



Makes Maths Fun

# Level 5 MASS

Bloomsmath is a comprehensive mathematics program which provides a fun way for every student to be learning to the best of their ability.

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## Mass

Level 5 is designed for students in their fifth year at school often called Year 4. Students will estimate, measure, compare and record masses using kilograms and grams.

**Knowledge:** Students will read and order a set of scales.



Students who demonstrate proficiency in this activity move on to Comprehension.



Students stop here as they require additional teacher support to master this activity.

**Comprehension:** Students will suggest methods whereby they can use known weights to find unknown weights.



Students who demonstrate proficiency in this activity move on to Application.



Students stop here if time has run out or they require additional support with this activity.

**Application:** Students will solve the puzzle "The Full Fuel Fiasco".



Students who demonstrate proficiency in this activity move on to Analysis.



Students stop here if time has run out or they require additional support with this activity.

**Analysis:** Students will test their theory using 8 similar and 1 different weight.



Students who demonstrate proficiency in this activity move on to Synthesis.



Students stop here if time has run out or they require additional support with this activity.

**Synthesis:** Students will find 1 heavier weight in a set of 12 items in the fewest weighs possible and then order 6 unknown masses.

**Evaluation:** Suggested questions provide a starting point for discussions related to Mass.



Students may complete more or fewer activities for each learning outcome depending on the time allocated and their strength in the area being covered.

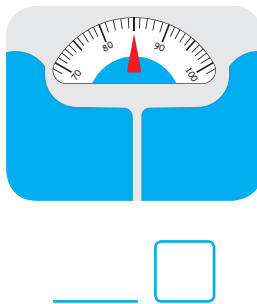
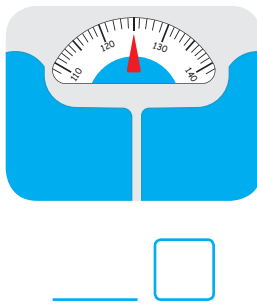
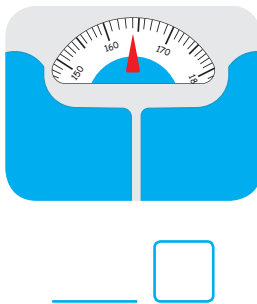
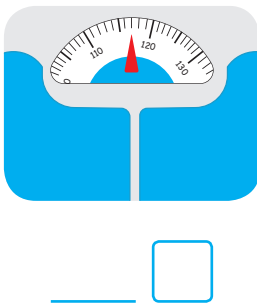
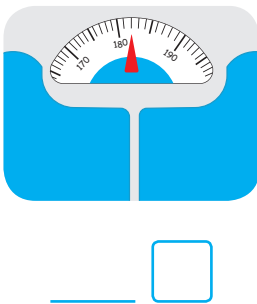
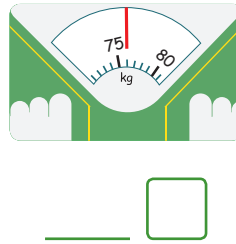
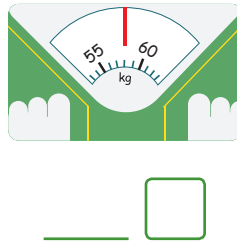
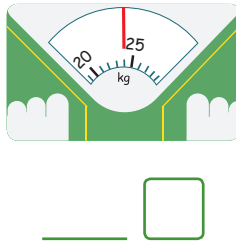
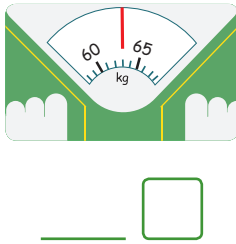
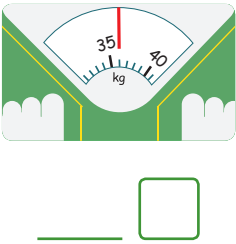
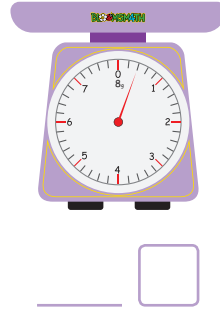
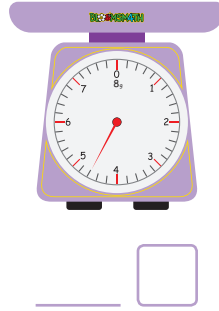
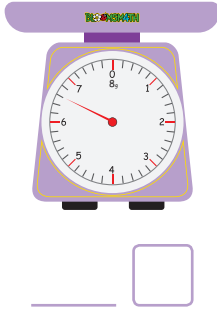
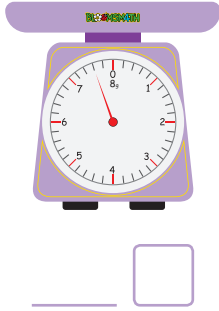
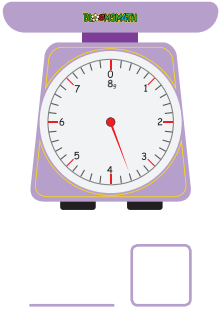


All students should participate in the Evaluation discussion to encourage the use of mathematical language, logical reasoning and reflection on that which they have completed.

