

Developing Early Mathematical Concepts

Early Mathematical Experiences	<p>As part of the transition into Reception, the provision should be planned to enable pupils to develop early mathematical concepts in classifying, matching, comparing and ordering. These experiences form the foundations for mathematics in Reception; helping pupils to identify and describe relationships.</p> <p>Pupils' experiences in classifying, matching, comparing and ordering should be explored through child-initiated learning, and developed thought incidental opportunities. Practitioners should plan the provision to enable pupils to explore these concepts in different situations and contexts. The role of the adult is to observe pupils in their play, assess their understanding of classifying, matching, comparing and ordering and to plan opportunities for pupils to develop these further.</p> <p>This document has been developed to provide examples that demonstrate what practitioners might observe in their pupils and to give suggested tasks for practitioners to plan from for pupils who do not demonstrate an understanding of these early mathematical concepts. These concepts do have clear links to each other and should be explored together where appropriate.</p>
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Classifying	<p><i>Early mathematical experiences in classifying should be planned to enable pupils to:</i></p> <ul style="list-style-type: none"> • <i>Classify objects based on one attribute</i> • <i>Identify the complement of a set</i>
Matching	<p><i>Early mathematical experiences in matching should be planned to enable pupils to:</i></p> <ul style="list-style-type: none"> • <i>Match equal sets using one-to-one correspondence</i> • <i>Match unequal sets using one-to-one correspondence</i>
Comparing	<p><i>Early mathematical experiences in comparing should be planned to enable pupils to:</i></p> <ul style="list-style-type: none"> • <i>Compare objects according to size</i> • <i>Compare sets without counting</i>
Ordering	<p><i>Early mathematical experiences in ordering should be planned to enable pupils to:</i></p> <ul style="list-style-type: none"> • <i>Order objects according to length or height</i> • <i>Order sets without counting</i>

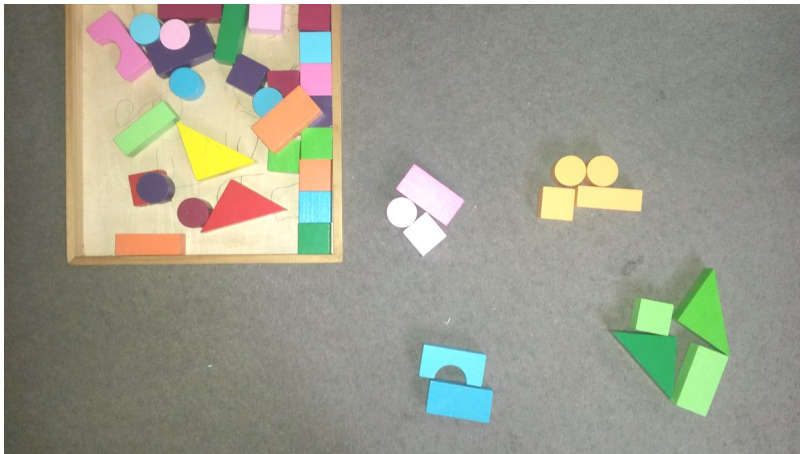
Classifying

The provision planned for pupils should ensure that pupils have many opportunities to sort and classify a variety of objects.

Pupils should have the opportunity to explore:

- Sorting a collection of objects based on one attribute.
- Adding similar objects to a set.
- Sorting objects into the complement of a set

Pupils who demonstrate an understanding of classifying may explore sorting objects in different areas of learning. Practitioners might observe pupils sorting objects according to colour, building towers with identical blocks, sorting coloured pencils into the pencil pot when tidying up, being able to arrange themselves into groups with an identified attribute such as pupils who are having school dinners.



*Harleen (4 years 3 months)
sorted some shapes according
to colour.*

*She picked up a red cuboid and
put it back.*

*When asked why she put it
back Harleen said "Because it's
red. Not pink, not orange, not
blue, not green."*

Practitioners should continue to plan the provision to ensure that there are opportunities to sort and classify objects through child-initiated learning. Guided tasks should also be planned, for pupils who don't demonstrate an understanding in classifying. Please use the suggested guided tasks and plan your own tasks based on your pupils, your provision and the resources available to make the experiences engaging and meaningful.

Classifying

Guided tasks: These examples of guided tasks are designed for teachers to plan from. Practitioners should explore opportunities for pupils explore classifying and sorting through the provision in meaningful situations.

