blind, or partially sighted, the letter could be made from a particular texture that the student will learn to recognise. If the material used makes a particular sound when it is rubbed, so much the better. For students who may move on to the point where they recognise their photographs, it is a good idea to place the object of reference under their photograph, even though the focus will initially be on the sight, feel or sound of the letter. This also helps adults to know whose object of reference it is.
- The chart is designed with as much involvement from the students as possible. It might contain information similar to that outlined below and should be made as attractive as possible on a visual and tactile level.

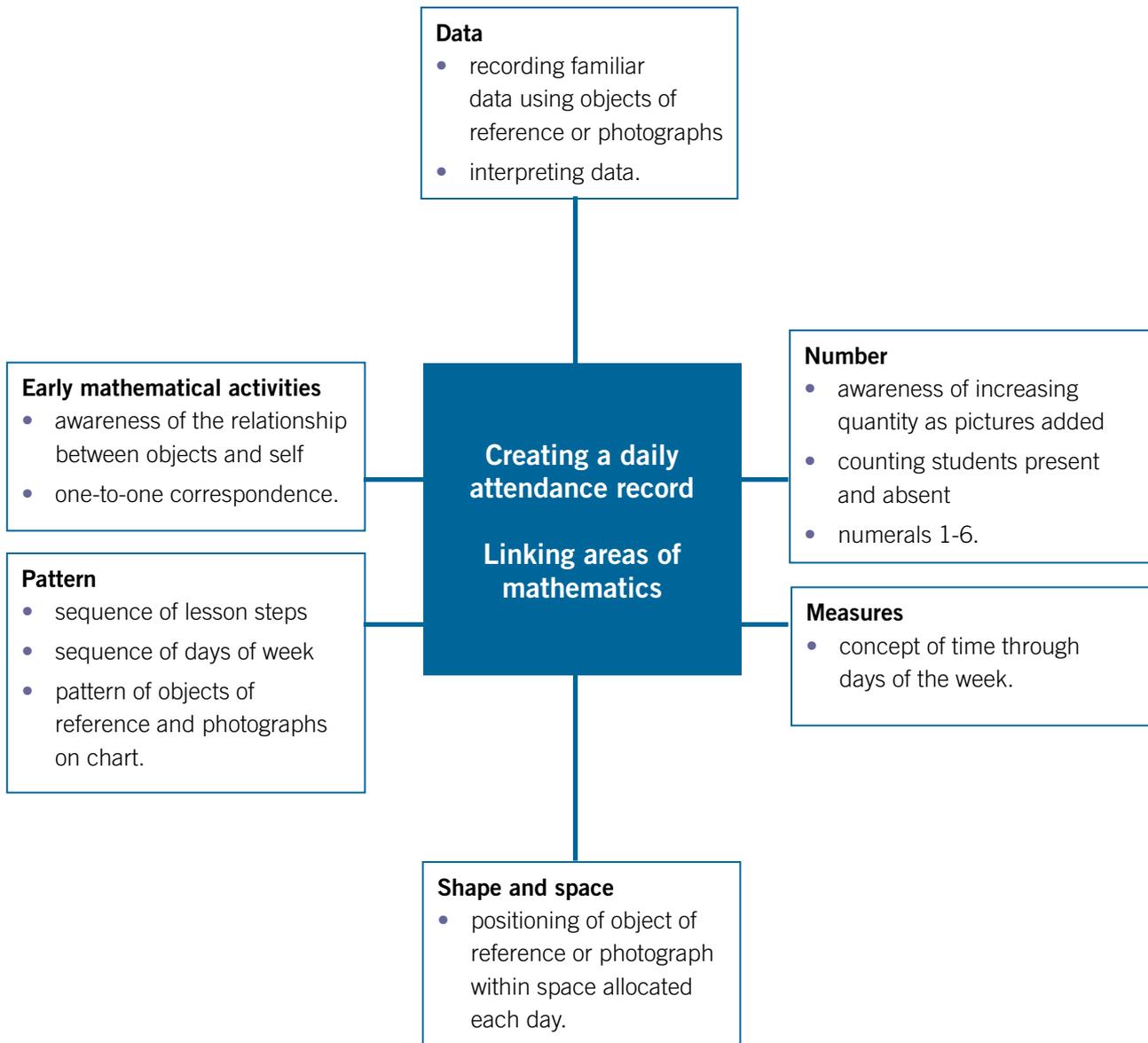
Daily attendance chart

Day of the week	Who is in school today?	How many students are here today?

Exemplar 3: Mathematics

Linkage within mathematics:

The following diagram shows how strands of mathematics can be linked in a lesson such as this.



Exemplar 3: Mathematics

Integration

- **Communication and language:** Showing a response, awareness of names of the students in class, names of the days of the week, the language of counting, awareness of representing himself/herself and other students with object of reference or picture.
- **Social, personal and health education:** Self-identity, identity of others, awareness of being part of a group.

Stages of the lesson

1. Link with a morning greeting session where each student is named and greeted. Students sit in a circle where they can see each other. As the greetings are carried out, or at the end of the greetings, each student is identified by an object of reference or by his/her clear photograph. Students should be given as much help as is needed to pick out his/her object of reference or photograph from an attractive box. These are held by the student, with help as necessary.
2. If a student is missing, attention is drawn to this. His/her object of reference or photograph is shown and their teacher says, *'Where is he/she?'*. After some looking and a simple discussion of where he/she is the object of reference or photograph is put back into the box.
3. The teacher then draws attention to the daily chart and introduces it in minimal language, for example *'We are going to show who is in school today'*. The day of the week is named and placed on the chart.
4. The teacher asks, *'How many students are here today?'*. Students are counted. A rhyme might be used to illustrate this.
5. The teacher asks, *'Is Mary in school today?'* and waits for agreed response. Mary is helped to put her object of reference or photograph on the chart.
6. When all students are represented, they are counted personally and then counted on the chart. Students are helped to relate the number of students present in reality to their representation on the chart.
7. Numerals are now produced, if this is appropriate to the students involved. (See suggestions on making numerals attractive in the Number strand). Depending to their ability levels, one student might be able to name and count the numerals that have been placed in order, another might pick out the correct numeral for today's attendance, and others might participate by looking at and feeling the appropriate numeral.
8. The chart is placed in a prominent place. It could be used functionally during the day to check that everyone is back in the classroom after an outdoor activity. A recap could be done at the end of the school day, and students could place their objects of reference/photographs back into the box just before they go home.