
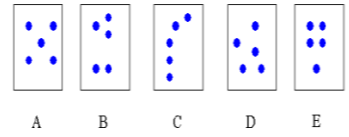
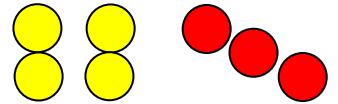






Progression in Number Sense

Concrete: Abstract: Visual

<p>Number sense: nrich.maths.org :: Mathematics Enrichment :: Number Sense Series: Developing Early Number Sense</p> <p>nrich.maths.org :: Mathematics Enrichment :: Number Sense Series: A Sense of 'ten' and Place Value</p>	<p>Models and images</p>
<p>Learning to count with understanding is a crucial number skill, but other skills, such as perceiving subgroups, need to develop alongside counting to provide a firm foundation for number sense.</p> <p>To begin with, early number activities are best done with moveable objects such as counters, blocks and small toys.</p>	<p>Concrete models</p> <p>Random arrangements that can be counted. Random arrangements that can be 'subitised' e.g. 5 beads and 2 beads. Linear arrangements, such as a bead string</p> 
<p>By simply presenting objects (such as stamps on a flashcard) in various arrangements, different mental strategies can be prompted.</p> <p>After the essential experiences of practical apparatus more static materials such as 'dot cards' become very useful.</p>	<p>Abstract – Counting ITP</p> <p>Which are instantly recognised and which are counted?</p> 
<p>If mental strategies such as these are to be encouraged (and just counting discouraged) then an element of speed is necessary. Seeing the objects for only a few seconds challenges the mind to find strategies other than counting. It is also important to have children reflect on and share their strategies.</p>	<p>Combining – Counting ITP</p> <p>Recognising the 4 and then the 3, combining this to make 7. Counting on from 4 rather than counting all 7.</p> 


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Learning focus	Concrete	Abstract
<p>Distinguish between quantities; recognise when a group of objects is more than one</p>	<div style="text-align: center;">   </div> <p>Provide opportunities through play for children to identify sets containing 'only one' object and those containing more than one.</p> <p>One bear all alone You will need: small plastic bears or other objects, opaque plastic cups or bowls Place three or four bowls upside down on a table. Place a single bear under one of the bowls and different quantities of bears under the others. Invite children to help you. Tell the children that you are looking for the lonely bear, the one all on its own. Ask the children to take turns to turn over a cup or dish, encouraging them to describe what they have found. Use prompts and questions such as: <i>Tell us what you have found. Have you found one bear or more than one?</i> Encourage children to take the bears that they find and to place them in a line in front of them. Prompt children to compare the number of bears that they have, by asking questions such as: <i>Do you think that Max or Evie found more bears? How could we check?</i></p>	<p>Use published pictures and photographs of every day objects recognisable to the children (both inside and outside of the classroom) that show only one object and more than one.</p> <p>For example: fruit, animals, cars</p> <div style="text-align: center;">   </div>


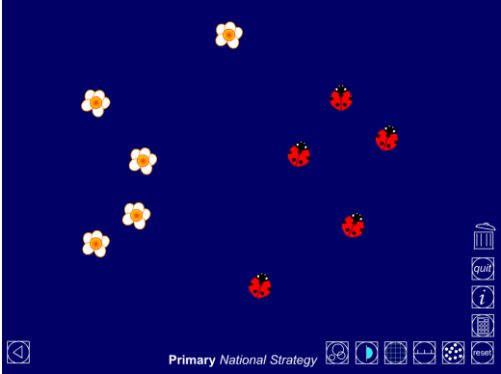
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	<p>Invite the children to play again by placing their bears back under a cup. The child who found the lonely bear could mix the cups around before you play again.</p> <p>Taking ideas further: Provide appealing objects and containers for children to use in their play. Ensure that you provide some containers with lids to encourage children to guess which or how many objects may be inside.</p>	
<p>Recognise groups with one, two or three objects</p>	<p>Subitising with objects. For example, provide equipment that has to be counted e.g. matches, multilink and counters. Children then count out 1, 2 and 3 from each set of objects.</p> 	<p>Any activity that uses images of one, two or three objects. For example: One, two or three? You will need: three hoops, number cards 1, 2 and 3, some photographs of objects normally found individually or in pairs, images of groups of three objects, a camera</p> <p>Place a couple of cards or objects into each hoop so that one hoop contains individual objects (such as a photograph of a nose, a bin), a second contains objects normally found in twos (such as a photo of two eyes, a pair of socks) and the third contains images of objects in groups of three (such as wheels on a tricycle, legs on a three-legged stool, triplets).</p> <p>Invite children to help you to add to the display. Encourage them to look at the objects in each hoop so far and to suggest how you have sorted the objects. If no one suggests that you have sorted them by number, show children the number cards 1, 2 and 3 and say that these cards could be used to label the hoops. <i>Which number goes with which hoop? Why?</i></p> <p>Encourage children to go for a walk (in pairs or a small group), inside and outside, to find other items that could be added to the display. Explain that if children cannot bring the actual objects, they can</p>