Focus	Task
<p>Sorting a collection of objects based on one attribute.</p> <p>Adding similar objects to a set.</p>	<p style="text-align: center;">Undirected sorting</p> <p>Provide pupils with a sorting box that includes a range of materials and resources from the classroom such as: shells, bottle tops, interlocking cubes, toy cars, spoons, conkers, leaves.</p> <p>Ask pupils to sort some of the contents of their box in anyway that they choose. Encourage pupils to explain how the objects have been sorted and why.</p> <p>Once pupils have sorted some of the contents of the box in one way, ask pupils to sort them in another way.</p> <p><i>Note for practitioners:</i> <i>Teachers should provide a selection of materials and resources, the number of objects is optional. Pupils are not expected sort all of the contents of box in the beginning. This will develop through</i></p> <div style="text-align: right;"> </div>
<p>Sorting a collection of objects based on one attribute.</p> <p>Adding similar objects to a set.</p> <p>Sorting objects into the complement of a set</p>	<p style="text-align: center;">Forming sets (pupils and objects)</p> <p><i>Note for practitioners:</i> <i>The universal set is the complete set e.g. 'beads'. The set is a well-defined group of objects e.g. 'red beads'. The complement of a set are the objects that belong to the universal set but not the well defined set i.e. 'beads that are not red'. Pupils are not expected to use these terms. Pupils develop a deeper understanding when they explore sorting the same pupils or objects in different ways.</i></p> <p>Sorting pupils: Plan activities that involve sorting pupils into sets. Ensure that the criteria for sorting is well defined e.g. Pupils who are 4, Pupils who walked to school this morning, pupils who like tomatoes.</p> <p>For each example, highlight that the pupils who aren't in the set, aren't in the set because they... are not four, did not walk to school this morning, do not like tomatoes.</p> <p>Sorting objects: Provide pupils with the following toy vehicles in blue, yellow and red: motorbike, car, 6 wheeled lorry. Tell pupils that they are all vehicles and place them on an A3 piece of paper. Provide pupils with a sorting hoop and place it on the paper. Ask pupils to sort the vehicles in one way and explain how they have sorted them, highlighting the set and the complement of a set. Give pupils another vehicle and ask them where it will go on the paper and why.</p> <p>Repeat, asking pupils to sort the same vehicles in a different way.</p> <div style="text-align: right;"> </div>

Matching

The provision planned for pupils should ensure that pupils have many opportunities to match various objects in different contexts and for different purposes.

Pupils should have the opportunity to explore:

- Matching pairs of identical objects
- Matching pairs of related objects
- Matching objects in equal sets to identify whether there are the same amount or not
- Matching objects in unequal sets to identify whether there are the same amount or not

Pupils who demonstrate an understanding of matching may explore putting objects together for different purposes in different areas of learning. Practitioners might observe pupils matching pairs of identical objects such as sock or identical images, matching objects that go together such as coat on a peg, placing their name on their photograph or cups on saucers. There will be many incidental opportunities to explore matching to find out whether there are an equal amount or not e.g. matching pencils to the pupils in a group to see if there are an equal amount of pencils and pupils without counting them.


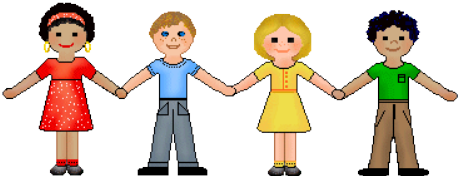





Sebastien (4 years 6 months) and Ethan (4 years 2 months) had the 'Rescue squad' puzzles. They sorted the pieces that go together for each vehicle before matching the pieces of the puzzle to complete each picture.

Practitioners should continue to plan the provision to ensure that there are opportunities to match identical and similar objects and to explore matching objects in sets through child-initiated learning. Guided tasks should also be planned, for pupils who don't demonstrate an understanding in matching. Please use the suggested guided tasks and plan your own tasks based on your pupils, your provision and the resources available to make the experiences engaging and meaningful.

Matching

Guided tasks: These examples of guided tasks are designed for teachers to plan from. Practitioners should explore opportunities for pupils explore matching through the provision and in meaningful situations.

