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Year 1

Small Steps Guidance and Examples

Block 4: Weight & Volume

White Rose Maths

Year 1 – Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value (within 10)				Number: Addition and Subtraction (within 10)				Geometry: Shape	Number: Place Value (within 20)		Consolidation
Spring	Number: Addition and Subtraction (within 20)				Number: Place Value (within 50) (Multiples of 2, 5 and 10 to be included)			Measurement: Length and Height		Measurement: Weight and Volume		Consolidation
Summer	Number: Multiplication and Division (Reinforce multiples of 2, 5 and 10 to be included)			Number: Fractions		Geometry: position and direction	Number: Place Value (within 100)		Measurement : money	Time		Consolidation

Overview

Small Steps

- Introduce weight and mass
- Measure mass
- Compare mass
- Introduce capacity
- Measure capacity
- Compare capacity

NC Objectives

Measurement: Weight and Volume
Measure and begin to record mass/weight, capacity and volume.

Compare, describe and solve practical problems for mass/weight: [for example, heavy/light, heavier than, lighter than]; capacity and volume [for example, full/empty, more than, less than, half, half full, quarter]

Introduce Weight & Mass

Notes and Guidance

Children are introduced to weight and mass for the first time. They may already have concepts about mass from own personal experience of carrying objects.

The use of balance scales is essential to form an understanding of comparing mass, they should be allowed to pick up and feel the mass of objects before putting them on the scales and seeing what happens.

Mathematical Talk

Hold my two objects, which is heavier/lighter? How do you know?

How can we prove this?

If the balance scale is down, what does that tell us?

If the balance scale is up, what does that tell us?

If the balance is level, what does that tell us?

Which of these objects is heavier? How do you know?

Can you predict what the scale will do when I put these two objects on either side of the scale?

Varied Fluency

- Using balance scales, compare and model how objects around school can be heavier or lighter than others.



Which object is heavier? Which object is lighter?

The is heavier/lighter than the .

- Fill in the missing gaps to make the sentences correct.



The is heavier than the .

The is lighter than the .

The is equal to the .

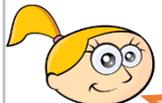
- Collect different objects from around your classroom. Use a balance scale to find the heaviest object. Can you find 2 objects that are equal in mass?

Introduce Weight & Mass

Reasoning and Problem Solving

The class are seeing whether the balloon or apple will weigh more.



 Kate: The balloon will go down because it is bigger than the apple.

 Jessica: The balance will be level because they are both red.

 Jack: The apple will go down because it is lighter.

 Kenny: The balloon will go up because it is lighter.

Who is correct? Explain why.

Kenny is correct. Jack is wrong because he has said lighter but the scale will go down.

Children may also explain why the other's are incorrect.

I'm thinking of an object. It is heavier than a pencil, but lighter than a dictionary,



Will

What object could Will be thinking of? Prove it. How many objects can you think of?

Children will use a balance scale to find objects that are heavier than a pencil, then to check that their chosen objects are lighter than the dictionary.

Examples may include: a bottle of water, pencil pot etc.

Measure Mass

Notes and Guidance

Children learn to use non-standard units (e.g. cubes, bricks) to weigh and compare the mass of an object.

Children use a non standard unit and recognise this stays the same to weigh the mass of an object. They use the non standard unit of measure to make the scales balance to work out how much an object weighs. Children learn that a non-standard unit of measure could be any object.

Mathematical Talk

When the scales are balanced, what does this mean? Can anyone think of any symbols we use in maths that are similar?

If I add one more cube to this side, what will happen?
How do you know? What if I take a cube away?

What other objects could we use to weigh the mass of something?
Which object do you predict will be heavier?

Varied Fluency

- 1 Use everyday objects e.g. banana, apple, book etc. Using a non standard unit of measure e.g. cubes, bricks etc, investigate how much each object weighs. Use the sentences to describe your investigation.

The object weighs *cubes/bricks*.
I need more/less to make the scales balance.

- 2 Weigh an object e.g. a book, using cubes and then weigh the same object using bricks. What do you notice? Complete the sentence using the words; *heavier, lighter, more, less*

The the non standard unit of measure, the units are needed.

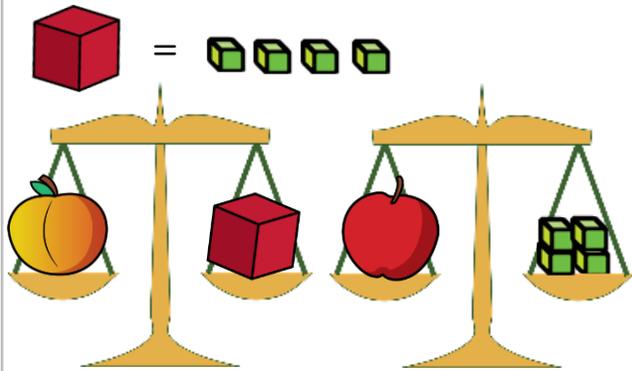
- 3 Using other non-standard units, weigh and compare the mass of an object in relation to another object.