Name: \_\_\_\_\_

# Knowledge

Read and record each scale below and then use the box next to each weight to order them from **1 lightest** to **5 heaviest**.



Let's Try This Again



Progress To Comprehension

Name: \_\_\_\_\_

# Comprehension

It is possible to order 3 items by weight using a lever arm twice. See if you can order these items and then check with scales to see if you were correct.

Set 1: Apple, water bottle, scissors

Estimated Heaviest Item: \_\_\_\_\_ Estimated Lightest Item: \_\_\_\_\_

	Side 1	Side 2
Weigh 1		
Weigh 2		



Now use a set of scales to see if you were correct.

	Weight	Order 1 Lightest to 3 Heaviest
Apple		
Water bottle		
Scissors		

Actual Heaviest Item: \_\_\_\_\_ Actual Lightest Item: \_\_\_\_\_

Repeat this with a new set of items of your choice.

Item 1: \_\_\_\_\_ Item 2: \_\_\_\_\_ Item 3: \_\_\_\_\_

Estimated Heaviest Item: \_\_\_\_\_ Estimated Lightest Item: \_\_\_\_\_

	Side 1	Side 2
Weigh 1		
Weigh 2		



Now use a set of scales to see if you were correct.

	Weight	Order 1 Lightest to 3 Heaviest
Item 1		
Item 2		
Item 3		

Actual Heaviest Item: \_\_\_\_\_ Actual Lightest Item: \_\_\_\_\_



Let's Try This Again



Progress To Application

Name: \_\_\_\_\_

# Application

See if you can solve the "Full Fuel Fiasco" puzzle below.

## The Full Fuel Fiasco

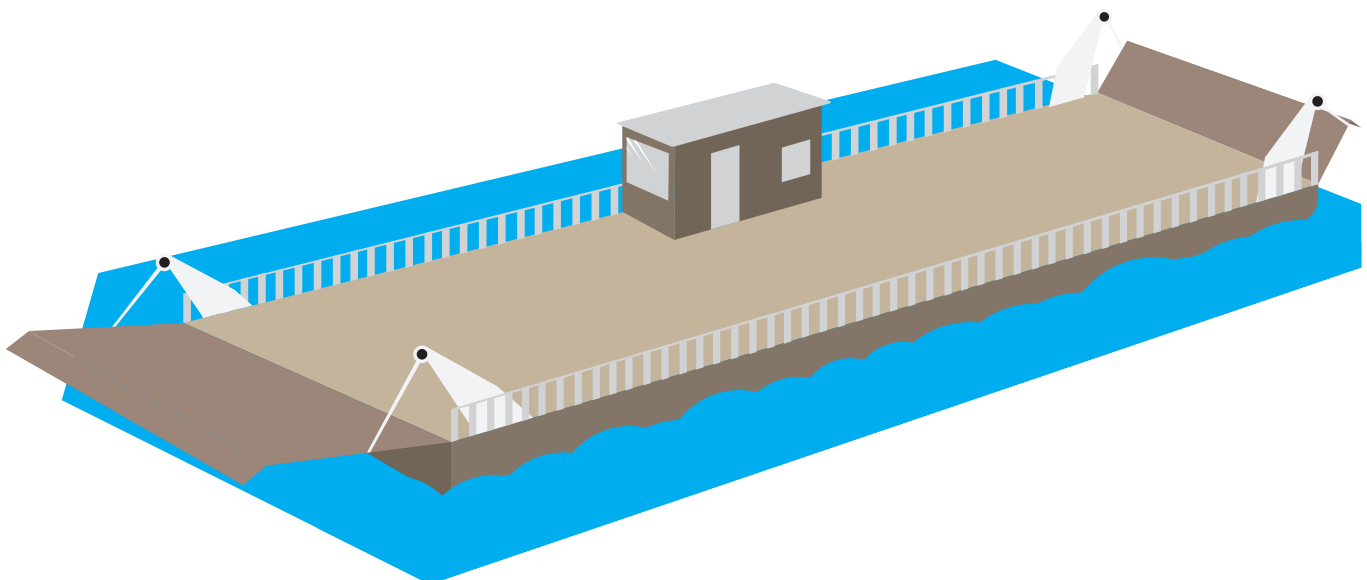
There was a barge that used to let people cross the local river.

The problem was that if too many cars were put on the barge at one time it might sink. The barge operator knew that if the cars wanting to cross the river had full fuel tanks they could carry eight cars but if the fuel tanks were closer to empty nine cars could be put on the barge and it would still float.

One morning the barge operator arrived to find that there were nine vintage cars parked waiting to cross the river but they were not sure how full each tank was as the petrol gauges of all the cars had stopped working. The problem was the barge had to run on time and the barge operator did not have time to drive every car onto the barge individually to see how much lower it would make the barge in the water.

The barge operator's wife knew that an empty car would obviously weigh less than a car with a full tank of petrol and that weighing the cars quickly was essential. She suggested that she could find the car with the suspected full tank in just two weightings. How could the barge operator's wife use the barge as a double-sided scale to determine if one of the cars had a full petrol tank in only 2 weightings?

