Spring Block 2

Mass and capacity

White Rose MATHS

Teacher guidance

Key books

- *Who Sank the Boat?* by Pamela Allen
- *Balancing Act* by Ellen Stoll Walsh
- *A Beach for Albert* by Eleanor May

Key resources

Top tips

- Providing different kinds of balance scales can support children to explore mass in their play and investigate objects in different ways.
- Enhancements to provision involving mass, such as a post office or bakery, can support the learning in this block.
- Taking learning outdoors encourages children to make their own balancing materials. Use equipment such as guttering to help children to actively explore finding a balance or not finding a balance in different contexts.
- Explore capacity of spaces using children as the non-standard unit: how many can fit in a hoop, on the carpet, or in the sandpit?

Small steps

Step 1	Compare mass
Step 2	Find a balance
Step 3	Explore capacity
Step 4	Compare capacity

Compare mass

Notes and guidance

In this small step, children build on their learning of simple comparisons from the autumn term to now make more precise comparisons using different units. Children may still be more familiar with the word 'weight' and there is no harm in using this interchangeably with the word 'mass'.

Children will become more familiar with using balance scales and distinguish between the different quantities on either side. Use different kinds of scales so children do not think there is only one way to compare mass. It is important to provide a range of resources to explore, including loose parts, so that children can investigate the mass of different objects.

Encourage children to make their own water vehicles such as boats and explore floating and sinking activities. Experiment with the concept of mass by putting in and taking out objects or animals, linking to stories.

Books

- *Who Sank the Boat?* by Pamela Allen

Key questions

- Which object is heavier? How do you know?
- Which object is lighter? How do you know?
- What has happened to the balance scale?
- Which objects will float/sink?

Possible sentence stems

- The _____ is heavier/lighter than the _____.
- I think the _____ is heavier/lighter than the _____ because...
- The heavier/lighter object is _____ on the balance scale.

Links to the curriculum

- *Development Matters* – Reception – Compare length, weight and capacity.
- *Birth to 5 Matters* – Range 6
  - Enjoys tackling problems involving prediction and discussion of comparisons of length, weight or capacity, paying attention to fairness and accuracy
  - Becomes familiar with measuring tools in everyday experiences and play

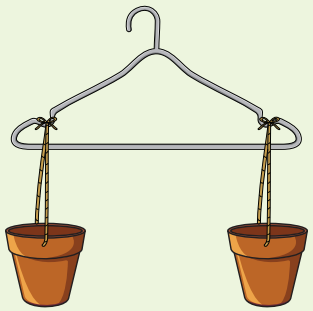
Compare mass

Adult-led learning

Provide two objects, one heavy and one light, and place them on a balance scale. Explain that the heavier object is lower on the balance scale. The lighter object is higher on the balance scale.

Repeat with different objects and encourage children to estimate which will be heavier and which will be lighter. Test their predictions.

Build a home-made balance scale outside using a coat hanger and pots, or a piece of guttering and a crate.



Use the scale to explore which items are heavy or light. How do they know? Prompt children to put more than one object on each side and explore what happens.

Read stories such as *Who Sank the Boat?* by Pamela Allen. Provide children with recyclable junk modelling resources to build their own boats. How many small world characters can they fit in the boat before it sinks?

Prompt children to explore whether this changes for different combinations of animals.

Provide children with a variety of number shapes. Prompt them to explore what happens when they place the number shapes on a balance scale. Support children to notice that the greater the number, the heavier the number shape.

Find a balance

Notes and guidance

In this small step, children will further explore mass and progress to discovering how to find a balance. Prompt children to recognise that the scales are balanced when the objects on each side have the same mass. Explore measuring different objects to see which ones balance and encourage children to say why.

Explain that the line across the balance scale needs to be straight, using gestures to emphasise the horizontal line. Emphasise to children that when balancing a scale, both sides need to have an equal mass.

Task children with exploring how different objects balance and how more than one lighter object will be needed to balance a heavier object. Prompt children to say how many lighter objects balance with one heavier object. Compare to see if there are more or fewer objects on each side of the scale.

Books

- *Balancing Act* by Ellen Stoll Walsh

Key questions

- Which object is heavier/lighter?
- What has happened to the balance scale?
- Which side needs more/fewer to make the scale balance?
- What does it mean when the scale is balanced?

Possible sentence stems

- The scale is balanced because...
- The mass of the _____ is _____ cubes.
- I know the _____ is heavier/lighter than the _____ because...

