Years 6-8 Diagnostic Test

Whole class oral test: Key Number Concepts

The following 4 questions focus on testing Place Value, Multiplicative Thinking and Proportional Reasoning, all of which lead into algebraic reasoning. This should enable you to put students into 4 groups. Group 1 should use the 3-5 test. Advice follows for groups 2-4. Remember that the whole class testing is not always accurate as students make errors. If you think that a student has ended up in the wrong group then repeat the questions later, adapting them for each group as necessary, to find out what they understand. Record your findings in the Recording Sheet on the final page.

Group 1: 0 or 1 correct

Try 3-5 test

Group 2: 2 correct

Whole Class

1. *Draw blank number line 1-1000 across a page.* "Where does 10 go? Write it on please. How about 100?" (**E and H, 3 digit**)

2. *Take an A4 piece of paper. Fold both ends into the middle, then open it out.* "What fraction have I made? Please draw what I have made and write on the fractions." (**E and J, base-two fractions**)

3. "*Draw what 5 multiplied by 4 looks like - not the answer, what it means... Now do the same for 5 divided by 4.*" (**I and J, single digit terms**)

4. *Show 2 tens and 3 ones, tens on the <u>left</u>.* "How much is this?" *Swap the tens to the <u>right</u>.* "How much is this?" (**B, 2 digit**) "Using this as 23, can you please draw for me what 23.7 would look like?" (**C and J, decimals**)

Group 3: 3-4 correct but answered 3 with groups, remainders or struggled with any

Group 4: all correct easily

Record student names or initials in the appropriate groups:

	Correct	Multiple attempts	Incorrect
1. **Number line 1-1000.** Shows base-ten placement, not base-two, equally distant, or 100 one quarter of the way along the time.			
2. **A4 folding of one half and two quarters**. Not "uneven thirds", three quarters, or a half and two thirds.			
3. **5x4 as an array** (groups ok, but not ideal). **5÷4** as groups or array, with **1.25 or 1 ¼** (remainder not ideal)			
3. **23.7 Decimals are smaller than ones, decimals are base-ten**. Not whole blocks with a dot, not cutting into base-two fractions or sevenths.			

Group testing:

Refer to recording sheet on following pages for what the letters mean.

Group 1

Use the 3-5 testing pages to find out what students understand. You could try written test 2 for the Years 3-5 if you don't want to do the oral test.

Group 2

Written test 1 (over page, roughly year 3-4 standard). If written test 1 is too easy, try test 2. You may need to adapt the questions. Most questions are year 3 standard, however 5÷4 is year 4 standard (remainders), and if they answer with quarters or as a decimal then that is year 5.

Group 3 and Group 4

Written test 2 (over page, most questions are years 4-5 standard, last question is year 6), then written test 3 if only very minor mistakes. Written test 1 if they find 2 too difficult.

If students are <u>mostly</u> successful at test 3 then they should be ready to resume years 7-9 maths without additional intervention.

Recording sheet

Using the information collected, work out what stage each child fully understands (listed below). Work on the next stage. In sequence the stages for quantities for all sections below excluding I are: 3, 4-5, 6-7, 8, 9-11, 12, 13-20, 2 digits, base-two fractions, 3 digits, integers, simple fractions, decimals, any positive fractions, conversions, generalisation to equations and balance. For I stages are: single digit numbers, 12-20, single digit terms, remainders for division, simple fractions or decimals for division, any size terms

Record a quantity in each box for which a child can consistently and successfully complete the task										
Name	A. Collect this amount from a box	B. Conserve when visible	C. Draw in a structure when covered	D. Conserve when covered	E. Partition (simple)	F. Partition (complex)	G. Partition with one part hidden	H. Relative size and estimation	I. Multiplicative or structural thinking	J. Proportional Reasoning

Written test 1:

1. Look at the number line. Write on 2, 3 and 8 in their correct position. (**H, 9-11**)

```
◄─────────────────────────────────────────────────►
1                                                10
```
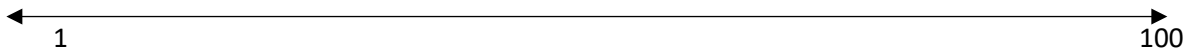
2. Each number sentence below has two boxes. They should have **the same number** in them to make the sums work. Fill in the boxes. (**G, 2 digits**)

   ☐ + 3 + ☐ = 31   ☐ - 4 + ☐ = 24

3. Look at the number line. Write on 10, 20, 80 in their correct position. (**H, 2 digits**)

```
◄─────────────────────────────────────────────────►
1                                                100
```

