Area of Learning: Shape Space and Measures

Concept: **Measures**

Mathematically, measuring is based on the idea of using numbers of units in order to compare attributes, such as length or capacity. Although young children engage with using rulers and experience being measured in centimetres, kilos – and years! – the measuring units themselves are hard to understand. Children need to realise which attribute is being measured, e.g. weight as opposed to size, and the idea of conservation: that the amount stays the same, even if the appearance alters, e.g. if dough is stretched out or in bits. In order to understand units, they need to realise that two items can be compared using a third item, or 'go between', such as a stick. Finally, children need to understand how equal size units are used repeatedly to express an amount as a number. While young children can engage actively in making comparisons and exploring equivalence of length, volume, capacity and weight in different ways, some of these ideas are challenging and will develop later in primary school. For instance, weight (mass or density) is difficult to distinguish from size since it is invisible, and the concept of conservation is harder to understand for weight and capacity. Measuring with non-standard units of different sizes in order to appreciate the need for equal units is less effective with younger children, so centimetre cubes are recommended as accessible units. While time is also elusive to measure, young children can sequence events and, for example, count 'sleeps'. (Money as a measure of value is too advanced to consider here.)

Typical progression within this concept		**Recognising attributes**	**Comparing amounts of continuous quantities**	**Showing awareness of comparison in estimating and predicting**	**Comparing indirectly**	**Recognising the relationship between the size and number of units**	**Beginning to use units to compare things**	**Beginning to use time to sequence events**	**Beginning to experience specific time durations**
Progression steps to enable typical progression within this concept	0 to 3	I can fill and empty containers.	I can attempt, sometimes successfully, to fit shapes into spaces on inset boards or jigsaw puzzles.	I can compare sizes, weights etc. using gesture (e.g. pointing or picking up) or language to indicate bigger, smaller, high, low, heavy, light					
		I can build with a range of resources	I can squeeze myself into different types of spaces.						
	3 to 4 years	I can describe use size words to describe the things I see.	I can use the phrases 'too much' and 'not enough' when filling containers.	I can put things away in their correct boxes – understanding that these are the right size for the object.	I can play with a variety of different sized toys when filling/emptying containers.	I know it takes longer to count out a box full of tiny objects compared to the same box filled with large objects.	I can make everyday objects larger or smaller. e.g. how can you make that puddle bigger? When you squeeze that sponge does it stay small? What happens when you stretch the dough?	I can describe a familiar route e.g. where I walk to get to nursery	
		I can use weight words to describe the things I hold.	I can describe something as 'longer' or 'shorter' when two objects of vastly different length are laid next to each other.					I can begin to describe a sequence of events, real or fictional, using words such as 'first' and 'then'	

		I can use capacity words to describe how full something is.	I can describe something as heavier or lighter when two objects of vastly different weights are compared.						
	Reception		I can find out which container will hold more than another container.	I can predict/estimates related to capacity e.g. which container would need to be used to carry these items? What could we fit in here? Etc.	I can order at least 3 items from smallest to biggest. .	I can compare filling a container with fluid or objects using small, medium sized and large containers.	I can make a tower of blocks that is the same height, taller and smaller than myself.	I can order and sequences important times during the day.	I can talk about how many 'sleeps' there are before an event such as a birthday or Christmas.
			I know that a balance scale will be lower on the side where the object is heavier.	I can make estimates related to distance e.g. how far I think a tire will roll, how many construction toys will be needed to span an area, etc.	I can order at least 3 items from heaviest to lightest	I can compare creating a tower with small, medium sized and large objects.	I can compare a tower of multilink to an object and describe if it is the same size, longer/bigger or smaller/shorter.	I know and understand the words 'before', 'after', 'next', and the relative terms 'yesterday' and 'tomorrow'.	I am able to measure how long an activity takes in simple ways e.g. by counting, by using a simple timer etc.
					I can order at least 3 items by capacity.	I can use a balance scale to compare somethings weight using small, medium sized and large objects.	I can measure the length of objects using various measuring apparatus such as apples, multilink, metre sticks etc.	I know what the days of the week are.	I am beginning to understand the concept of minutes by being timed to do as many actions as possible in a certain number of minutes.
					I can help to solve everyday problems that involve comparisons of size, weight and capacity.				

Guidance from NCETM progression document									