Focus	Task
Matching pairs of identical objects Matching pairs of related objects Matching objects in equal sets to identify whether there are the same amount or not	<p style="text-align: center;">Matching identical objects</p> <p>Place some pairs of sock on a washing line and explain that they are muddled up. Ask pupils to match the pairs of sock. Discuss whether each sock has a pair. Play matching games such as matching identical images on cards.</p> <div style="text-align: right;">  </div> <p style="text-align: center;">Matching related objects (when equal)</p> <p>Place some fruit on the table and ask some pupils to sit at the table for snack time. Ensure there are the same number of fruit as pupils at the table. Ask whether there are enough fruit for each pupil to have one. Have we got too many, too few or just enough fruit? Select a pupil to give each pupil a piece of fruit to find out. Key vocabulary for discussions include: enough, not enough, too many, too few, more, fewer</p> <div style="display: flex; justify-content: space-around; align-items: center;">  </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;">  </div> <p>This task can be repeated using different resources when working with a group of pupils. For example, books for each pupil, pieces of paper and pencils etc.</p>
Matching pairs of related objects Matching objects in unequal sets to identify whether there are the same amount or not	<p style="text-align: center;">Setting the table</p> <p>Place some knives and forks on the table, making sure there are fewer knives than forks. Ask pupils to put a knife with each fork and discuss whether there are enough knives so that each fork has a knife. Key vocabulary for discussions include: enough, not enough, too many, too few, more, fewer</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Matching related objects (when unequal)</p> <p>The task 'setting the table' can be repeated using different resources for setting the table. For example, matching cups and saucers, straws and glasses etc.</p> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;">  </div> <p>The task 'setting the table' can be adapted using different resources in different areas of learning For example, matching buckets and spades in the sand tray, hanging aprons on pegs, pupils with small vehicles to ride.</p>

Comparing

The provision planned for pupils should ensure that pupils have many opportunities to compare various objects in different contexts and for different purposes.

Pupils should have the opportunity to explore:

- Comparing similar objects that differ in size
- Comparing similar objects that are equal size
- Comparing sets without counting

Pupils who demonstrate an understanding of comparing may explore comparing the size of objects without measuring and quantities without counting in different areas of learning. Language for comparing should be modelled correctly and reinforced.



Jessica (4 years 1 month) was getting breakfast ready for mummy and baby Eeyore.

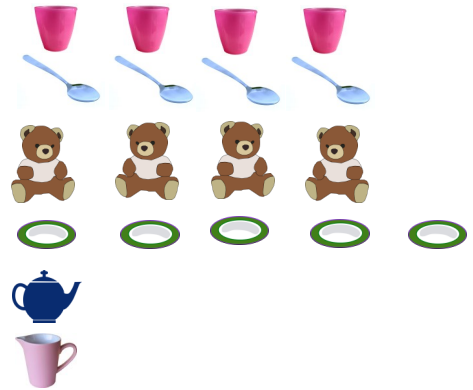


She gave the bigger stacking cup to the mummy for her bowl and the smaller stacking cup to baby for his bowl.

Jessica put an orange ball in each 'bowl' for the breakfast. She then swapped that balls over so that mummy had the bigger ball and baby had the smaller ball.

Practitioners should continue to plan the provision to ensure that there are opportunities to compare similar objects that are equal in size or in quantity and to compare similar objects that differ in size or quantity through child-initiated learning. Guided tasks should also be planned, for pupils who don't demonstrate understanding in comparing. Please use the suggested guided tasks and plan your own tasks based on your pupils, your provision and the resources available to make the experiences engaging and meaningful.

Comparing

Guided tasks: These examples of guided tasks are designed for teachers to plan from. Practitioners should explore opportunities for pupils explore comparing through the provision and in meaningful situations.

Focus	Task
Comparing sets without counting	<p style="text-align: center;">Tea party</p> <p>Tell pupils that they are going to have a tea party for a group of toys. Sit four toys around a picnic rug without counting them and show pupils what they have for preparing the picnic rug. Place five plates, four cups, four spoons, one teapot and one jug in no particular arrangement and without counting them. Ask pupils to sort the objects into sets and discuss how they have been sorted. Ask pupils to compare the set of cups with the set of spoons and find out whether there are more cups than spoons, fewer cups than spoons or the same amount of cups and spoons by matching them. Ask pupils to compare the set of plates with the toys to find out whether there are more or fewer plates than toys. Repeat with other objects for the tea party.</p> 
Comparing similar objects that differ in size	<p style="text-align: center;">Book shelves</p> <p>Place a selection of books on the carpet and explain that you want pupils to put the books away but not all books will fit on the shelf. Ask pupils to find out which books will fit on the shelf. Key vocabulary to explore: too tall, taller, shorter,</p> <p style="text-align: center;">Containers</p> <p>Comparing objects that differ in size can be explored in different areas of learning such as building sandcastles in the sand tray, comparing the capacity of containers in the water tray and comparing the height of towers tower using building blocks.</p> 
Comparing similar objects that are equal size	<p style="text-align: center;">Exploring containers</p> <p>Place buckets in the sand tray, that are identical in shape and size but that differ in colour e.g. red and grey Ask pupils to compare the buckets. Ask pupils to explore filling the red bucket and then ask pupils whether they can fill the grey bucket with the sand in the red bucket. Ask pupils to use the buckets to make sand castles and discuss whether they will be the same size or different.</p> <p>Pouring the contents from one container into another can also be explored using identical</p> 

Ordering

The provision planned for pupils should ensure that pupils have many opportunities to order objects without measuring and, to order quantities without counting them in different contexts and for different purposes.