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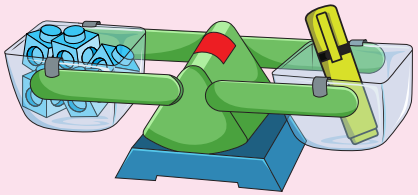
Find a balance

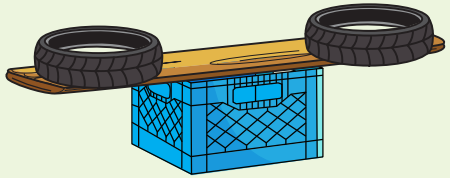
Adult-led learning

Place classroom objects on a balance scale. Add cubes to the other side until the scale is balanced and point out what this looks like.

Prompt children to count how many cubes made the scale balance. Will they need more or fewer cubes to make a different object balance the scale?

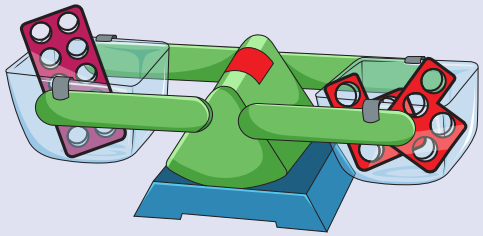


Make a home-made balance scale using objects such as a plank on a crate and explore which objects balance the scale.



Explore how many bricks it would take to make the scale balance with larger objects.

Place one number shape on a balance scale. Encourage children to find a way to balance the scale using different number shapes.



Encourage children to find different ways to make the scale balance.

Deepen understanding by providing objects such as a large feather and a small pebble to address the misconception that larger items are always heavier.

Prompt children to predict which object will need more cubes to balance the scale.

Encourage children to test their predictions.

Explore capacity

Notes and guidance

In this small step, children build on their understanding of 'full' and 'empty' to further investigate different capacities and how they relate to each other. They will explore how non-standard units can be used to measure capacity.

Ensure a range of resources are available in provision so that children can explore capacity easily and build on more complex comparisons in their language and play. Encourage children to use the language 'tall', 'thin', 'narrow', 'wide' and 'shallow' when describing containers and prompt them to experiment filling these using other sized containers. Allow children to use different materials such as water, rice, sand and beads to explore the containers' capacities.

Rhymes

- *There's a Hole in My Bucket*

Books

- *A Beach for Albert* by Eleanor May

Key questions

- How many _____ does the container hold?
- How can you measure the capacity of the containers?
- How many _____ are needed to fill the container?
- Will the container hold more or less _____ than _____?

Possible sentence stems

- The container holds more/less _____ than _____.
- The _____ has the same capacity as _____ cubes/pine cones/marbles.

Links to the curriculum

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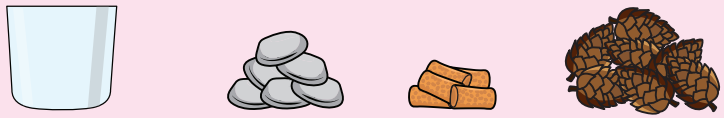
Explore capacity

Adult-led learning

Read stories such as *A Beach for Albert* by Eleanor May. Ask children to make a beach for small world animals. Provide a selection of containers to transport water to their beach. Include one with holes in, one that is too small and one that will be too big/heavy.

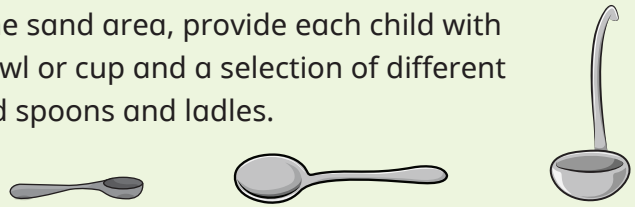
Ask children to predict which container will be the most suitable and then check to see.

Prompt children to explore filling a container with different loose parts, such as pine cones, stones and corks.



Support children to notice whether the container can hold more of one object than another object.

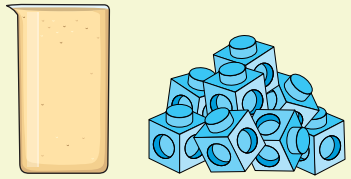
In the sand area, provide each child with a bowl or cup and a selection of different sized spoons and ladles.



Ask them to investigate how many small spoonfuls it takes to fill their container. How many large spoonfuls does it take? How many ladles does it take? Which sized spoon was the best? Why?

Encourage children to first fill a container with cupfuls of sand and then fill another container of the same size with cubes.

Prompt them to talk about which is the most suitable to measure the capacity of the container.



Support children to notice that there are gaps in between the cubes, but the sand completely fills the container.

Compare capacity

Notes and guidance

Children will continue to explore capacity in this small step and will move on to making comparisons. Encourage children to make direct comparisons by pouring from one container to another.