For example: 1 peach
weighs the same as
4 pencils



Measure Mass

Reasoning and Problem Solving



Possible answer

I agree with Jack, because 1 brick weighs the same as 4 cubes so the apple and the peach weigh the same.

Raj says,



The apple is heavier than the peach, because it weighs 4 cubes.

Jack says,



The apple and the peach weigh the same.

Who do you agree with?
Explain why.



How many cubes does the teddy bear weigh?
Explain how you know.

The teddy bear weighs 5 cubes. I can take 1 cube off of each side of the scale and it will still balance.

Compare Mass

Notes and Guidance

Children continue to use non-standard units to weigh objects and now focus on comparing the mass of two objects. They use balance scales to compare two objects and use the language of 'heavier', 'lighter' and 'equal'.

Once children are confident using this language they can use < and > to compare mass.

Mathematical Talk

How many cubes weigh the same as _____? Which object is heavier? Which object is lighter?

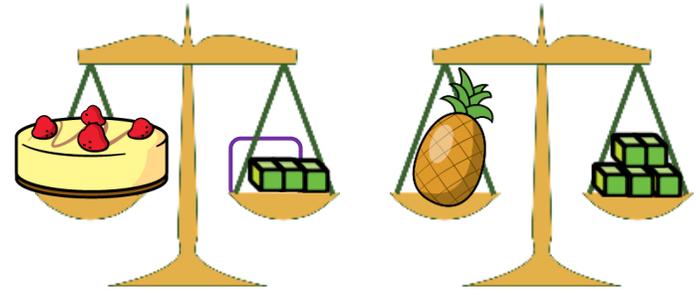
Which object do you predict will be heavier/lighter?

Can we order the objects from heaviest to largest?

Can I weigh this object with cubes and this object with bricks and order them? Explain why.

Varied Fluency

- 1 Complete the sentences below.



- 2 One cake weighs roughly cubes.
 One pineapple weighs roughly cubes.
 A cake is than a pineapple. (*heavier/lighter*)

Find and weigh 4 objects, finding their mass in cubes. Order them from lightest to heaviest.

- 3 Can you order the objects from heaviest to lightest?



= 3 pencils

Ball



= 8 pencils

Teddy Bear

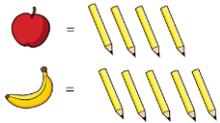


= 4 pencils

Sock

Compare Mass

Reasoning and Problem Solving



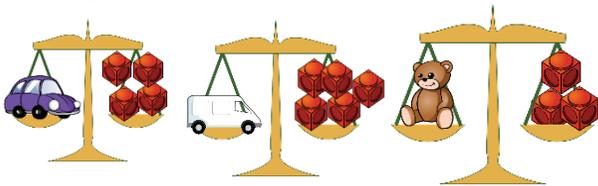
How many sentences can you write about the banana and the apple?

Possible responses:
Banana weighs one more pencil than the apple.
The apple is lighter than the banana.

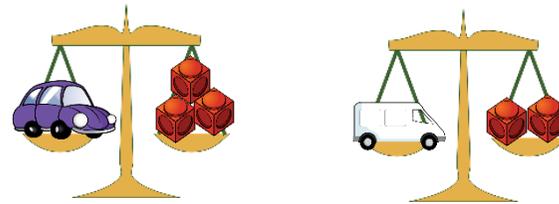
Can you match the clue to the images?

- My object weighs more than the car.
- My object is less than 5 cubes.
- My object is not the heaviest or the lightest.

- Van
- Teddy
- Car



Look at the balance scales below.



Which statements are true?

- The toy car is heavier than the van.
- The van is heavier than the car.
- The car is lighter than the van.
- The van is lighter than the car.
- The car and van weigh the same amount.

The car is heavier than the van.
The van is lighter than the car.

Can you make your own version for your partner?



Introduce Capacity

Notes and Guidance

Children are introduced to capacity. They explore the concept in a practical way, using a variety of containers. They compare the volume in a container by describing whether it is full or empty and use 'greater than' and 'less than' to further describe the volume.

Children understand that when a container is full, the capacity is equal to the volume but when the container is empty the capacity is the same but the volume is zero.

Mathematical Talk

Look at my bottle, is it full? Is it empty?

Compare my two bottles, which has more liquid in? Which has less?

How can we show the container is nearly full or nearly empty?

What's the same? What's different? If the container is different can we compare the volume easily? Why?

Varied Fluency

- 1 Use different containers filled with liquid or rice. Use the words and sentence stems to describe the volume and capacity.

full

empty

greater

less

The container is _____.

The amount of liquid in container 1 is _____ than the amount of liquid in container 2

- 2 Using a container and rice, show me:

- A full container
- A nearly full container
- An empty container
- A nearly empty container
- A half full container
- More than half full container

- 3 Match the sentence to the correct image.



The container is full.

The container is empty.

The container is half full.

The container is more than half full.



Introduce Capacity

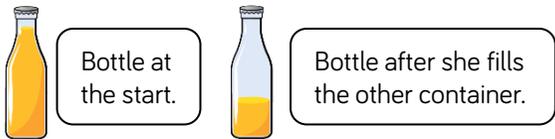
Reasoning and Problem Solving

Always, Sometimes. Never

The tallest container holds the most liquid.