Pupils should have the opportunity to explore:

- Ordering three objects according to size
- Ordering sets without counting

Pupils who demonstrate an understanding of ordering may explore comparing the size of objects such as containers, toy vehicles, toys people without measuring. Pupils may also compare quantities without counting in different contexts.



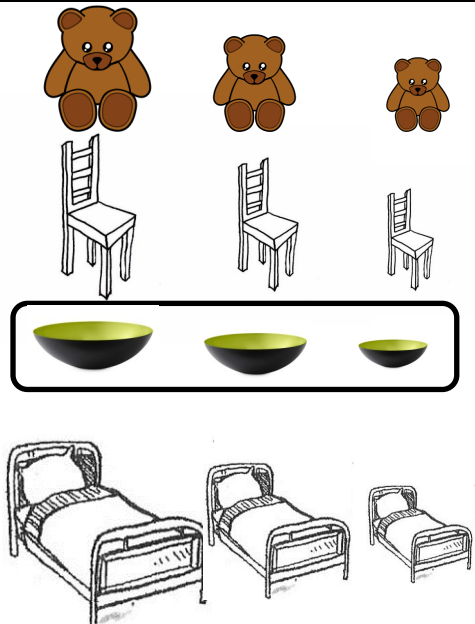
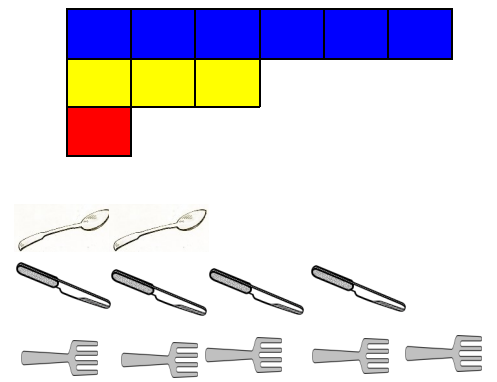
When working in the home corner, Khaled (4 years) set the table, placing the cups in a row. They were ordered according to height.

Khaled pointed to each cup in turn and said who the cup was for (Daddy, mummy, brother and baby)

Practitioners should continue to plan the provision to ensure that there are opportunities to order objects and to order quantities without counting through child-initiated learning. Guided tasks should also be planned, for pupils who don't demonstrate understanding in ordering. Please use the suggested guided tasks and plan your own tasks based on your pupils, your provision and the resources available to make the experiences engaging and meaningful.

Ordering

Guided tasks: These examples of guided tasks are designed for teachers to plan from. Practitioners should explore opportunities for pupils explore ordering through the provision and in meaningful situations.

Focus	Task
Ordering three objects according to size	<div style="text-align: center;"> <p>Goldilocks and the Three Bears</p> <p><i>This task is planned, based on the story of Goldilocks and the Three Bears in the home corner. Practitioners could plan similar tasks based on a different theme and / or based on a different area of continuous provision.</i></p> <p>Tell pupils that you want them to help you to get the home corner ready for the three bears. Show three bears that differ in size and talk about which bear is daddy, mummy and baby. Ask pupils to put the bears in order from the biggest bear to the smallest bear.</p> <p>Have the following prepared: three bowls that differ in size, three chairs that differ in size and three beds that differ in size.</p> <p>Ask pupils to place the chairs in order of size along the table from the biggest to the smallest.</p> <p>Sit the bears at the table.</p> <p>Ask pupils to place the bowls along the table from the biggest to the smallest, talking about which bear each bowl belongs to.</p> <p>Create an area for the bedroom and ask pupils to place the beds in order according to size, again discussing which bear will sleep in which bed.</p> </div> <div style="text-align: right; margin-top: 20px;">  </div>
Ordering sets without counting	<div style="text-align: center;"> <p>Interlocking cubes</p> <p>Provide pupils with some interlocking cubes in three different colours e.g. 1 red, 3 yellow and 6 blue. Ask pupils to sort the cubes according to their colour.</p> <p>Ask pupils to use the cubes in each set to make three different towers, one tower in each colour.</p> <p>Ask pupils to compare the towers and put them in order without counting them.</p> <p>Discuss which tower has most cubes, which tower has fewest cubes etc.</p> <p>Matching and comparing sets</p> <p>Provide pupils with related objects sorted into sets e.g. 2 spoons, 4 knives and 5 forks.</p> <p>Ask pupils to match the related objects to find out whether they can make sets with one knife, one fork and one spoon in it. Discuss which they have the most of and which they have the fewest of.</p> <p>Ask pupils to sort the objects into three sets: knives, forks, spoons and to place the sets in order.</p> </div> <div style="text-align: right; margin-top: 20px;">  </div>