Draw pictures below to demonstrate how she could have weighed the cars.



Let's Try This Again

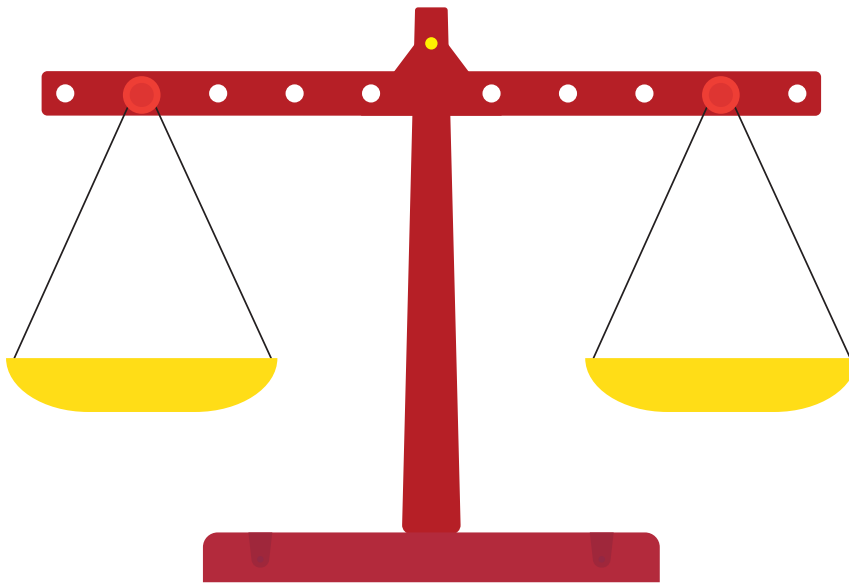
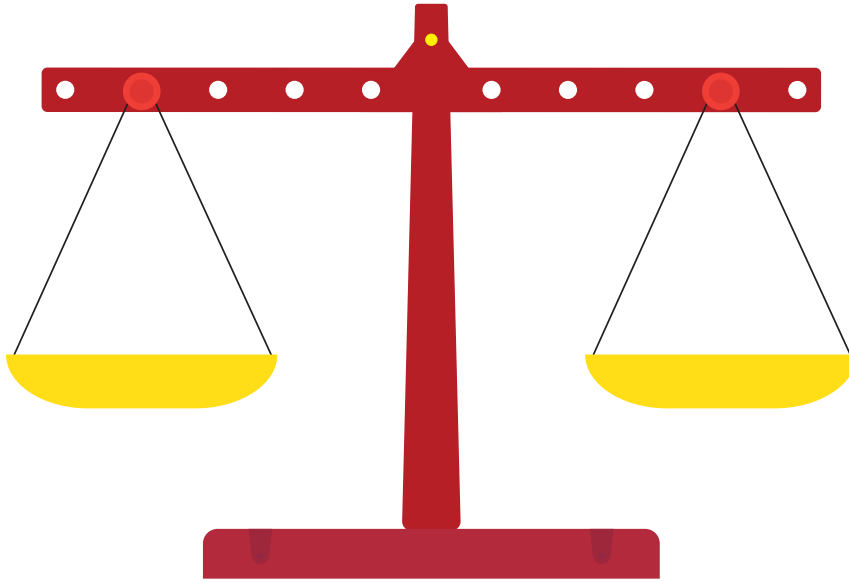


Progress To Analysis

Name: \_\_\_\_\_

# Analysis

Use your solution from the previous Application task, a lever arm scale and 9 items where 8 are the same and 1 is different such as 8 x 100 unifix flats and 1 x 1000 unifix cube and see if your theory actually works.



Mass - Level 5 - Students will estimate, measure, compare and record masses using kilograms and grams.

Knowledge

Comprehension

Application

Analysis

Synthesis

Evaluation



Let's Try This Again



Progress To Synthesis

Name: \_\_\_\_\_

# Synthesis

Using the same principle as before how could you find 1 heavy weight from 12 weights in just 3 weighings?

Draw your explanation below.



Imagine this time that you have just 6 items but you must order them from lightest to heaviest. What is the least number of weighings you could do to order them correctly? Use the space below to test your theory.



Let's Try This Again



Progress To Evaluation

# Evaluation

The following questions and activities are provided as a starting point for fun discussions related to Mass. During these conversations students will have an opportunity to use appropriate mathematical language in its correct context, to engage in reflection on the Mass activities they have completed and to use logical reasoning to tie their in-class mathematics to its everyday context.



Use the internet to research machines which measure a coin's weight to establish the value of a group of coins in a bank.



See if students can devise their own machine to weigh 3 different items and know how many 600ml water bottles, 10g glue sticks and paper clips there are in a pre-weighed box. (Choose 3 items of drastically different masses so they can see 100s of grams, 10s of grams and gram weights).



Have students explain how they can weigh lots of items in a few weighs if they know that just 1 item is different.



How would this system change if the items need to be ordered rather than an odd item found?



How can very heavy or very large items be weighed when they can't be put on scales?



What are the largest and smallest measures of mass?

