

## KS4 Maths

### Measure: Capacity and Weight

#### Capacity

<b>Subject curriculum intent:</b>	<p>We want our students to be able to develop functional measure skills to be as independently as possible. Depending on the cognitive ability of our pupils, they will begin to measure capacities in non-standard and standard measurements. Depending on the cognitive ability of the pupil, our intention is that pupils are able to use and apply measuring skills in every day 'life skills' such as measuring liquid ingredients when cooking for themselves.</p> <p>We want pupils to use and apply number skills such as addition, subtraction, multiplication and division when problem solving during measuring.</p> <p>Students will</p> <ol style="list-style-type: none"><li>1. develop <b>fluency</b> in the fundamentals of mathematics so that they are efficient in using and selecting the appropriate strategies to <b>use measurement skills</b> including mental methods, underpinned by mathematical concepts</li><li>2. can <b>solve problems by</b> applying their mathematics to a variety of problems with increasing sophistication, including in unfamiliar contexts and to model real-life scenarios</li><li>3. can <b>reason mathematically</b> by following a line of enquiry and develop and present a justification, argument or proof using mathematical language.</li></ol> <p><b>In all math lessons, teachers plan engaging lessons with the aim that pupils:</b></p> <ul style="list-style-type: none"><li>• master skills in maths which they are then able to apply to a range of contexts within the school and home context</li><li>• embed their new skills and understanding to a range of contexts; thus supporting application and progress in learning</li><li>• acquire core mathematical skills to support their independence as they progress through the school</li><li>• are able to apply their understanding; supporting them in other areas of the curriculum</li></ul>	
<b>End of KS3 intent/outcome</b>	<b>End of KS4 intent/outcome</b>	<b>End of KS5 intent/outcome</b>
Students will be introduced to the key vocabulary linked to the topic. Students will be able to use jugs to make and compare different capacities. When ready, students will be asked to order jugs based on their capacities. Some students will measure in non-standard units and some in millilitres .	Students will continue to build on their learning from KS3. Students will be able to use a variety of resources to make and order capacities. Students will be more confident in using equipment to measure in millilitres and litres. Students will use and apply their knowledge into a variety of different settings, such as within their café baking lessons.	Students will continue to build on their KS4 knowledge. Students will continue to use measuring equipment to measure and order capacities and will then apply this knowledge in a variety of contexts. They will do this confidently in their workplace setting such as the café, self-catering and bespoke cooking.

Students will develop early skills in measuring capacities accurately e.g. eye level to the jug and pouring slowly.	Students will develop early problem-solving skills when measuring liquids e.g. knowing when to add more or take some away until they have the correct amount.	Students will be able to select the most efficient and accurate equipment that they need to measure before undertaking tasks.  Students will confidently use and apply number skills to problem solve.
Intent for this topic:	This half term, pupils will develop their measurement skills through the topic 'capacity'. They will develop an understanding of how to measure and compare a range of capacities e.g. non-standard, millilitres and litres. They will begin to understand how measuring skills can be applied in other areas of the curriculum such as cooking. They will develop their early measuring skills, including accuracy, that can developed as they move into KS4 and KS5.  Within this topic, pupils will also use and apply other mathematical skills such as addition, subtraction, multiplication and division.	
Key vocabulary taught within this topic:	Measure, capacity, liquid, millilitre, litre, ml, l, fill, empty, pour, more, less, container, full, jug, beaker	
Links to other subjects:	<ul style="list-style-type: none"> <li>- Food technology</li> <li>- Café baking</li> </ul>	

**Measurement: Capacity**

	B2 progression step 5	B2 progression step 6-8	B2NC step 1c-1b	B2NC Step 1b-2c	B2NC Step 2c-2a	B2NC Step 2a-3a
<p><b>Subject specific knowledge</b></p> <p><b>What do pupils need to know?</b></p>	<p><b>To know</b> key words: fill and empty</p> <p><b>To know</b> when a container is full or empty</p>	<p><b>To know</b> key words: full, half full and empty</p> <p><b>To know</b> when to stop pouring once a container is full.</p> <p><b>To know and understand</b> that the 'bigger' the container, the more it holds</p>	<p><b>To know</b> how to use non-standard units (cups) to measure the capacity of a container</p> <p><b>Begins to know</b> that the width of the container can alter how much it holds.</p>	<p><b>To know</b> a measuring jug measures liquids</p> <p><b>To know</b> liquid is measured in ml and l</p> <p><b>To know</b> how to use a measuring jug accurately: go to eye level and pour slowly.</p>	<p><b>To know</b> litres are bigger units that millilitres</p> <p><b>To know</b> 1 litre is made of 100 millilitres</p>	<p><b>To know</b> and understand what measures are between increments on a measuring jug</p> <p><b>To know</b> which measuring jug is most appropriate to measure a liquid based on how much is needed e.g. 10ml v 150ml</p>