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		<p>make a drawing or use the camera to take a photograph. Walk around with children, observing if they can instantly identify whether sets contain one, two or three items.</p> <p>Taking ideas further: Play 'Odd one out', asking children to close their eyes while you move an object from one of the hoops to another. Can the children identify which object you have moved?</p>
<p>Match and compare the number of objects in two sets, recognising when the set contains the same number of objects.</p>	<p>Provide opportunities for children to compare two sets of objects through malleable play. (page 9 of enabling environments)</p>  <p>Find five You will need: hoops or plates, five each of three interesting objects (to hide) Show children objects that you have chosen to hide and explain that there are five of each of these hidden around the building, inside and outside. Invite children to go on a hunt to find the hidden objects. Suggest that as soon as they find an object, they bring it back and place it on the table or floor. Encourage children to hunt in pairs so that they can discuss their ideas. Observe and listen to children as they hunt. Discuss the hunt with children, for example: <i>I can see that you have found two key-rings. Have you found anything else?</i> After a while, call children together by the pile of objects to look at what has been found so far. Lead a discussion about what has been found. Use prompts such as:</p> <ul style="list-style-type: none"> ● <i>Could we organise the objects to see clearly what we have</i> 	<p>Counting ITP: Use counting ITP to compare 2 sets of objects.</p> 

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	<p><i>found so far?</i> (Use hoops or plates to sort the objects.)</p> <ul style="list-style-type: none"> ● <i>How many stars have we found?</i> ● <i>Can you show me this number on your fingers?</i> ● <i>Have we found all of them yet?</i> ● <i>Which object have we found least of (or most of) so far?</i> <p><i>How do you know?</i> Encourage children to hunt for the remaining objects until they are all found.</p> <p>Taking ideas further: Change the number of each object hidden. Ask children if they can work out how many of each object they still need to find.</p>	
<p>Instantly recognise without counting familiar patterns of up to six objects.</p>	<p>Use apparatus such as dice, playing cards and dominoes which have a structured pattern for instantly recognising a number and get children to replicate using counters.</p> <div style="text-align: center;">  </div> <p>Make dominoes You will need: sticky dots, rectangular cards in different colours, cut into domino-shaped cards with a central line Invite children to make their own sets of dominoes with up to four dots in total. Encourage children to explain what dominoes look like. Give children different-coloured card. Explain that you are going to start by making all of the different</p>	<p>Use pelmanism memory game to match familiar patterns of up to six objects.</p> <div style="text-align: center;">  </div>

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	<p>dominoes that you can that use only one dot altogether. Ask everyone to have a go at making a domino that has only one dot. Make a domino yourself so that you can model the use of mathematical language, for example: <i>I have one dot. I am going to place it on this side of my domino.</i> Compare children's examples. Show that it doesn't matter which side you stick the dot by turning the dominoes around.</p> <p>Next make dominoes that have two dots. Encourage children to discuss what they are doing and to compare their dominoes. Use prompts such as:</p> <ul style="list-style-type: none"> ● <i>You have taken two sticky dots. Where are you going to stick them now?</i> ● <i>Paul and Sam's dominoes look different. Why? Do they both have two dots altogether?</i> <p>Encourage children to make sure that they have all possible ways of using the dots each time. Where necessary, use questions such as: <i>Sam, you have made a two-dot domino with both dots on the same half of the domino. How could you put two dots onto this domino so that they are not on the same half?</i></p> <p>Continue until children have made all possibilities up to a total of four dots. Encourage them to look at the sets they have created. Ask questions such as:</p> <ul style="list-style-type: none"> ● <i>Can you find all of the dominoes with three dots on one half?</i> ● <i>Who can describe the way that the dots are organised on this domino?</i> ● <i>How many dots altogether are there on this domino?</i> <p>Taking ideas further: Children could play games with their sets of dominoes.</p>	
Instantly recognise, without counting, organised and	Practical Subitising with numbers greater than 6, but within the counting experience of the child.	Counting ITP Opportunities for children to recognise random