During activities and in provision, prompt children to use smaller pots or ladles to make indirect comparisons by counting how many of one container it takes to fill another. Children can then order the containers from the smallest capacity to the greatest capacity.

Ensure children are provided with opportunities in the outdoor provision to compare the capacity of larger containers. Mud kitchens, sand and water areas all provide opportunities for both direct and indirect comparisons outdoors.

Enacting scenarios such as 'sabotaging snack' in provision can support further discussion and discovery of comparing capacity. For example, all the cups or bowls are different sizes.

Books

- *A Beach for Albert* by Eleanor May

Key questions

- How many _____ of _____ can the container hold?
- Which container has the greatest/smallest capacity?
- What could we use to measure the capacity?
- Does this container hold more or less? How can you find out?

Possible sentence stems

- The container holds _____ cupfuls/spoonfuls of _____.
- The _____ holds more/the most.
- The _____ holds less/the least.

Links to the curriculum

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Compare capacity

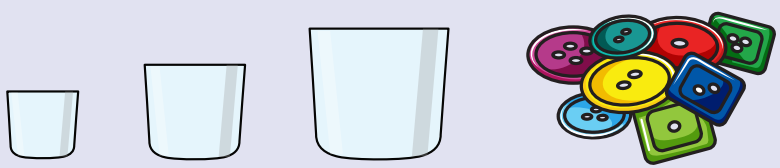
Adult-led learning

Provide a selection of containers of different shapes and sizes and ask children to investigate which holds the most water.

Children could use a small cup to fill each container, counting how many cupfuls the containers hold.

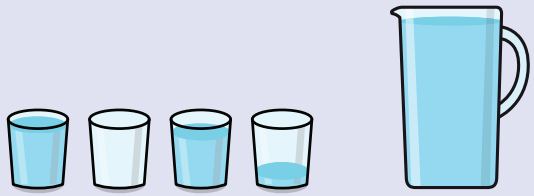
Place the containers in order from the smallest capacity to the greatest capacity.

Provide sets of similar containers in different sizes, such as sets of nesting bowls or boxes. Prompt children to fill the containers with objects such as cubes, buttons or marbles.



Encourage children to compare and order the capacities of the different containers.

At snack time, provide each child with a cup. Ask them to make their cup full, empty, nearly full and nearly empty.



Prompt them to find a container that holds more water than their cup or a container that holds less water than their cup.

Provide children with a tall, thin container and a shallow, wide container.

Ask them to predict which will hold more water.

How could they check? Encourage children to try different methods and prompt them to record the capacity of each container.

To extend further, more containers could be added, and children could order them from the smallest capacity to the greatest capacity.

Continuous provision

Follow a recipe to bake a cake. Weigh out the ingredients using a balance scale with one or two eggs on one side.

Add flour to the other side until the scale is balanced.

Repeat this to weigh the sugar and butter, prompting children to notice when the scale is balanced each time.

Provide a variety of pans, bowls, spoons and ladles.

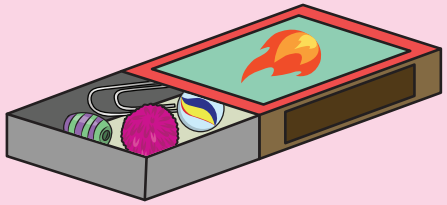
Add daily recipes on a chalkboard and encourage children to measure out cupfuls and spoonfuls of ingredients.

They could also design and create their own recipes.

Set up a pulley system outside. This could be a basket attached to a rope over a tree branch.

Explore how the mass of the basket changes as different objects are placed inside.
Which objects are harder to pull? Which are easier to pull?

Provide children with a small, empty matchbox each.



Ask them to hunt for things to put inside their matchbox. How many objects do they need to fill their box?

End of block checkpoint

Checkpoint 1

Can children use the language 'heavy' and 'light' to explore and compare mass when playing?

Observe children as they play in provision. The dough and construction areas provide great opportunities to support this.

Are children able to describe what they notice when they place objects on a balance scale?

Are they able to find a balance?

Checkpoint 2

In the snack area, provide a variety of jugs of milk and some beakers. Encourage children to take drink orders and make these for other children in the class.

Are they able to use the language 'full', 'empty', 'nearly full' and 'nearly empty'?

Checkpoint 3

Observe children in continuous provision as they explore and compare capacity. The sand, water and mud kitchen provide great opportunities to support these skills.

Encourage children to explore how much water or sand (or how many objects) different containers hold.

Can children predict how many of one container it takes to fill another? Can they explore which containers hold more and explain why?