<p><b><u>Subject</u></b> <b><u>specific skills</u></b></p> <p><b>What do pupils need to be able to do?</b></p>	<p><b><u>Is able to respond</u></b> to key words fill and empty by pouring or emptying liquids from a container</p> <p><b><u>Is able to sort</u></b> containers into full or empty categories.</p>	<p><b><u>Is able to stop</u></b> pouring when the container is half full or full when asked.</p> <p><b><u>Is able to order</u></b> capacities for: empty, half full and full.</p> <p><b><u>Is able to sort</u></b> capacities based on: empty, nearly empty, half full, nearly full and full.</p> <p><b><u>Is able to apply</u></b> pouring skills in context independently e.g. getting them self a drink</p>	<p><b><u>Is able to record</u></b> how many 'cups' of water a container holds</p> <p><b><u>Is able to calculate</u></b> how much more or less water a container holds than another</p> <p><b><u>Is able to predict</u></b> how much water a container will hold (non-standard units)</p>	<p><b><u>Is beginning to use a</u></b> measuring jug by reading the numbers in ml and attempting to measure this out with some accuracy</p>	<p><b><u>Is able to</u></b> confidently measure liquids in ml</p> <p><b><u>Is able to use</u></b> and apply measuring skills when following a recipe</p>	<p><b><u>Is able to use and</u></b> apply measuring skills with a range of measuring beakers</p>
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Suggested teaching activities

How should I teach this?

Practical and engaging activities:



- Have different width containers. Problem solve. Which holds the most liquid?
- Making fruit juices
- Mixing coloured water (links with primary and secondary colours)
- Look at different measuring equipment. Which will give the most accurate measurement?
- Addition and subtraction number sentences with capacity.
- Use coloured water, rice, sand or beads to represent different capacities
- Following and reading recipes
- Reading capacities of every day food items e.g. tin of beans, milk, soup etc. What items do they have at home?

## Weight

<p><b>Subject curriculum intent:</b></p>	<p>We want our pupils to be able to develop functional measuring skills so that they can be as independent as possible in their adulthood. Depending on the cognitive ability of the pupil, our intention is that pupils are able to use and apply weighing skills in every day 'life skills' such as weighing ingredients when cooking for themselves.</p> <p>We want pupils to use and apply number skills such as addition, subtraction, multiplication and division when problem solving during weighing.</p> <p>We want our pupils to...</p> <ul style="list-style-type: none"> <li>-</li> <li>1. develop <b>fluency</b> in the fundamentals of mathematics so that they are efficient in using and selecting the appropriate strategies to <b>use measuring skills</b> including mental methods, underpinned by mathematical concepts</li> <li>2. can <b>solve problems by</b> applying their mathematics to a variety of problems with increasing sophistication, including in unfamiliar contexts and to model real-life scenarios</li> <li>3. can <b>reason mathematically</b> by following a line of enquiry and develop and present a justification, argument or proof using mathematical language.</li> </ul> <p><b>In all math lessons, teachers plan engaging lessons with the aim that pupils:</b></p> <ul style="list-style-type: none"> <li>• master skills in maths which they are then able to apply to a range of contexts within the school and home context</li> <li>• embed their new skills and understanding to a range of contexts; thus supporting application and progress in learning</li> <li>• acquire core mathematical skills to support their independence as they progress through the school</li> <li>• are able to apply their understanding; supporting them in other areas of the curriculum</li> <li>•</li> </ul>	
<p><b>End of KS3 intent/outcome</b></p> <p>Students will be introduced to the key vocabulary linked to the topic. Students will be able to use balancing scales to identify and compare weights.</p> <p>Some pupils may begin to use non-standard or standard units to weigh items using a balance scale.</p>	<p><b>End of KS4 intent/outcome</b></p> <p>Students will continue to build on their learning from KS3. Students will further develop their skills in weighing in grams and kilograms. They will further develop their problem-solving skills and will develop more confidence in using and applying number skills when weighing (addition and subtraction).</p>	<p><b>End of KS5 intent/outcome</b></p> <p>Students will continue to build on their KS4 knowledge and skills. Students will be confident in measuring in grams and kilograms. They will be able to use and apply weighing skills within their self-catering lessons, cup &amp; cake café and bespoke cooking lessons.</p> <p>They will further develop their problem-solving skills and will develop more confidence in using and</p>