4. Draw an arrangement of counters or squares to show what these operations mean. (**I, single digit terms**)

   15 x 3   15 ÷ 3

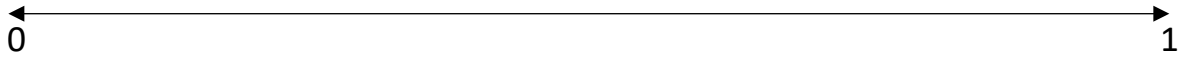   5 x 4   5 ÷ 4

5. Circle the quarters. Cross through any that are not quarters. (**J, base 2 fractions**)
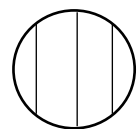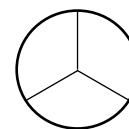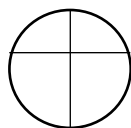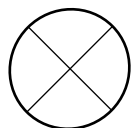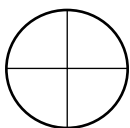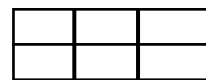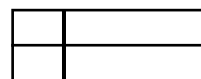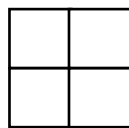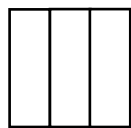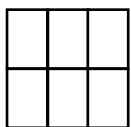
Written test 2:

1. Write these fractions on the line in their correct position: $\frac{1}{2}$ $\frac{1}{4}$ $\frac{2}{3}$ $\frac{3}{4}$

   Each is correct fraction is worth one point.
   (**H, simple fractions**)

   0 ⟵————————————————————————————————⟶ 1

2. Here is 3 made from MAB. Draw 3.6 made from MAB **(J, decimals)**

3. Draw 12 ÷ 5. You need to show WHY your answer is what it is, as the answer by itself counts for zero. If you can provide multiple correct representations, each is worth a point (up to 3 points total).

4. Draw lines to show how you would cut the rectangles below to make thirds. Each must be a different shape. Equivalent fractions don't count for any more points. Each correct representation of thirds is worth a point. Tick any that you know are correct, cross any that didn't work and write a question mark on any that you are unsure of.
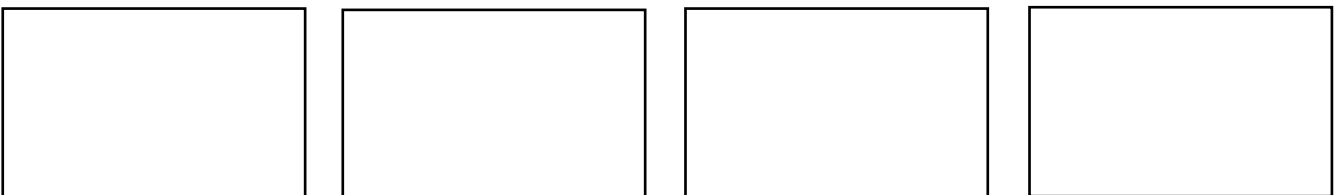
5. Find one half, one quarter and one third of the following if possible. Cross any not possible.

|	One half	One quarter	One third
12			
10			
8			
9			

Written test 3:

1. Write these fractions on the line in their correct position: $\frac{1}{2}$ $\frac{2}{3}$ $\frac{3}{2}$ $\frac{3}{4}$ $\frac{4}{3}$

   Each is correct fraction is worth one point.
   (**H**)

0   2

2. Write three fractions or percentages that are the same as 3.6 **(J)**.
   NB – adding zeroes on the end does not count so don't write 3.60

3.6 =

3. Draw lines to show how you would cut the rectangles below to make thirds. Each must be a different shape. Equivalent fractions don't count for any more points. Each correct representation of thirds is worth a point. Tick any that you know are correct, cross any that didn't work and write a question mark on any that you are unsure of.
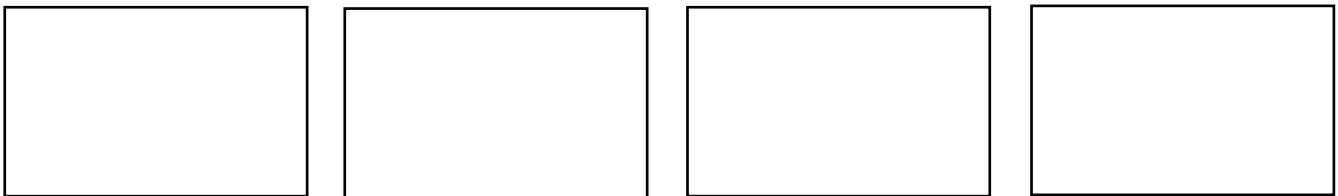
4. Find one half, three quarters and two thirds of the following if possible.

	One half	Three quarters	Two thirds
10			
8			
9			

5. A shop had a sale of 20% off. Fill in the blanks in the table below to show the full price and sale prices for items. **Show your working**. Use the back of this page if needed.

	Full price	Sale price
Shirt	$20	
Shoes		$20
Hat		$100