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random arrangements of small numbers of objects

Bead strings, coins, counters, straws, matchsticks can all be used to set up arrangements using the familiar patterns previously explored (using dice, dominoes and playing cards), linear arrangements (beads) as well as random arrangements.



Going dotty

You will need: 3 x 3 squared paper (to use to make dot patterns for numbers), sticky dots to fit into the squares, a dotty dice

Invite children to help you make cards to play a game. Ask children to show you the face of the dice that has six dots on it. Encourage children to consider the pattern of the dots. Use prompts such as: *How did you recognise so quickly that this face has six dots? What is special about the pattern?* Respond to comments, reinforcing mathematical vocabulary, for example: *Jamie said that the dots are in two lines. How many dots are in each line? The six dots are in two rows (pointing), with three dots in each: one, two, three... one, two, three.* Ask each child to take a piece of squared paper and some sticky dots and make the same pattern of six dots. Encourage them to talk about what they are doing. Use prompts such as: *How many dots have you stuck down so far? What are you going to do next?*

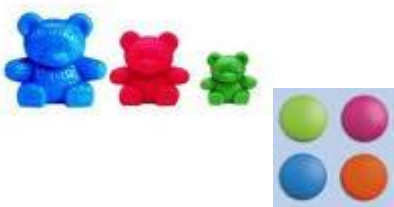
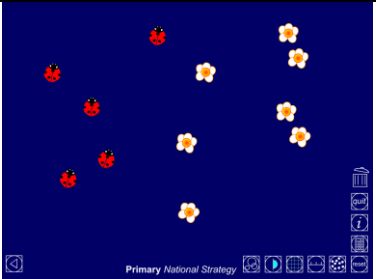
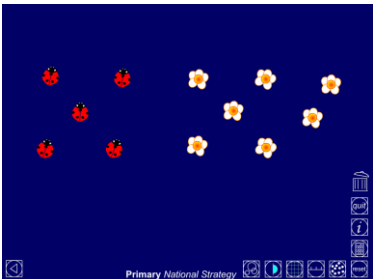
Show children a different arrangement of six dots and ask them how many dots they can see. Establish that there will be lots of ways to organise six dots onto squared paper. Ask each

and organised arrangements.



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	<p>child to try to find a different arrangement. Work together in a similar way to produce different patterns of five, four and three dots and use them in a game. Place the patterns in the middle of the table, face down. Then children take turns to select two patterns. If they show the same number of dots then they keep the pair. Taking ideas further: Use the cards for similar matching games such as snap.</p>	
<p>Use the skills of subitising to combine two sets of objects with or without counting in the range of 1-10.</p>	<p>Work with two sets of objects that children arrange into recognisable formations. Are children able to say how many there are altogether?</p> <div style="text-align: center;">  </div> <p>Combining boxes You will need: boxes containing different numbers of items (each labelled with the number of items inside), number cards to 20 or blank labels Pick two boxes and show them to the children. Ask what they think the number on each box tells them. Check by asking children to count the objects in each box. Explain: <i>We are going to put the objects from these two boxes together. We need to work out how many objects that will give us altogether. How could we do that?</i> Encourage children to suggest different methods and try them. Include counting on</p>	<div style="text-align: center;">  <p>Random to recognisable patterns for addition.</p>  </div>

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	<p>methods, for example: <i>There are eight objects in this box and three in the other. Let's add the three objects into this box. Ask children to count aloud as each object is dropped in, giving the total number of objects in the box so far: We started with eight, that's nine, ten, eleven. How many objects are there altogether? Write the total on a sticker.</i></p> <p>Ask children to work in pairs, to choose two boxes and combine the objects into one box, working out the total to record on the box. Observe how children go about this.</p> <p>Taking ideas further: Carry out similar subtraction activities, taking some items from one box to put into another and working out how many objects are left in the first box.</p>	
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