<p>Some pupils will understand when they need to add or subtract the changing weight to balance the scales.</p> <p>Students will begin to use and apply early measure skills within their food technology lessons where appropriate.</p>	<p>Students will use digital scales to begin to recognise weights in grams and will use and apply these skills within their café baking lessons.</p>	<p>applying number skills when weighing (addition, subtraction, multiplication and division).</p>
<p>Intent for this topic:</p>	<p>This half term, pupils will develop their measurement skills through the topic 'weight'. They will develop an understanding of how to measure and compare a range of weights e.g. non-standard, grams and kilograms. They will begin to understand how weighing skills can be applied in other areas of the curriculum such as cooking. They will develop their early measuring skills, including accuracy, that can developed as they move into KS4 and KS5.</p> <p>Within this topic, pupils will also use and apply other mathematical skills such as addition, subtraction, multiplication and division.</p>	
<p>Key vocabulary taught within this topic:</p>	<p>Measure, weight, heavy/light, heavier/lighter, unit of measure, grams, kilograms, g, kg, digital scale, balance scale</p>	
<p>Links to other subjects:</p>	<ul style="list-style-type: none"> <li>- Cook-It</li> <li>- Food technology</li> </ul>	

**Measurement: Weight**

	<u>B2 progression step 5</u>	<u>B2 progression step 6-8</u>	<u>B2NC step 1c-1b</u>	<u>B2NC Step 1b-2c</u>	<u>B2NC Step 2c-2a</u>	<u>B2NC Step 2a-3a</u>
<p><b><u>Subject specific knowledge</u></b></p> <p><b>What do pupils need to know?</b></p>	<p><b><u>To know/show</u></b> it takes more effort to move an item that is <b>heavy</b></p> <p>e.g. push harder to move, only be able to hold one object at a time</p> <p><b><u>To know/show</u></b> it takes more effort to move an item that is <b>light</b></p>	<p><b><u>To know</u></b> key words: heavy/light</p> <p><b><u>To know</u></b> the size of object does not always determine the weight e.g. bigger does not always mean heavier</p>	<p><b><u>To know</u></b> what a balance scale is and how to use it</p> <p><b><u>To know</u></b> the side of the balance that touches the table = heaviest and the side that lifts = lightest</p> <p><b><u>To begin to know</u></b> how to use non-standard units to measure</p>	<p><b><u>To know</u></b> how to use a digital scale to measure weight</p> <p><b><u>To know</u></b> we measure weight in grams / kilograms</p>	<p><b><u>To know</u></b> which is the correct standard unit for a measurement e.g. mm,cm,m,g,kg etc</p> <p><b><u>To know</u></b> how many grams are in a kilo</p>	<p><b><u>To know</u></b> how to break down a worded problem related to measure</p>

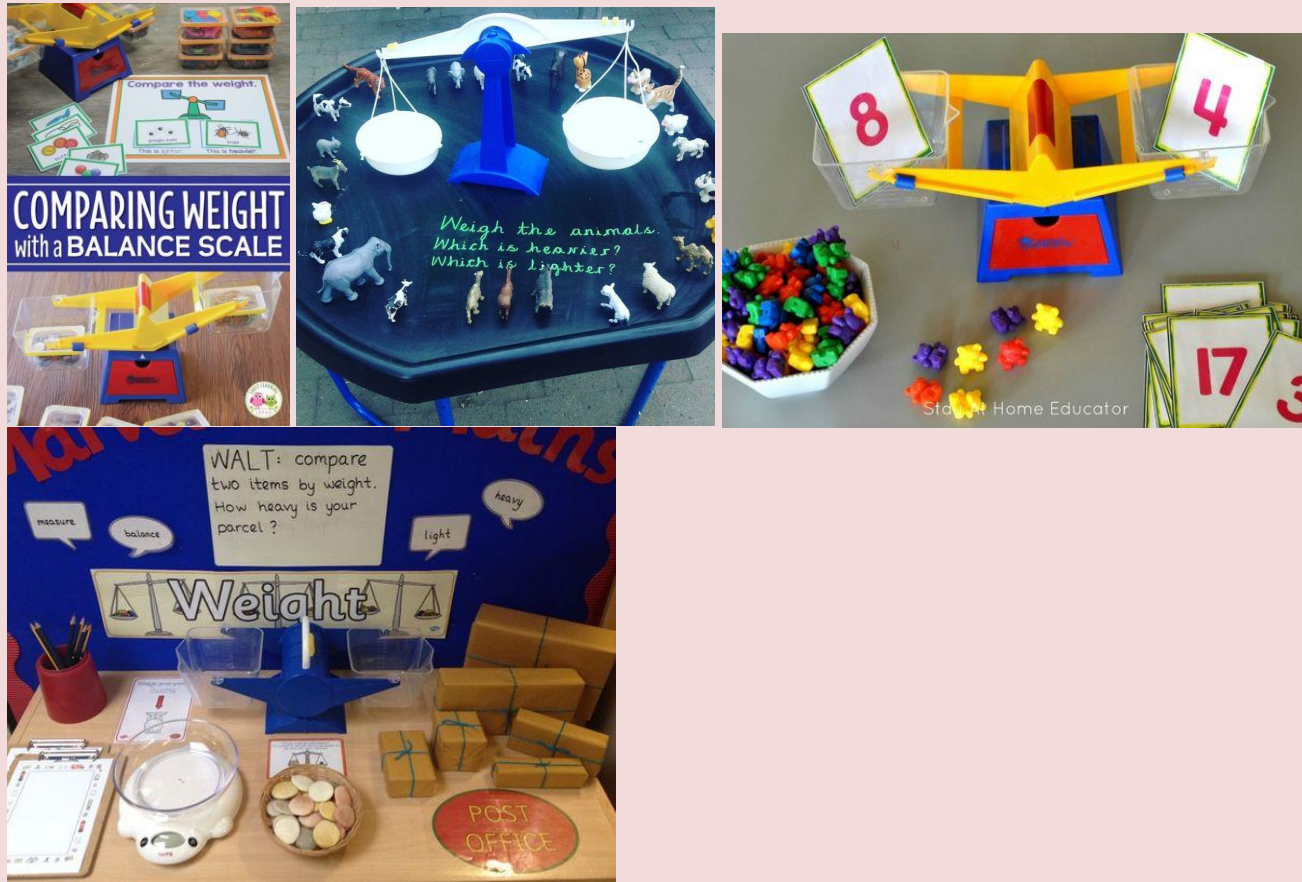
	e.g. carry more objects, minimal effort to move or handle		objects using a balance scale			
<b><u>Subject specific skills</u></b>  <b>What do pupils need to be able to do?</b>	<b><u>Is beginning to</u></b> sort items into heavy and light from touch and feel alone; recognising a clear difference	<u>Is able to</u> use every day language to talk about weight in context and through play  <b><u>Is beginning to</u></b> compare and describe weights of objects using heavy/light or heavier/lighter	<u>Is able to</u> use a balance scale to aid comparative vocabulary independently  <u>Is able to</u> predict which object will be heavier/lighter and then use the balance scale to check independently.  <u>Is able to</u> add measuring cubes to a balance scale, beginning to understand when to stop adding when the scale is balanced	<u>Is able to</u> measure amounts in grams (e.g. flour)  <u>Is able to</u> problem solve if they do not have enough or too much of what is being measured e.g. add more or take away	<u>Is able to</u> use and apply addition/subtraction skills to problem solve how many more or less is needed to get to the desired weight  <u>Is able to</u> compare and order weights (use and apply number skills)	<u>Is able to</u> solve worded problems related to measure.  <u>Is able to</u> use and apply measure skills in everyday situations confidently e.g. measuring in cooking