Identical containers can have a different capacity.

Mary has a full bottle of orange. She fills another container with the orange.



Which has a larger capacity - the bottle or the container? Explain how you know?

Sometimes.

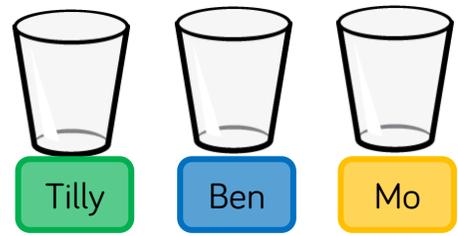
Never. If the containers are identical they will have the same capacity but can have different volumes of liquid in.

The bottle must have a larger capacity because Mary filled the container and the bottle has some orange left over.

Tilly, Ben and Mo are describing their glasses of water.



Can you fill in how much water could be in each of the children's glasses?



Label each glass using 'full', 'empty', 'nearly', 'half full' or 'quarter full'

Various representations for Tilly's and Mo's as long as they show that Mo's is less than Tilly's and Tilly's is more than half full.

Measure Capacity

Notes and Guidance

Children find the capacity of different containers using non standard units of measure. They understand to measure the capacity of a container the unit of measure must stay the same, for example the same cup, the same spoon etc. They explore the difference between capacity and volume by also measuring how much liquid can fill a container compared to how much liquid is in a container.

Mathematical Talk

How can we measure how much liquid will fill my container?
What could I use?

Can I start measuring the capacity with a spoon and then switch to a jug? Why not?

How many bowls of liquid fill the bottle?
How many cups of liquid are in the bottle?
How is this different? How is this the same?

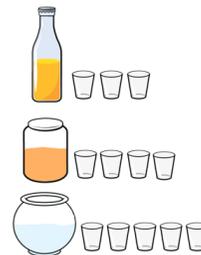
Varied Fluency

- 1 Take three different containers. Fill each container with liquid or rice using; a spoon, a cup, a large jug. Discuss which unit of measure will take more/less to fill each container.
- 2 Choose five different containers from your classroom. Predict which container will have the largest/least capacity.

Using a consistent unit of measure, complete the sentence for each container.

The capacity of the is units.

- 3 Measure the volume of liquid in each one using glasses as the unit of measure.



The volume of liquid in the bottle is about units.

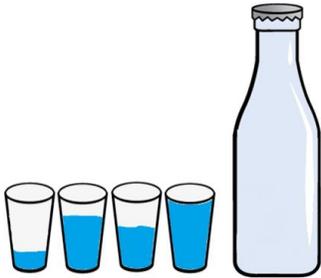
The volume of liquid in the jar is about units.

The volume of liquid in the bowl is about units.

Measure Capacity

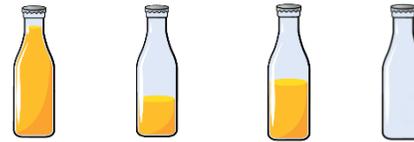
Reasoning and Problem Solving

Milly measures the capacity of the bottle. She says the bottle has a capacity of four cups. Do you agree?



Milly is wrong. She hasn't filled the cups to the top so her measuring is inaccurate.

Match the statement to the correct bottle.



A B C D

- The volume of orange is 0 cups.
- The volume of orange is the same as the capacity of the bottle.
- The volume of orange is about 2 cups.
- The volume of orange is more than 2 cups.

- D
- A
- B
- C

Compare Capacity

Notes and Guidance

Children compare the capacity of different containers using non standard units of measure.

They use 'more', 'less' and 'equal' to compare volume and can use the symbols $<$, $>$ and $=$ once they are confident using the correct language.

Mathematical Talk

Which container has the largest/smallest capacity?
Can we order them from largest to smallest?

Which container has the most or least volume?

Look at these two containers, can we compare them?

Can we show A has more than B but less than C?

Varied Fluency

- 1 Take three different containers.
Fill each container with liquid or rice using the same unit of measure e.g. cup.
Which container holds the most? Which container holds the least?
Order the containers from largest to smallest capacity.

- 2 Use the words 'more' or 'less' to compare the containers.



A B

A has _____ than B.



A B

A has _____ than B.

- 3 Colour in the bottles to show:



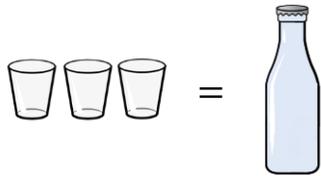
A B C D

- A has more volume than B but less than C.
- C has the same volume as D.

Compare Capacity

Reasoning and Problem Solving

If



Circle whether the glasses or bottles hold more in each row:

A		
B		
C		

A		
B		
C		

Jan has a bottle of juice. There is some juice left in the bottle.



The bottle holds exactly three glasses of juice.



Do you agree? Explain why.

I disagree. Jan has filled three glasses exactly but there is still juice left so she could have filled more than 3.