**Suggested teaching activities**

How should I teach this?

**Practical and engaging activities:**



- Use unifix as a non-standard unit to weight items with a balance scale
- Use unifix and balance scales to connect numbers to weights
- Predict and then measure the weight of parcels.
- Investigate: Is the biggest object always the heaviest?
- Doubling / halving weights
- Adding and subtracting weights
- Ordering the weight of objects. Predict and then measure.
- Look at food items they usually have in their home. Read in grams / kilograms

**Suggested flow:**



This flow is to be used as a guide. Teachers to adapt the flow to meet the needs and abilities of students within their class.

<b>Week 1</b>	<b>Week 2</b>	<b>Week 3</b>	<b>Week 4</b>	<b>Week 5</b>	<b>Week 6</b>
<p><u>Capacity</u></p> <p>Recap: capacities. Have a look at every day ingredients. Which holds more? How do we know?</p> <p>Reading and ordering capacities using measuring tools.</p>	<p><u>Capacity</u></p> <p>Making capacities - accurately using measuring equipment. Develop pupil's problem solving skills. What if they do not have enough? Or too much? Represent this as addition and subtraction calculations.</p>	<p><u>Capacity</u></p> <p>Use and apply</p> <p>Use and apply: Following a recipe to make capacities.</p> <p>Challenge to double / half ingredients to make a bigger or smaller batch.</p>	<p><u>Weight</u></p> <p>Recap: Weighing. Have a look at every day ingredients. Which weighs more? How do we know?</p> <p>Weighing and ordering weights using measuring tools.</p>	<p><u>Weight</u></p> <p>Weighing everyday items in grams/kilograms.</p> <p>Create different weights. Add weights.</p> <p>Converting kilograms to grams.</p>	<p><u>Weight</u></p> <p>Reading/making weights in a recipe.</p> <p>Use and apply: Following a recipe.</p> <p>Challenge to double / half ingredients to make a bigger or smaller batch.</p>
<p>Link to statistics</p> <p>Number skills</p>	<p>Link to addition/subtraction skills</p> <p>Problem solving</p>	<p>Using independence skills.</p> <p>Multiplication/division/fraction skills</p>	<p>Link to statistics</p>	<p>Link to addition/subtraction skills</p>	<p>Using independence skills.</p> <p>Multiplication/division/fraction skills</p>